Saginaw Bay Watershed Initiative Network

Fisheries Scoping Study Report

July 27, 1999

Prepared by The Conservation Fund

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Executive Summary

Saginaw Bay and its tributary rivers are a vibrant and vital source of fishing opportunities in Michigan. Despite many challenges over the past century, the fisheries of this unique watershed continue to contribute significantly to the region's economy as well as its communities' sense of identity. The study revealed four primary factors limiting the health and appropriate public use of the fishery resource. They are (1) loss and degradation of fish habitat, (2) toxic contamination, (3) loss of fish passage in tributaries, and (4) lack of adequate public access. Each of these factors presents suitable opportunities for the Saginaw Bay Watershed Initiative Network (WIN). WIN can make a significant contribution by assisting groups already working in the watershed and by bringing together individuals and organizations to initiate new on-the-ground projects.

This Scoping Study Report is not intended to serve as an exhaustive review of the scientific literature on the watershed's fisheries or as a statistically rigorous sampling of public opinion. The purpose of the Report is to provide an overview of the health and history of the resource and a "snapshot" of public views and perceptions about the fishery. The Report also identifies project opportunities for WIN. These opportunities are outlined in the "WIN Opportunities" section below and are indicated by a ⇒ symbol in the margin. To take full advantage of these opportunities, WIN will require expertise from a variety of sources. The Conservation Fund recommends that WIN continue to seek partnerships with sub-watershed organizations, fishing clubs, and other grass roots conservation groups. One of the most promising findings of this study is the dedication of a wide variety of government agencies, private groups, businesses and individuals to improving the fisheries of the Saginaw Bay watershed.

Introduction

The Water Resource Task Group ("WRTG") of the Saginaw Bay Watershed Initiative Network has identified fishery enhancement as a primary focus for its initial work. The WRTG intends to identify areas where it can target its time and resources to make a tangible difference in the quality and public perception of water resources in The Saginaw Bay Watershed. The Group has concluded that fishery enhancement is an appropriate initial focus because (1) a broad cross-section of visitors and residents highly value fishing in the watershed; (2) to a large degree, the quality of the fishery is a 'shorthand' indicator of many of the environmental concerns it would like to address; and (3) fishery enhancement has direct linkages to the region's economic, environmental and community assets, making it a valuable demonstration of sustainability concepts.

The Conservation Fund: The Conservation Fund is a national, non-profit conservation organization that purchases and protects land – more than 1.6 million acres since 1985. The Fund also assists local communities, private individuals and organizations, and government agencies with programs that balance conservation with economic development. Current efforts include sustainable forestry, eco-tourism, greenway development, battlefield protection, watershed sensitive design, and community visioning.

The Fund has been active in the Great Lakes Basin since it opened a regional office in 1995. The initial focus of its work was the Great Lakes Watershed Initiative. This basin-wide effort to address nonpoint source pollution was conducted in partnership with the Council of Great Lakes Governors with major funding from the Great Lakes Protection Fund and Kraft Foods. The Fund has worked with many local partners to launch a network of community-based projects addressing nonpoint source pollution in urban and rapidly urbanizing areas in eight states and Canada.

Continuing the work begun in the Great Lakes Watershed Initiative, the Great Lakes office has helped to lead the Saginaw Bay Watershed Initiative Network. The Fund's goal is to help local residents engage businesses, community groups, and government agencies to better link the environmental and economic well being of Saginaw Bay communities. WIN is seeking to sustain and improve the region's overall quality of life. The Dow Chemical Company provides major financial support for The Fund's role in WIN.

The Scoping Study:

Goals: The WRTG commissioned this Study in order to understand more thoroughly both public perceptions about fisheries in the watershed and the status of those fisheries. This Report also identifies potential opportunities for projects to enhance the resource and improve public perception. Specifically the WRTG asked The Conservation Fund to answer the following questions:

1. What are commercial fishermen's perspectives about sustainable yields and catch limits in Saginaw Bay? (p. 7)
2. What are the primary conflicts between commercial operators and recreational anglers, and what other user conflicts exist? (p.7, 11)
3. What can be done to improve the fisheries? (with specific emphasis on gauging species preferences and infrastructure and access needs) (p. 8, 18)
4. What impact do fish consumption advisories have? How do people perceive and react to them? (p. 12)
5. How does the public view fishing licenses? Specifically what are their views on license cost vs. value, and catch limits? (p. 12)
6. What are the impacts of stream quality on the fisheries? (p. 18)
7. Can the public suggest promotional strategies that might be beneficial? (p. 24)

Each of these questions is answered in this Report. The page number on which the answer appears is indicated in parentheses after each question. The question itself appears in boldface type in the text of the Report.

Scoping Study Activities: To develop a practical, broad-based understanding of the status and public perceptions of fisheries in the watershed, The Fund conducted the Scoping Study in two concurrent steps: interviews with people on fisheries issues and a scientific literature review. With early assistance from WRTG members, The Fund developed a list of fisheries contacts representing a cross-section of the fishing community and the public. This group included commercial and recreational anglers, bait shop owners, local fishing and conservation groups, and fisheries biologists. Seventy-five people were interviewed about perceptions, concerns, and activities (both professional and volunteer) relating to, and their suggestions to improve, the fishery. A complete list of the individuals and organizations we have interviewed or worked with appears in Appendix A. Additionally, we have compiled a list of individuals who will be valuable additional contacts as WIN proceeds with projects. This list appears in Appendix B.

The second element of the Scoping Study was a review of the relevant scientific and technical literature available about the Saginaw Bay watershed's fisheries. We have also worked with staff from the Michigan Department of Natural Resources (MDNR), Fisheries Division, the Saginaw Bay Resource Conservation & Development, Inc. (RC&D), and other concerned government agencies and nonprofit organizations, to survey data and enhancement plans for fisheries within the watershed. A bibliography of these materials is attached as Appendix C.

The Conservation Fund would like to thank all of those who agreed to be interviewed or provided other assistance. Special thanks to Jim Baker, District Fisheries Biologist, Michigan Department of Natural

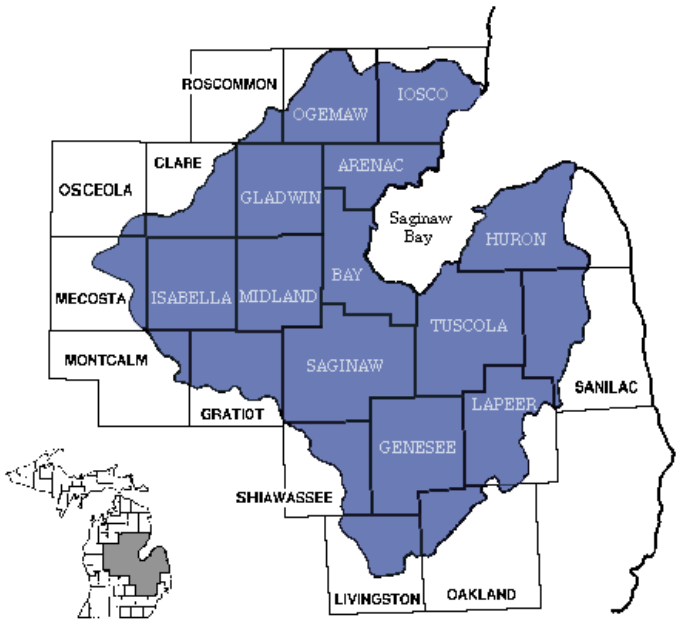
Resources, Terry Miller, President, Lone Tree Council, and William Wright, President, Partnership for the Saginaw Bay Watershed, for their written comments on the first draft of this Report.

History of the Fisheries

The Saginaw Bay watershed is Michigan's largest -- it drains roughly 15% of the state. Its approximate 8,709 square-mile area includes all or part of 22 counties. There are more than 175 inland lakes in the basin, and about 7,000 miles of rivers and streams. The watershed supports 15,000 acres of coastal wetlands, the largest contiguous freshwater coastal wetland in the United States. The watershed includes three major subwatersheds, the Saginaw River Basin, the East Coast Basin and the West Coast Basin. The Saginaw River System is the largest, and drains about 80% of the watershed, or approximately 6,278 square miles. The Saginaw River Basin also includes the four major urban areas in the watershed: Saginaw, Flint, Midland and Bay City. The four largest tributaries to the Saginaw River are the Tittabawassee, the Cass, the Flint and the Shiawassee. Saginaw Bay itself covers 1,143 square miles and has 240 miles of shoreline. More than 90 species of fish live in the Bay and its tributaries. A list of the most abundant species appears in Appendix D.

Historically, the Saginaw Bay and its tributaries supported a plentiful and healthy fishery. Native American people, including the Sauk, Hopewell, Ottawa, Potawatomi, and Chippewa, began relying on the fishery as early as 3000 B.C. As European settlers colonized Saginaw Bay, fishing became an important industry in many communities. Tawas City alone once hosted a commercial fishing fleet of over 50 ships. The commercial fishing industry peaked in 1902 when 14.2 million pounds were harvested. The industry reached its all time low in 1974 when 1.4 million pounds were taken. Today, the harvest averages slightly above 1974 catches.

The chart on the following page summarizes historic and projected catches (commercial and sport combined) in the Saginaw Bay.



The Saginaw Bay Watershed

Historic Yield / Future Goals by Species for Saginaw Bay, Lake Huron
Source: Draft Department of Natural Resources, Fisheries Division Management Plan

Species	**Historical Average (x 1000 lb) (1912-1940)**	***Current*** **(x 1000 lb) (1987-1996)**	**Year 2010 (x 1000 lb)**	**Year 2020 (x 1000 lb)**
Walleye	1,002	269	500	1,000
Sauger	36	<1	--	--
White Bass	?	10	10	10
Channel Catfish	82	525	395	250
Northern Pike	11	10	11	11
Muskellunge	?	<1	1	2
Whitefish	480	544	500	500
Menominee	5	9	5	5
Yellow Perch	584	779	779	779
White Perch	0	12	25	25
Smelt	0	13	13	13
Lake Herring	3,036	0	100	400
Bloater Chub	6	0	0	0
Lake Sturgeon*	?	0	0	0
White Sucker	1,000	119	119	119
Carp	750	411	500	500
Drum	15	52	50	50
Quillback	?	95	150	150
Total	7,007	2,719	3,148	3,814
Total predator	1,131	814	907	1,273
Total others	5,876	2,034	2,241	2,541

*Historic levels unclear but considered substantial.

Fisheries in the Saginaw Bay watershed have changed dramatically over the past 150 years. Species that once formed the majority of the commercial catch, including lake trout, lake herring and walleye, have declined significantly. Researchers have attributed the decline of these and other species to a number of factors, including over-fishing, loss of spawning habitat, eutrophication, toxic chemical contamination, and the introduction of non-native species. The impacts of exotics species, including salmon, white perch, sea lampreys, and most recently, zebra mussels, are not always clear. Predation and competition are certainly factors, and the zebra mussels have fundamentally altered the ecosystem. Most fisheries biologists interviewed have concluded that there is no feasible way to return the ecosystem to its pre-zebra mussel condition.

Saginaw Bay and River Area of Concern and RAP:

Agriculture and industry have also impacted water quality in the Bay and its tributaries. Impacts from nutrient loading, sedimentation and chemical contamination became significant in the 1950s and 1960s. In 1978, the International Joint Commission (IJC) listed the Saginaw River and Saginaw Bay as one of 43 Great Lakes Areas of Concern because of degraded water quality. The IJC found that of fourteen defined beneficial uses, twelve uses were impaired in the Saginaw River and Bay. For purposes of this Report, the most relevant of the impaired uses are restrictions on fish and wildlife consumption, the loss of fish habitat, degraded fish habitat, taste and odor problems in harvested fish, eutrophication, degradation of aesthetics, and degradation of phytoplankton and zooplankton populations.

The Area of Concern designation led to the creation of a Remedial Action Plan (RAP) for the River and Bay. The RAP process has generated a great deal of analysis of the region's fisheries, and has tracked the recovering health of the waterways. Readers interested in reviewing the scientific and technical literature about the region's fisheries are referred to the 1988 RAP report. The 1995 Biennial RAP Report has been prepared in draft, but is not completed. Efforts to continue to improve the health of the Saginaw Bay watershed's fisheries, particularly in the Area of Concern, will depend in part on the availability of current data about the fisheries. Without up to date information, it is difficult to gauge changes in conditions since 1988 or to evaluate the current status of certain aspects of fisheries.

The lack of current data is perhaps most significant with regard to toxic contamination. Improvements in point source controls have significantly reduced inputs of toxic contaminants in the watershed. However, nonpoint sources, including releases from contaminated sediments, atmospheric deposition, and runoff remain significant. Without an ongoing comprehensive analysis, evaluating the effectiveness of techniques to reduce nonpoint source pollution will remain problematic. For this reason, as WIN and other organizations launch projects to improve fisheries health, it will be difficult in some instances to measure the impact of these projects without ongoing monitoring in the field.

The 1988 RAP report identified four major causes for the decline of fish populations in the Saginaw Bay and Saginaw River:

- Shoreline development. Shoreline development contributes to sediment and nutrient loading in waterways and loss of wetland spawning habitat. Sediment silts in reef areas used for spawning by species like walleye and lake trout. The nutrients associated with runoff change water chemistry, resulting in excess algae growth, and eventually eutrophication. Changes in nutrient levels also alter the quantity and behavior of benthic and pelagic organisms, which are primary food sources for juvenile fish.
- Drainage of wetlands. Coastal wetlands are spawning, nursery and critical habitat areas for a wide variety of species, including largemouth bass, bluegills, Northern Pike, white bass, and yellow perch. A table listing species' reliance on wetlands is contained in Appendix E. Historically, the region supported 37,000 acres of coastal wetlands. Today there are 15,000 acres.
- Toxic contaminants. Contaminants may kill fish outright, depress or alter reproduction, infiltrate the food chain, or lead to fish consumption advisories. Contaminant levels are particularly high in bottom feeding species like catfish and carp.
- Over fishing. Historically, high commercial fishing pressures have been linked to the decline of a number of watershed species, including walleye. MDNR has no biological evidence that any species currently pursued by commercial fishers is over-exploited.
- Alteration of spawning habitat. Without adequate areas for natural reproduction, fish populations cannot be sustained.

Although these issues have begun to be addressed, a number of challenges remain. Concerns include development pressure, toxic contamination, nutrient loading, and exotic species. Exotic species have significantly altered the ecosystem of the Bay and its tributaries. Zebra mussels have caused the most dramatic changes. They have removed sediments, nutrients and vast amounts of plankton from the water. Although many anglers talk about how the zebra mussels have "cleared" the water, there seems to be limited understanding of the organism's negative impacts. In many places, clearer water, and corresponding increases in the penetration of sunlight, have led to increases in aquatic plant growth.

Extensive waterfront development exacerbates the growth of aquatic vegetation on some lakes and tributaries. Runoff from lawns and seepage from septic systems contribute significant nutrient loads in these areas. The impact of these factors will be discussed more fully below. The full effect of zebra mussels, including their interaction with existing processes, is not yet known. There are few tributaries or inland lakes not yet affected by zebra mussels. The Michigan Department of Environmental Quality (DEQ) has concluded that it will not be possible to return the ecosystem to a pre-zebra mussel condition. However, if WIN provides assistance to develop access points in areas that have not been invaded by zebra mussels, it should consider a partnership with the DEQ to distribute exotic species education materials at those sites.

Other exotic species have impacted the watershed. Sea lampreys are cited as one factor in the decline of whitefish and lake trout. White perch competes with yellow perch, and is believed to hinder walleye reproduction. The International Joint Commission is working to prevent introductions of new exotics. Its program to address ballast water releases by shipping vessels targets the primary source of invading species. Opportunities for WIN in this area appear limited at this time.

Notwithstanding these concerns, the watershed continues to support populations of yellow perch, walleye, large and smallmouth bass, crappies, brown trout, steelhead, coho and chinook salmon, and lake trout. Suckers, smelt, and panfish are also plentiful, particularly in nearshore areas. Populations are below the carrying capacity of the region, and most species are less abundant than in times past. There is evidence, however, that many populations are rebounding. Despite the impacts of human activities and exotic species, the watershed's fishery remains a valuable resource.

Readers interested in more detailed data about the history of the fishery are referred to the Michigan Department of Natural Resources, Fisheries Division Technical Report, "History, Status, and Management of Fishes in Saginaw Bay, Lake Huron, 1891-1986" referenced in the Bibliography in Appendix C.

Present Day Fishery

Today, the Saginaw Bay and its tributaries host a thriving sports fishery and an important and unique commercial fishery. According to the U.S. Fish & Wildlife Service (USFWS), Michigan's sports fishery generates $1.5 billion per year -- 1.8 million anglers participating in 28 million days of fishing. In 1986, MDNR estimated that walleye fishing alone contributed $28 million to the Saginaw Bay watershed's economy. Although the USFWS (with assistance from the U.S. Census Bureau) collects statewide economic data every five years, the data is not tabulated for specific regions of the State. Without such data, it is difficult to estimate accurately the impact of the sport fishery in the Saginaw Bay watershed.

⇒ WIN might consider commissioning an economic analysis of the impact of sport fishing in the region to encourage stewardship efforts.

Commercial Fishery:

The Commercial Fishery consists of approximately 24 licensed fishermen (operating under 26 commercial licenses) harvesting within Saginaw Bay. Each licensee is required to stay within 50 miles of his/her homeport. The primary species harvested are whitefish, yellow perch, and catfish. Other species caught include suckers and carp. A list of the species and poundage harvested appears in Appendix F. Many active commercial operators inherited family businesses. Commercial fishing remains a strong connection to the watershed's heritage.

Fish caught in the Bay serve a variety of markets. Catfish are sold to recreational fishing ponds throughout the Midwest. The entire yellow perch catch is sold to local restaurants and fish markets. Whitefish are sold nationally through fish distributors. The commercial fishery contributes significantly to the local economy. Fishermen's gross revenues exceed $2.4 million. One estimate of the total contribution to the region's economy is $5 million.

Whitefish now constitute the bulk of the commercial catch. In 1997, 827,950 pounds were harvested. In fact, there has been a proposal to shift some commercial nets (which catch a variety of species) from the Bay to Lake Huron to pursue whitefish. The number of licensed nets would not increase. Instead, some of the nets that would normally be used on the Bay would be used in central and southern Lake Huron. Currently, state law restricts commercial fishing on Lake Huron south of the 45th parallel (approximately Alpena) to within Saginaw Bay. MDNR and many Bay-Area sports clubs support the concept of issuing permits for Lake Huron to Saginaw Bay operators. Whitefish are not a highly pursued sport fish and the permits would reduce commercial pressure on sport fish like yellow perch and catfish. MDNR does not believe that increased fishing pressure on Lake Huron would endanger whitefish populations there. It does not appear that an appropriate opportunity exists for WIN to pursue this proposal at this time.

What are commercial fishermen's perspectives about sustainable yield/catch limits?

There is no consensus among commercial fishermen about appropriate catch limits. However, commercial operators interviewed indicated that licenses probably permit catches that exceed actual harvesting levels, given current conditions in the Bay. Although understandably protective of their rights, the fishermen understand that fish populations are unstable because of water quality and habitat issues, and recognize that excessive harvests could lead to another collapse in fish populations. The fishermen also emphasized their commitment to stewardship of the resources and a willingness to consider private sector initiatives to sustain them.

What are the primary conflicts between commercial and recreational anglers?

Tensions between sports and commercial fishermen exist. Recreational anglers have cut commercial nets and have lobbied to restrict commercial fishing. However, based on our interviews, the intensity of this historic conflict may have moderated. Many of the recreational anglers interviewed do not think the current commercial harvests pose a threat to the health of the resource. This conclusion may be based in part on their recognition of the commercial operators' stewardship ethic. Some recreational anglers did suggest that reducing the number of commercial nets on the Bay would reduce existing conflicts. MDNR staff suggest that the primary conflict is over fishing grounds -- the physical location for fishing -- rather than for the fish themselves. Sport fishermen want to fish in the same places where commercial nets are set. Consequently, sport anglers' boats and gear get entangled in commercial nets.

The proposal described above to shift some of the commercial fishing effort to Lake Huron, might accomplish that goal. It might also be possible to provide clearer information in the Michigan Fishing

Guide about avoiding entanglement in commercial nets, and a hotline number or "What to do now" information for anglers who become entangled.

The Sport Fishery:

The Watershed's sport fishery has a tremendous economic impact in the region. In 1986 (the most recent data available for the entire watershed), recreational anglers took more than 565,000 fishing trips on the lakes, rivers and Bay. In 1998, MDNR estimated there were more than 210,000 trips on the Bay alone. In this section we provide an overview of the status of the fishery and the general health of fish populations in the Bay and across the watershed. An analysis of the fisheries challenges and opportunities in the major tributaries and subwatersheds is contained in the Tributaries Section below.

Individuals interviewed, particularly long time anglers, were asked whether they thought the health of the fisheries and the natural systems have improved, gotten worse, or stayed the same over recent years. The vast majority believes the fishery is better, the fish are safer to eat, and the water is cleaner than in the past. People feel issues still exist, but seem generally to think that things will keep improving.

Fishing tournaments, contests and festivals draw thousands of anglers (and their families) to the region each year. Popular tournaments include Saginaw's "Shiver on the River" (walleye ice fishing contest, more than 2000 participants), Saginaw Bay Walleye Club's annual tournaments, Omer's sucker festival, Tawas City's "Perchville", and the various bass tournaments hosted by local fishing and sports clubs around the watershed. National tournaments also visit the region. For example, the national Professional Walleye Trail In-Fisherman Tournament will be held in Linwood in August 1999. This tournament attracts anglers and media from around the state and across the country. Tournaments and contests like these provide significant economic benefits. They also attract residents, and reinforce the watershed's unique sense of place. A list of major fishing events appears in Appendix G.

WIN might contribute to the region's long term sustainability by highlighting the linkage these events provide between natural resource protection and economic benefits. As a policy matter, WIN might favor catch and release tournaments, which have smaller impacts on fish populations and avoid fish consumption issues. A discussion of concerns relating to fish consumption advisories appears below.

What are the most popular species among recreational anglers?

It depends who you ask, but among those interviewed, the most sought after species include walleye, yellow perch, bass (white, smallmouth & largemouth), blue gill, suckers, trout and pike. The most popular species are walleye and yellow perch. Walleye, once called pickerel, are the prize fish of the sport fishery. They are sought by anglers both for the sport of catching the fish and for their delicious fillets.

The walleye population collapsed in the 1940s, and commercial harvesting was prohibited in 1970. Some recreational anglers believe, however, that commercial fishermen still take walleye. Wayne Coleman, MDNR Commercial Fisheries Enforcement Officer, indicated that there is no evidence of this. In fact, rumors suggest that unscrupulous members of a walleye club were selling their catch of walleye to local restaurants. This was several years ago and the present leadership in the walleye clubs stresses adherence to fishing regulations and conservation practices.

Anecdotal evidence and the scientific literature indicate that the walleye population has rebounded tremendously. Saginaw Bay walleye have a higher growth rate than walleye in any other watershed in the Midwest. The Saginaw River and Saginaw Bay are touted in nationally distributed magazines, including

In-Fisherman and Walleye Magazine, as world-class walleye fishing destinations. In 1986, recreational anglers took more than 73,000 fish in the watershed. Saginaw's annual Shiver on the River draws thousands of ice fishermen to the River and Bay. In 1999, 2120 people registered for the event. Nine to eleven pound walleye are common catches for experienced anglers. The average walleye caught in the watershed is 21-23 inches long and weighs about four pounds.

MDNR conducts numerous annual surveys to track the health of the watershed's walleye population. One of the more difficult and controversial issues MDNR is investigating is the role of natural reproduction and recruitment in the watershed's walleye populations. In the late 1970's and early 1980's, sports clubs and the Department of Natural Resources began stocking programs to reestablish walleye in the Saginaw Bay watershed. The goal of this ongoing program is to establish walleye as the predominant predator species in the Bay and its tributaries. Most of the research to date indicates that stocking plays a very significant role in maintaining populations. The prevailing study on recruitment (see Appendix H) indicates that the ratio of stocked walleye to natural reproduction is 81:19. In other words, if 100 fish are caught, on average 81 of them are stocked fish and 19 are wild fish. Other studies put the ratio at 50:50. MDNR interrupted its stocking program in 1993 and 1996 to help clarify the question. Emerging technology that allowed walleye fry to be marked with oxytetracycline made alternate-year stocking unnecessary. Now, MDNR marks pond-raised fish and collects data while stocking every year.

Notwithstanding the question of natural recruitment, stocking is and will continue to be an important part of the management of walleye. The MDNR Fisheries Division Draft Management Plan calls for continuous stocking at current levels, approximately one million fingerlings per year, into the foreseeable future. Charts detailing the MDNR's current stocking program are included in Appendix I. Fishing groups including the Arenac County Walleye Club, Walleyes for Iosco County, and the Saginaw Bay Walleye Club, work with the MDNR to raise and release fingerlings each spring. Seven walleye rearing ponds at various locations supply fingerlings for the Bay. Several additional ponds in Genessee and Isabella County provide fingerlings for inland lakes. The Bay area ponds currently provide one million fingerlings to the Bay each year at a cost of $50,000.

The long-term goal of the program is to establish a self-sustaining walleye population. However, current stresses on the population may render this goal elusive. The walleye's native spawning range has been greatly limited by impoundments on the major tributaries. Many spawning areas, including the Coryeon Reef, the historic spawning area in Saginaw Bay, have been lost to siltation. Competition from exotic species and loss of coastal wetlands are also impacting wild populations. For these reasons, stocking may be necessary for a long time to come.

⇒ The best opportunities for WIN to enhance walleye populations may be in demonstration projects that restore spawning grounds and allow fish passage around impoundments. Trout Unlimited has been leading an effort on the Big South Branch of the Pere Marquette River to restore the gravel beds used for spawning by several species, including walleye. The project includes installation of gravel in suitable riverbeds and installation of sediment catchment areas. Although the target species for Trout Unlimited's project are trout and salmon, their techniques can be replicated if successful to benefit an array of species. Information about the project appears in Appendix J. Specific opportunities to enhance the walleye fishery are described in the Tributaries section below.

Yellow Perch have also attained legendary status in Saginaw Bay. Au Gres is the Perch Capital of the World and Tawas City has an annual festival called Perchville. In 1986, more than 1.8 million perch (724,000 pounds) were taken from Saginaw Bay. Today, the average annual sport catch is approximately 600,000 pounds.

Yellow perch populations fluctuate significantly, puzzling anglers and fisheries biologists alike. Anecdotal reports from anglers over the past several years have varied, but many indicate that perch populations are depressed compared to catches in the late 1980's and early 1990's. MDNR's Fisheries Division has published periodic reports on the subject, and Jim Baker's "The Great Perch Puzzle" (April 1997) provides a succinct outline of the conundrum. Yellow perch appear to have a fairly complex biological relationship with the Bay ecosystem. Research indicates that when yellow perch are numerous, the average fish is smaller. When fish are less numerous, individuals are larger. Recreational anglers tend to blame both phenomena on commercial fishermen, but it seems the problem is more complex than that. We defer a full explanation to the reports referenced in Appendix C.

⇒ The primary opportunity for WIN to improve the health of the yellow perch population is to assist in the restoration of wetlands and other fish habitat on the shores of Saginaw Bay. Perch spawn and live in the shallow waters closer to shore. The dramatic loss of coastal wetlands in recent years has significantly impacted perch. Efforts to restore, enhance and protect these areas will directly benefit perch populations. A discussion of wetland protection strategies is included in the WIN Opportunities section below.

Perch and walleye are caught both in the Bay and in the rivers in the watershed. Both are also caught during summer and winter fishing seasons. A range of other species, including northern pike, steelhead, brown trout, suckers, crappies and bass are very popular among anglers. The bass fishery is active, both for large and smallmouth. Some anglers report a decline in largemouth bass fishing near shore. They suggest that the clearing of the water caused by the zebra mussels has moved the largemouth into deeper waters. MDNR has not documented any change in the largemouth bass fishery, however. Smallmouth fishing is still active near-shore, but some anglers report that populations appear to have declined. The white bass (a non-native) fishery was very active in the late 1980s, especially on the Tittabawassee. MDNR's 1999 creel census on the Saginaw and Tittabawassee Rivers shows that the white bass fishery is still substantial, though possibly not as large as in past years.

Active fisheries exist in many of the watershed's rivers as well as its inland lakes. River fishing tends to track spawning runs of species like walleye, trout, suckers, crappie and salmon. Anglers fish from small boats, piers, bridges and banks. Fly-fishing is popular in trout supporting rivers like the Rifle. Specifics about river fisheries are included in the Tributaries Section.

While the Saginaw Bay watershed is not well known for its inland lakes, many of them have very good fishing. These include Budd, Coldwater, Long, Lake George, Crooked, Eight Point, Big Lake, Five Lakes, Shingle, Little Long, Halls and Shamrock. Wixom and Sanford Lakes (although they are dammed portions of the Tittabawassee rather than true lakes) are also known for good fishing. Lake users tend to be local residents and local bass clubs, which often hold fishing tournaments. Sanford and Wixom also draw urban fishers wary of the toxicity of fish in the Saginaw River. Although not well known, a number of reservoirs and lakes support large populations of channel catfish. Sanford Lake and the Caro Impoundment have large populations of catfish. These areas are better options than the Bay and rivers for anglers seeking catfish because the fish are not contaminated with PCBs and are not subject to the inland lake mercury advisory. MDNR has small boat launches on most of these lakes and a few also have private launches.

The two most significant threats to the health of inland lake fisheries are atmospheric deposition of mercury and high development pressure. Michigan has posted a special fish consumption advisory for <u>all</u> inland lakes and reservoirs around the state because of the deposition of mercury from the atmosphere. Many anglers seem unaware that inland lakes are affected by atmospheric deposition of mercury, or that such deposition is an issue generally. Watershed residents in general do not appear to have made the connection between air pollution and water pollution and fisheries health. Although project opportunities

for WIN to address atmospheric deposition are limited, the mercury advisory should be considered in conjunction with projects that promote non-catch-and-release fishing for impacted lake species.

Better opportunities exist for WIN to address the second significant threat to inland lake fisheries -- development pressure. Construction of new homes and year-round use of cottages originally designed only for warm seasons are significantly impacting water quality. Septic system failure, increased fertilizer use, and destruction of natural buffers create complex management problems. The added nutrients these factors inject into the lakes, combined with the clearing effect of zebra mussels, has led to increased growth of aquatic vegetation in many of lakes. This results in fundamental changes in the lakes' ecosystems. Although there are benefits to certain predator species, such as largemouth bass, most lakeshore residents find the heavy vegetation undesirable. Many lake associations poison the lakes
⇒ periodically to kill vegetation. WIN could help address this issue by assisting projects that encourage lake front residents to curb fertilizer use and restore natural vegetation on the shoreline. WIN could also support buffer strip programs that reduce the impact of agricultural runoff.

User Conflicts:

In the Commercial Fisheries section, we outlined the conflicts between commercial fishermen and recreational anglers. In the course of the interviews, we asked recreational anglers about other types of conflicts. The primary conflicts are between snowmobilers and ice fishermen and jet ski operators and stationary boat anglers. There are incidents of snowmobilers running fishermen off the ice on the rivers because they fly by at speeds over 60 m.p.h. Reckless jet ski operators speed dangerously close to stationary boats. In some instances, according to anglers, the sheer numbers of jet skis simply drive away fish. Oil discharges and air quality issues related to jet skis also concern some people.

To address the water and air quality concerns associated with jet skis and marine motors, WIN is supporting a project of the Innovative Farmers of Michigan (IF). The IF are developing biodegradable two-cycle engine oil. This soy-based oil reduces air emissions and greatly reduces the release of petroleum-based compounds into the water. WIN provided funding to field test the oil.

Jet skis are particularly a problem on inland lakes. Some lake associations have passed rules restricting jet ski operations to a specific time of day, usually mid-afternoon. Sports clubs and local tournaments, like Clare Area Bass Anglers, encourage their members and participants to take the high road, remain courteous, and report whatever information they can to conservation officers.

The anglers we interviewed agreed that the conflicts caused by the jet skis and snowmobiles are more a nuisance than a threat to the fishery. Most of the people operating these recreational vehicles are responsible. Another motorized vehicle that does threaten natural areas is the use of airboats in wetland areas, including the state game areas and in the Shiawassee National Wildlife Refuge. These loud craft disturb wildlife and can damage natural vegetation. A noise ordinance has given state and federal conservation officers a mechanism to address the problem, but it is difficult to apprehend violators.

There does not appear to be a role for WIN in addressing user conflicts at this time. Every person interviewed agreed that the remedy for each of these problems is additional MDNR conservation officers. According to Tom Heritier, President of the Saginaw Field and Stream Club, each MDNR conservation officer has a jurisdiction of about 800 square miles. Michigan United Conservation Clubs has lobbied in Lansing for additional officers. Supporting such efforts may make sense, but WIN is not suited to political activity.

How do people feel about fishing license costs and restrictions?

In our interviews, we inquired into perceptions of fish consumption advisories, fish license cost, and catch limits for sport fishing. We will first discuss licenses. The majority of those interviewed did not object to the cost of licenses, and viewed them as a good value. (An "all species" license costs residents over age 17 $26.00 per year. A "restricted" license, for all species but trout and salmon, costs $13.00.) Many were not aware, however, that funds from fishing and hunting licenses are earmarked for the Game and Fish Protection Fund. Although this information is included the State's Annual Fishing Guide, it is not highlighted. Emphasizing that license revenues are used exclusively for fishing and hunting programs would improve public perception of the value of the license.

Not surprisingly, most people report that they comply with catch limits and other restrictions. Anglers interviewed indicate they catch 15-20 perch per trip and about 3 to 4 walleye per trip. Frequency of fishing trips varies widely - most of the people we interviewed were not subsistence fishers, and went fishing 4 to 5 times per month during peak seasons. A rigorous scientific survey was not conducted. The interviewees were, for the most part, avid anglers who shared their personal views as well as insights from their interaction with other anglers. Compliance with catch limits seems to be related to fishing skill. Many people comply because they simply are unable to catch above the limit.

Fish Consumption Advisories: **What impact do fish consumption advisories have? How do people perceive and react to them?**

Because the issue of sport-caught fish consumption advisories is of great concern to a number of WRTG members, this section describes the advisories posted in the watershed in some detail. It should be noted, however, that fish consumption advisories are an issue in each of the Great Lakes watersheds in Michigan, and in general, the advisories in the Saginaw Bay watershed are no more stringent that those in other Michigan watersheds.

The Michigan Department of Community Health issues an annual Fish Advisory, which cautions people about eating certain types and sizes of fish because of contamination. It is indexed by body of water and species, and provides guidelines about how often contaminated fish should be eaten. Michigan's Environmental Science Board (MESB) reviews the standards and procedures for establishing the advisories. A copy of the 1999 Advisory is included in Exhibit K.

The application of sport fishing consumption advisories and their role in the promotion of public health are not without controversy. Two issues are of particular interest. The first is the difference between Michigan's standards for sport-caught fish and the Food and Drug Administration's (FDA) standards for commercially-caught fish. The second is the relative risk of including or excluding fish from the diet. Each issue will be discussed in turn.

FDA and the Michigan Department of Community Health (MDCH) each set standards for fish consumption. The FDA's standard applies to commercially caught fish, MDCH's applies to sport-caught fish. These standards are based on the toxicity of the contaminant at issue. Fish with concentrations of contaminants above the "trigger level" are subject to consumption advisories and restrictions. The following table provides each agency's trigger levels for a number of contaminants.

Contaminant Trigger Levels

Contaminant	FDA	MDCH
PCBs	2.0 parts per million (ppm)	2.0 ppm
Mercury	1.0 ppm	.5 ppm
Chlordane	.3 ppm	.3 ppm
Dioxin	50 parts per trillion (ppt)	10 ppt
DDT	5.0 ppm	5.0 ppm
Heptachlor	.3 ppm	.3 ppm

Trigger levels are established by evaluating the increased risk of health impacts associated with consumption of a specified quantity of contaminated fish per day over a 70-year lifetime. Using PCBs as an example, the FDA standard is based on the assumption that a 70 kilogram person eats 1gram of PCB contaminated fish per day (just under 2 meals per year) for 70 years. At 5.0 ppm of PCB, that person would have an increased cancer risk of 1 in 5000. A similar set of assumptions is used for each contaminant.

As shown in the table above, MDCH's trigger levels for dioxin and mercury are lower than FDA's. In addition, MDCH's standards for other contaminants are significantly more restrictive because of the way trigger levels are measured. When FDA inspectors test commercially caught fish, they select sample fish from all size categories and process them into one composite sample for analysis. If more than 50% of the tested samples exceed the trigger level, then the fish cannot be sold for human food. In contrast, MDCH tests sample fish from each size class, and reduces the required number of samples that must exceed the trigger level before an advisory is imposed. Advisories are imposed when 11-49% of the samples exceed the trigger level. If 11-49% of a size class of a particular species test at or above the trigger level, an advisory is posted cautioning the general population to eat no more than one meal per week of the particular fish; sensitive populations are advised not to eat any. This system significantly reduces MDCH's trigger levels. When 11% of a given sample exceeds the trigger level, the mean concentration of the contaminant in the entire population is approximately one-half the trigger level.

For example, PCBs have a trigger level of 2.0 ppm. When only 11% of samples exceed 2.0 ppm, the mean concentration of PCBs in the entire fish population is approximately 1.0 ppm. Therefore, MDCH's standards are about twice as restrictive as FDA's. The foregoing description of FDA's and MDCH's standards and practices is drawn heavily from the "Summary Criteria Used by the Michigan Department of Community Health for Sport Fish Consumption Advisories" prepared by John L. Hesse as Appendix 3 to the MESB's Evaluation of Michigan's Proposed 1998 Fish Advisory Program.

According to Hesse (Id. 1998), MDCH's standards for sport fish consumption advisories are more stringent than FDA's for a number of policy reasons:

1. Fish purchased at a store are assumed to come from a number of sources and fish eaten by sports fishers frequently come from the same body of water. If that water is contaminated, then the angler is continually exposed to the same contaminants.
2. The FDA is required to consider economic impacts in its decisions, so its regulatory levels may not be based entirely on health concerns.
3. FDA trigger levels are designed to protect the average national consumer, and do not take into consideration the consumption patterns of local populations that might vary significantly from the national average. Some studies indicate that anglers tend to eat approximately two to three times more fish then the average consumer.

The other public health issue related to fish consumption advisories concerns the relative risk of eating fish as compared to the health risks associated with eliminating or reducing fish consumption. Fish consumption advisories do not evaluate the health risks associated with reducing or eliminating fish from the diet. It has been suggested that for most people, the health benefits of fish consumption more than offset the risks associated with consuming contaminated fish. (See P.D. Anderson and J.B. Wiener, "Eating Fish", in Risk Versus Risk: Tradeoffs in Protecting Health and the Environment 104 - 123 (1995)). Anderson and Wiener discuss at length the tradeoff between reducing the risk of coronary heart disease (CHD) by substituting fish for red meat in the diet versus increasing the risk of cancer by consuming contaminated fish. They note studies demonstrating a pronounced reduction in the risk of CHD as fish consumption increases. "[I]ncreasing fish consumption from 0 grams per day to about 20 grams per day (equivalent to about one meal of fish every ten days) is estimated to result in a 44 percent decrease in the adjusted relative risk of CHD. . ." Id. at 109.

In comparison, a person who consumed 20 grams of fish/day containing target levels of all six cancer-causing compounds monitored by EPA (DDT, PCB, Chlordane, Dieldren, Heptachlor, Dioxin) would increase the lifetime risk of getting cancer by 1 in 100, or 1%. The total risk of getting cancer for Americans is 25%; daily consumption of contaminated fish would increase that risk to 26%. Based on this analysis, Anderson and Wiener conclude, "Given the relatively small increase in excess lifetime cancer risk caused by consumption of contaminated fish and the substantial reduction of CHD associated with consumption of fish, the benefits of eating fish appear to far outweigh the risks." Id. at 117. The authors note that people may fear cancer more than CHD. However, even if cancer is deemed to be two to three times worse than CHD, its increased incidence due to fish consumption "would still not overcome the estimated 12 - 23 times larger decrease in the risk of CHD mortality from eating these fish." Id. at 118. The analysis holds, the authors maintain, for subsistence fishers. They suggest, therefore, that discouraging people from eating fish may significantly impair overall public health. Readers interested in this debate are referred to the materials referenced in Appendix C.

There does not appear to be an appropriate opportunity for WIN to resolve these two issues relating to fish consumption advisories. However, WRTG members should be aware of the complexity of the issues when evaluating possible project opportunities that might be influenced by concerns about fish consumption advisories.

In the Saginaw Bay watershed, there are different advisories for each of the rivers, lakes, and reservoirs. A map in Appendix K illustrates the major advisories in the watershed. Atmospheric deposition of mercury has led to a statewide advisory for all inland lakes and reservoirs. Methyl mercury, the primary form of mercury found in these fish, affects the development of the brain and nervous system in the fetus. The inland lake advisory provides:

> No one should eat more than one meal a week of fish of the following kinds and sizes: rock bass, yellow perch, or crappie over 9 inches in length; bass, walleye, northern pike, or muskellunge of any size.

The advisory is more stringent for pregnant women and children: it recommends only one meal a month for the same species and sizes.

There is no other common advisory for Michigan waters. In general, advisories warn against consumption of bottom feeders like carp and catfish, suggest moderation in the consumption of predator species like pike and walleye, and are less stringent on prey species such as yellow perch and panfish. A complete Michigan Fish Advisory is supposed to be provided to every person who purchases a fishing license in the State. However, some anglers and WRTG members have noted that Advisories are not always provided. State agencies currently are working to evaluate the breadth of this problem.

The most common contaminant in the watershed and statewide leading to advisories is PCBs. The MESB concluded in its Evaluation of Michigan's Proposed 1998 Fish Advisory Program, that PCBs "usually provide the highest risk to public health compared to other contaminants in sport caught fish." In animal studies, PCBs have been linked with increased incidence of cancer and with impacts on reproductive capacity. However, the MESB noted that the impacts on human health are unclear because of the lack of data correlating exposure to health effects in people. For this reason, trigger levels for PCB advisories are based on the effects of PCBs demonstrated in animal studies and suggested by the available data on humans. For more detailed information about the impacts of PCBs on human health, the reader is referred to the MESB's 1998 Report and the accompanying appendices.

The most restrictive consumption advisories in the Saginaw Bay watershed are associated with Super Fund sites on the Pine and the South Branch of the Shiawassee. In these areas, no species should be consumed. Advisories in other areas for other species vary significantly. The Tittabawassee and Saginaw Rivers advisories state that no carp or catfish should be eaten and that pregnant women and children eat no more than one meal per month for of any species. Saginaw Bay also has an advisory against consumption of any carp or catfish. Most other species are approved for unlimited consumption by all men and non-pregnant women. A color map of the major advisories for the watershed is provided in Appendix K. It should be noted that the advisories on the smaller tributaries (Rifle, Kawkawlin, Tawas, Sebewaing, etc.) are based on data collected in 1988. Collecting this data is very expensive and because there are not new or consistent sources of contamination on these rivers, they are lower on the priority list for sampling.

The interviews conducted for this study focused on individuals who fish or use the resource in other ways. The perceptions of consumption advisories that we report, for the most part, reflect their opinions and views. There may be a significant number of people who do not fish at all because of concerns about toxic contamination in the fish. Terry Miller, President, Lone Tree Council, noted that many people identify a primary factor limiting public use of the fisheries as, "You can't eat the fish."

Anglers' reaction to fish consumption advisories was diverse and sometimes conflicting. Some do not eat any fish they catch, while others eat most. One angler summed up the latter group's attitude, "I still need a flashlight 'cause I don't glow in the dark!" Anglers that do not eat the fish may just not like them or not want to bother to clean them --they fish for the fun of catching them. Others avoid eating the fish because of health concerns.

A 1993 report, "Michigan Sport Anglers Fish Consumption Study," indicates that fish consumption is highest among low-income and minority populations. It is not clear, however, that simply because these people eat more fish, that they are unaware of or do not understand advisories. Again, without systematic polling, conclusions cannot be reached. One angler noted that if a man is trying to feed his family, he probably is not going to be concerned about an advisory unless the fish looks funny or smells like chemicals. Several of the African American anglers we interviewed from Saginaw indicated that they would not fish the Saginaw River or if they did that they would not eat the fish from it. Many of these anglers have boats and travel to the Bay or other waters in the watershed to fish. Walleye were not necessarily the primary catch for the African American anglers we interviewed. Panfish species were a more common goal and were being kept for dinner.

There is an interesting disconnect in the perceptions of many of those interviewed. Many said they personally observe a rule of thumb warning: They eat only one meal of fish per week. They do not appear to distinguish between species that are subject to an advisory and those that are not. The disconnect is that these people do not think most other people care about advisories. From a public health perspective, our interviews indicate that most recreational anglers are not exceeding the consumption

levels posted in the advisories. This is due to three factors: (a) not eating fish that are caught because of advisories (b) catch and release fishing just for fun; and (c) not catching enough fish to reach target levels.

The variance of perceptions about the advisories was perhaps best reflected in our interviews with African American shore fishermen in Flint. One man indicated that he would never keep and eat anything he caught from the Flint River. A woman fishing a little further down the shore said she was not sure if the fish were totally safe but because they did not seem sick, and she does not eat fish that often, that it wasn't a problem for her. And another man a little further down the shore said he would eat anything he caught as much as he wanted and wasn't at all concerned about the advisories.

Additionally, all anglers noted that the fish they catch today are considerably cleaner than they were two and three decades ago. We heard from several anglers that foul odor, aspirin taste, or odd colored meat used to be prevalent in fish caught in the Saginaw and Tittabawassee Rivers. Today, anglers are much more confident that the fish they eat are safer.

The effectiveness of fish consumption advisories has been examined in the academic literature (see Fish Advisories: Useful or Difficult to Interpret? (J. Burger & M. Gochfeld 1995)) and specific suggestions for improving the effectiveness of Michigan's Advisory are included in the 1998 MESB Report. These include changes to the fishing guide and targeted communication plans to reach at risk populations. The MESB suggests that "subsistence anglers, including some Native American and Asian sub-populations, and women of childbearing age should receive tailored messages via effective routes of communication. The use of focus groups to evaluate the effectiveness of the communication should be considered." MESB also recommends that low-income groups, who consume proportionately more quantities of sport fish than other groups (see 1991-1992 Michigan Sport Anglers Fish Consumption Study), be considered for a targeted message. These recommendations do not take into account the benefits of fish consumption noted by Anderson and Wiener.

The Michigan Department of Community Health has responded to many of the suggestions to improve the Michigan Fish Advisory Guide. However, it is not clear that action has been taken to develop communication plans that are targeted at specific audiences. It has developed a public service announcement (PSA) that has been provided to the Michigan Association of Broadcasters. The Association represents 95% of the commercial stations in Michigan. The text of PSA is included in Appendix K.

WIN members have expressed concern about Michigan's fish consumption advisories. Some worry that promoting sport fishing could harm public health by encouraging more people to eat unsafe fish. Others are concerned that expanding promotion about advisories could unjustifiably reinforce a public perception that no fish are safe to eat. Finally, some WIN members are concerned that existing advisories are not being effectively communicated to all populations, particularly at-risk groups. These issues will be addressed separately.

A number of complex and interdependent issues influence whether promoting the Saginaw Bay watershed as a fishing destination would harm public health. These include:

a) The nature of the fishing activity being promoted:
   - ♦ catch and release tournaments?
   - ♦ inland lake fishing, river fishing, bay fishing?
   - ♦ nature-based tourism generally, with fishing as a component?

b) The populations targeted for fishing promotion:

- adult males for weekend 'getaways with the guys'?
- families for overnight camping, fishing stays?
- residents for expanded fishing activities close to home?

c) The efficacy of existing advisories:
   - Do people understand that women of childbearing age and children are more vulnerable to contamination?
   - Are low-income groups sufficiently aware of the importance of advisories?

d) The very gradual reduction of contamination in fish populations as Super Fund sites and other sources of contamination are cleaned up.

e) An analysis of the relative risk of eating fish versus the risks of foregoing the benefits of eating fish.

The appropriate balance of these factors is a policy question, both for WIN members and for residents of the Saginaw Bay watershed. Striking that balance will be an ongoing and dynamic process. It is beyond the scope of this study to suggest a definitive approach to reconciling these concerns, and this Report does not attempt to do so. However, in examining potential projects, WIN might consider the following:

- Favoring catch and release events over non catch and release;
- Avoiding efforts that promote eating watershed fish vs. fishing activities;
- Focus outreach to families on the entire outdoor experience available in the watershed vs. fishing as an exclusive vacation experience; and
- Support efforts that inform at risk populations (women and children who are most sensitive to contaminants, low income and minority populations who eat more sport fish) about advisories.

The other concern expressed by WIN members is that at risk populations are not sufficiently aware of fish advisories. Women, who are more sensitive to toxics during childbearing years and who frequently prepare fish for the family, often are not anglers themselves. Because fewer women purchase licenses, they may be less likely then men to see the Advisory Guide and other materials aimed at anglers. Women do eat less sport fish than men, but it is unclear whether they are heeding advisories, or simply choose not to eat it as much. The other population of particular concern to WIN members is minority anglers. African American and non-reservation Native American anglers have higher sport fish consumption rates than other people. In the course of the study, our interviews indicate that income level, not race, has more influence on an angler's awareness of fish advisories. Generally, lower income people appear to be less aware of fish advisories than higher income groups. Again, our sampling methods were far from scientific, and we encountered individuals from all income groups who were unconcerned about advisories. Arguably however, simply because minority groups eat significant quantities of sport fish, it is appropriate to insure that the advisories are reaching them.

MESB's 1998 report recommended that the State develop specific messages tailored to women of childbearing age and to minority anglers. During the course of this study, we found no state efforts beyond the Advisory Guide that implemented this recommendation. In order to act on this recommendation, specific information would need to be gathered from the target populations about the current level of awareness. Strategies for improving dissemination of the information would have to be developed. Are printed materials sufficient? Would public service announcements help? What media should be used? After initial forms and media were identified, these alternatives would need to be tested. The MESB suggests focus groups of target audiences as a method of testing.

Exploring the parameters of such a communication plan is beyond the scope of this Report. It is clear, however, that such a project would need to be undertaken by or with the support of the Michigan Department of Community Health or similar agency with significant public health expertise as well as communication and survey experience.

There does not appear to be an appropriate role for WIN in developing a communication plan for fish consumption advisories. WIN is not well equipped to make conclusions about public health issues. WIN has also stated that it would not fund public education efforts that are not linked to specific projects that demonstrate sustainability. There might be opportunities to partner with the MDCH and other public health organizations to develop messages in conjunction with specific projects. In order to evaluate these opportunities appropriately, however, WIN needs to conduct more intensive survey or polling work focused specifically on at risk groups in the watershed. Eileen van Ravenswaay at Michigan State University, prepared the bulk of the recommendations in the MESB's 1998 Report. She might be able to provide assistance. WIN member organizations might also explore communication projects with MDNR.

Areas of Opportunity: (What can be done to improve the fisheries?)

Based upon our interviews and review of the literature, we have identified five areas of opportunity to improve the watershed's fisheries that will provide economic, environmental, and community benefits and are also suitable for WIN projects. The opportunities fall within two broad categories: projects that will improve the health of the resource and projects that will improve public access to or awareness of it. This section outlines these opportunities across the watershed. The last section of the Report describes the major tributaries in the watershed, identifies organizations working in these areas, and highlights specific issues and project opportunities in each.

Opportunities to improve fishery health **(What are the impacts of water/stream quality on the fisheries?):**

The primary threats to the health of watershed fisheries are loss of spawning habitat, stream bank erosion, nutrient loading in the Bay and its tributaries, toxic contamination, and problems with fish passage. The following section briefly describes each threat and outlines potential WIN project opportunities.

Wetland Restoration, Enhancement & Protection**:** A strong consensus exists among the people interviewed and the literature reviewed that wetland restoration is a critical component of a healthy fishery. The watershed still contains the largest contiguous coastal freshwater wetland system in the United States. However, the extent of the system today -- about 15,000 acres -- is less than half of its pre-settlement size. Wetlands provide habitat for spawning and for juvenile and adult fish. Wetlands also provide critical water storage and filtration functions. Their ability to hold large quantities of water during storm events greatly reduces the frequency and severity of flooding. Wetlands also remove sediment and contaminants from runoff. The loss of wetlands along the coast of the Bay and along river corridors has contributed significantly to shoreline and streambank erosion and was one of the measures used by the IJC in listing the region as an Area of Concern.

⇒ WIN has already supported two projects to restore wetlands on state land. A large number of organizations, including Ducks Unlimited, Inc., the Saginaw Basin Land Conservancy, The Nature Conservancy, US Fish & Wildlife Service, Michigan Duck Hunters Association, Pheasants Forever, the Partnership for the Saginaw Bay Watershed, and the MDNR are working to protect and restore wetlands. If WIN could assist in coordinating these efforts more effectively, and bring the Saginaw Bay RAP into the process, there might be tremendous opportunity to leverage resources and expertise. The Water

Resources Task Group (WRTG) has had some preliminary discussions about this project. The Wildlife Stewardship Task Group is launching an effort to coordinate habitat protection efforts across the watershed. It is our recommendation that these efforts be pursued.

⇒ Although coastal wetlands are the watershed's trademark, wetland restoration along the rivers is also critical. There are opportunities through existing federal programs, including the Wetlands Reserve Program (WRP) and Conservation Reserve Program (CRP), that offer property owners annual rental payments in exchange for conserving wetland areas. For more information about these programs, see Appendix L. Soil & Water Conservation Districts in the watershed are actively pursuing these strategies, but there are opportunities for WIN to help leverage these efforts. Doug Young, Gratiot County Soil and Water Conservation District, has been working with farmers to establish buffer strips and other Best Management Practices. He also encourages eligible landowners to apply for the WRP and CRP. Working with the Agriculture/Pollution Prevention Task Group, the WRTG could convene a meeting of farmers, soil and water conservation district staff, and the State WRP program coordinator, Jim Marshall, State Wetland Specialist for the Natural Resource Conservation Service. Bringing this group together and providing seed funding for projects could kick start an expansion of these efforts in the watershed. It should be noted that demand for the WRP and CRP is very high. At this time, more than 25,000 acres are on a waiting list for enrollment in these programs. Additional resources and efforts are needed. Contact information for Mr. Young and Mr. Marshall is included in Appendix L.

⇒ Although not targeted directly at wetlands, efforts to keep stream corridors and shorelines clear of trash and related materials should be encouraged. Community-based clean up days are good opportunities to improve habitat and foster people's connection to the resource. WIN should support efforts by the Partnership for the Saginaw Bay Watershed and others to initiate river clean up programs.

Runoff and Sedimentation: Runoff and sedimentation are significantly impacting water quality and fisheries health. Stream bank erosion is a particular problem identified in both the literature and the interviews. Nutrient loading from farm fields, waterfront lawns, and urban areas is also an issue. Toxic materials, including heavy metals, motor vehicle fuel residues, lubricants, and agricultural chemicals, are also contained in runoff in many areas.

Existing WIN projects, including the Midland County River Inventory, were developed to address runoff and erosion. However, a concerted effort to protect river corridors, expand the use of buffer strips, to minimize the use of turf grass along shorelines and banks, and to encourage conservation tillage practices and cover crops would have significant benefits.

⇒ Working to improve and protect river corridors offers significant opportunities to partner with other organizations. The Orvis Company -- the outfitting people -- provides financial support for river corridor enhancement. An Orvis store in Midland, Little Forks Outfitters, might be interested in getting involved in a WIN project. John Van Dalen, President of the local Trout Unlimited chapter, who participated in this study, manages the store. The Chippewa Watershed Conservancy is also committed to river corridor enhancement. Current WIN members, including Ducks Unlimited, Inc., the National Fish & Wildlife Foundation, and the Little Forks Conservancy are also working actively in river corridors. The WRTG might want to convene a brainstorming session with these potential partners to develop ideas for pilot projects.

To expand the use of buffer strips, WIN's Agriculture/Pollution Prevention Task Group is developing an outreach project to landowners that lease land to farmers. In the watershed today, many farmers lease the land they farm. As lessees, they would not be eligible for the financial incentives provided by federal and state agencies to enroll land conservation programs. Many buffer strip programs have targeted these farmers, instead of the people who own the land. Farmers and soil conservation officers on the

Ag/Pollution Task Group Task Group believe this may be less effective than direct contact with the landowners. They are developing this new strategy to address the problem

⇒ Another WIN opportunity might be a partnership with one or more drain commissioners to conduct a buffer strip demonstration project along one or more large drains. Agricultural drains are expensive to maintain -- sediment must continually be removed -- and are a significant source of nutrient and sediment loads in the Bay. Many of the larger drains do support some fish populations. However, constant dredging, influxes of sediment, and the lack of shade or cover limit habitat values. WIN might fund the installation of buffers and other best management practices along a designated section of a drain, and work with the Department of Environmental Quality to monitor water quality impacts and reductions in clean out costs. Because sedimentation and runoff are significant issues in the East Coastal Basin (Huron,

⇒ Tuscola and portions of Bay County), it might be a suitable location for a project. WIN might also continue to support projects that promote farming techniques that reduce runoff, including conservation tillage and cover crops. If it could be demonstrated that buffers and other practices save money in the long run by reducing drain maintenance costs, WIN might be able to work with drain commissioners to encourage their widespread adoption.

⇒ Opportunities to work with non-agricultural property owners also exist. Michigan State University (MSU) has launched the Michigan Turf Grass Environmental Stewardship Program to partner with golf course property managers to minimize runoff from golf courses and improve their green space values. Heavy management is required to maintain golf courses, including irrigation and the application of pesticides, herbicides and fertilizer. The MSU project is intended to reduce the impacts of these practices on water quality. Organizations including the Huron River Watershed Council, the Clinton River Watershed Council and Trout Unlimited have been working with MSU on this program. Since more than 153 public courses operate in the watershed (figures on private courses were not available), this might be an opportunity for WIN to explore. This voluntary, public-private program could provide a valuable opportunity for WIN to leverage its resources and expand its membership. Contacts at MSU and an article describing the program, titled "A New Shade of Green," are included in Appendix O.

⇒ There may also be an opportunity for WIN to address the impacts of sedimentation on spawning habitat. Trout Unlimited has been working in the Pere Marquette River to restore gravel-spawning areas. Trout, walleye and other species need gravelly bottoms on which to spawn. The Trout Unlimited project includes efforts to replace gravel in areas that have been silted in, and to construct sediment catchment areas to reduce the rate of siltation. WIN might be able to partner with Trout Unlimited to test these practices in the Saginaw Bay watershed. WIN can also highlight successful activities by Trout Unlimited and the various Friends organizations active in the region, and disseminate the most effective approaches to combating siltation of spawning areas.

Toxic contamination: In the last 25 years, a great deal of progress has been made to reduce point sources of toxic contamination. Currently, nonpoint sources of contaminants, including atmospheric deposition of mercury, runoff, and releases from contaminated sediments are the most significant sources of toxic contamination in the watershed. Remediation of Super Fund sites and other hot spots (including General Motors' efforts to remove contaminated sediments from the Saginaw River, and the Environmental Protection Agency's work on the Pine River (described more fully below)) will do a good deal to remedy this problem. Efforts to reduce point sources of pollution, including the Army Corps of Engineers' dredge spoil site at the mouth of the Saginaw River, may also be appropriate in the future.

The DEQ regulates point source emissions in the watershed. The U.S. Environmental Protection Agency (EPA) lists more than 180 holders of water discharge permits in the watershed. A list of these, and the receiving waters, is attached in Appendix M. It should be noted that the number and type of point

sources in the watershed is not significantly greater than the point sources to be found in other Great Lakes watersheds of similar size and diversity.

WIN can support voluntary efforts, such as the Michigan Source Reduction Initiative, to further reduce the use and emission of toxics in the watershed. However, opportunities for WIN to address the release of chemicals from contaminated sediments or atmospheric deposition of mercury are limited.

⇒ One possible project opportunity is to explore programs that assist small and medium-sized manufacturing firms to reduce toxic emissions. One model program, the Cleveland Advanced Manufacturing Program's (CAMP's) organochlorine project, assists businesses to find substitutes for organochlorine compounds in manufacturing processes. Organochlorines are used in a number of applications, including metal parts cleaning, degreasing and dry cleaning. These applications are all common in the Saginaw Bay watershed. Through this voluntary program, CAMP works with companies on a voluntary basis to find alternatives that are economically viable and environmentally benign. CAMP is a nonprofit economic development organization based in Cleveland, Ohio. It conducts assessments and provides other technical assistance for Ohio companies. One tenet of CAMP's work is to give Ohio firms a market advantage by improving their ability to compete under increasingly stringent environmental frameworks. Information about CAMP and its organochlorine project is attached in Appendix N.

⇒ WIN might also support the Partnership for the Saginaw Bay Watershed's storm drain stenciling program. This program provides materials for youth organizations and community groups to label storm drains. The permanent label alerts people not to dump materials into storm drains because the drains lead to local waterways. Stenciling programs help educate residents, who frequently believe that materials dumped in storm drains are cleaned up at local sanitary sewer treatment facilities.

Fish Passage: Four hundred and fifty dams and impoundments restrict fish passage on the watershed's tributary rivers. These barriers limit the ability of fish species to reach significant portions of their historic spawning habitat. Dams also alter stream conditions and can significantly change downstream temperatures. Installation of structures that permit fish passage could greatly increase the potential for natural recruitment, particularly for walleye. Unfortunately, most of the fish that spawn in these rivers will not use devices like conventional fish ladders because they do not jump. Research is ongoing in other river systems in the U.S. and Canada to develop structures that provide passage for walleye. According to Chris Bunt, a fish passage consultant at the University of Waterloo in Ontario, there are two types of fish ladder that walleye will use: Denil and Vertical Slot. Diagrams of these structures and contact information for Mr. Bunt are contained in Appendix P. The fish like a steady, strong current to swim against, however, and if conditions are not ideal, walleye are reluctant to use even these devices.

⇒ Mr. Bunt and his colleagues are testing a new design on the Grand River in Ontario that may provide a model for future passageways. WIN may want to consider bringing together a team of experts and using the Dow Dam on the Tittabawassee River as a pilot project. Passage over the Dow Dam would free the Chippewa River for walleye spawning all the way to Mt. Pleasant, and the Tittabawassee all the way to Sanford Dam. Dow has installed a conventional fish ladder on the dam, and has expressed an ongoing commitment to address fish passage issues. This project opportunity is discussed fully in the Tittabawassee River portion of Tributaries section below. Construction of a state-of-the-art passageway could provide a model not only for other sites in the Saginaw Bay watershed, but for rivers throughout the U.S. and Canada.

Other opportunities for WIN to address fish passage and public fishing access around dams and impoundments must take into account each dam's unique history, purpose, and concomitant array of user conflicts and disputes. WIN members can be most effective in addressing fish passage by taking all user interests into consideration. Some dams, like Wolverine Power's facilities at Sanford and Edenville, are

not going anywhere any time soon, but existing partnerships between Wolverine, local residents and the Midland County Parks & Recreation Department are leading to new fishing access and canoe portages. WIN can support these efforts, and initiate others. Specific project opportunities are described in the Tributaries Section for the appropriate river.

If WIN invests in projects to improve fisheries health, there is an opportunity for it to leverage its investment with funds from the Great Lakes Fisheries Trust. The Trust was established to enhance fisheries in the region, and is administered by staff from Public Sector Consultants, a WIN partner. Contact information for the Great Lakes Fisheries Trust is included in Appendix Q.

Public Access & Promotion:

The public access issues are small boat passage, which is often impeded by snags and other 'natural obstructions', boat access (places to put boats and canoes into the water), and bank access. In many areas, it is difficult to get to the water (or ice) from public parks or roadways. Public parking adjacent to boat launches is an issue in many locations. Inadequate or nonexistent parking areas lead boaters and anglers to park on private property or in roadside areas. This angers the property owners, obviously, and trucks and trailers can damage off-road areas, contributing to shoreline and stream bank erosion concerns.

This next section describes each issue in more detail, and suggests potential projects to address them. Additional site specific project opportunities are outlined in the Tributaries section. We also suggest potential sources for matching grants and financial assistance. Complete contact information for these funding sources are listed in Appendix Q.

What are the watershed's infrastructure and access needs?

Most anglers interviewed are concerned about the need for access (usually boat/canoe launch access) at specific sites and/or the lack of adequate improvements at existing sites. In addition, in some areas, snags and fallen trees block small boat traffic and hamper fish passage. Those interviewed also recommended that WIN explore projects to provide systematic information about fishing events, launching areas and related facilities. Activities to involve children in fishing were also recommended.

Public Access: The anglers and watershed organizations interviewed had a number of specific recommendations about sites where new boat launches or improvements would be appropriate. The MDNR, the Inland Fisheries Program, and the Coastal Zone Management program can all provide financial assistance in developing these facilities, but local units of government must take responsibility for their management.

⇒ In some instances, it would seem that access issues could be solved fairly simply. For example, during the study a number of anglers complained that the boat launch in Veteran's Park in Bay City is fenced in all winter. That means that when there is no ice on the river, anglers cannot launch their boats. Liability concerns were behind the City's reluctance to keep the site open -- a car went through the ice a few years ago. However, the City of Saginaw is able to keep its sites open all winter. WIN member Shirley Roberts opened a discussion with Mr. Jim Palenick, the City Manager. Mr. Palenick spoke with The Conservation Fund staff about the issue, and informed them that the City had revisited the issue and has decided to keep the launch open year round. They will post warning signs to address their liability concerns. WIN and Bay City produced a press release announcing the decision. A copy of the Bay City Times article announcing the change in policy appears in Appendix R.

⇒ Sites where boat launches or improvement to existing facilities could be developed are listed below. These sites reflect our evaluation of the opportunities identified through the interviews that provide the broadest potential benefits.

- The Kawkawlin River: Boat/canoe launch in Bangor Township
- The Flint River: Boat/canoe launch near downtown Flint and in western Genessee County
- The Flint River: Mott Lake shore fishing infrastructure improvements
- The Cass River: Boat launch in the Frankenmuth area below the dam
- The Cass River: Canoe launch, signage as identified by Cass River Partnership
- The Shiawassee River: Boat launch between Chesaning and Owosso
- The Chippewa River: Boat launch in western Midland County
- The Rifle River: Public Boat launch north of Omer
- The Saginaw River: Boat launch in Crow Island State Game Area; potential partners are Michigan State Duck Hunters Association and the City of Saginaw. (This was a project explored by WIN's Wildlife Task Group. Hunters and fishermen currently use an unimproved gully.)

Local champions will play a critical role in developing these projects. Although anglers and community residents suggested the sites noted above, a local champion was not identified in most instances. Although people are not vehemently demanding access points in these areas, if WIN is interested in promoting the use of the resource, these locations appear to be good places to provide improved facilities. Use of the resource often produces vocal proponents for conservation and restoration efforts.

To proceed with projects, WIN must identify groups or individuals willing to identify and/or adopt specific access projects. A potential strategy might be for the WRTG to establish a working committee to focus on access issues. More specifics about these opportunities and the local partners to implement are included in the Tributaries and Next Steps sections. To maximize the leverage WIN can generate, match requirements for funding might be appropriate. We suggest that WIN maintain contact with the watershed organizations on each river to identify the best site opportunities.

⇒ There is also tremendous potential to expand canoeing, kayaking and small boat tours in rivers in the watershed. MDNR's water trails program supports community efforts to develop point to point canoe trips and tours. For example, a new water trail across the Keweenaw Peninsula allows people to paddle from Keweenaw Bay to Lake Superior. The 49-mile trail includes camping areas, launch sites, restaurants and other facilities. A brochure describing the trail and contact information for the MDNR program are attached in Appendix S.

Many of the rivers in the Saginaw Bay watershed are suitable for small boating trails. Active canoe liveries operate on the Rifle, Chippewa, Shiawassee & Cass, and a canoe rental and livery service operates occasionally on the Flint. WIN is providing funding to The Friends of the Bad River to support their efforts to create a short trail along the Bad River between Ringwood County Park and St. Charles River Park. Each of these projects is described more fully in the Tributaries section. Developing a network of water trails could greatly expand the watershed's nature-based tourism sector. An appropriate first step might be developing a single directory of all canoe rental operations and launch sites in the watershed. A 'Canoe Saginaw Bay' brochure promoting an array of paddling opportunities might also be valuable.

Urban fishing access presents its own challenges. The individuals and organizations we interviewed indicated that facilities in Saginaw and Bay City are satisfactory. Saginaw clearly leads the way in accommodating fishermen, although there were some complaints about vandalism to cars left in parking areas on some sections of the river. Additionally, some members of the African American community

perceived the recent closing of the Wickes Park launch as a neglect of the predominantly African American East Side of Saginaw. They note the new launch at Rust Avenue on the West Side as further evidence. However, according to Darwin Baranski, City of Saginaw Parks, it is the city's intention to find a short term fix to reopen the launch as soon as possible and to investigate long term renovations as resources become available. The launch was closed because the ramp is in disrepair. Low water levels exacerbated the problem and boaters who damaged their trailers trying to use the launch threatened to sue the city. In Flint, bank, shore and bridge fishing opportunities abound, although many of these sites are unimproved or in disrepair. Small boat access in downtown is also limited.

Promotion & Outreach (**Can the public suggest promotional strategies?**): Convention and visitors bureau (CVB) and city officials around the watershed have identified regional marketing of the fisheries
⇒ resource as beneficial to the local economy. MDNR maintains a hotline about fishing and fishing conditions at ASK-FISH. It provides weekly fishing reports at 517-373-0908. Although these lines provide useful information, public awareness of these services could be improved. Interviewees felt that a brochure that includes fishing resources and highlights the largest fishing festivals and contests would be valuable. Such brochures might include a statement referring people to the Michigan Fish Advisory for guidance on eating fish. If events are targeting young anglers, a special caution about the sensitivities of women of childbearing age and children could be included.

The WRTG should discuss and reach consensus about the policy considerations before launching broad-based efforts to promote fishing related activities in the watershed. For example, promoting boating and canoeing might not raise the same concerns as promoting of fishing might. On the other hand, sport anglers are a terrific constituency for natural resource protection. Expanding the watershed's popularity among this politically powerful group could increase the number of advocates for continued stewardship of the watershed's fisheries. Before concluding this discussion, WRTG members should reach some consensus about the goals that it is trying to achieve through expanded promotional efforts. These goals might include:

- Increase tourism revenue
- Alert residents to local recreational opportunities
- Increase public understanding of the role of sport fishing in local communities
- Improve understanding of the connection between a healthy environment (safe, stable fish populations) and a healthy economy (visitors and residents supporting fishing-related businesses)
- Generate support for projects and programs to improve the health of watershed fisheries.

With some consensus about the goals of promotional efforts, the WRTG would be better prepared to develop promotional projects.

Although many anglers are reluctant to see more people at their favorite fishing spots, they do not oppose better public information about fishing sites and access points. With assistance from The Conservation Fund, the Bay County Environmental Affairs Department has obtained a map of all the public boating access points in the State of Michigan. The map in Appendix T shows many of the canoe and boat launch sites in the watershed. This map could be used as the basis for a brochure or other map that could be distributed. The map might also serve as a starting point for developing the water trail described above.

The WRTG has had some initial discussions about a fishing brochure. One private company, Delorme Mapping, produces a brochure/map of "fishing hotspots" in the Saginaw Bay, Saginaw River and Tittabawassee. A copy of this map is attached in Appendix U. In 1992, the convention and visitors bureaus of Saginaw, Midland and Gladwin Counties produced a brochure listing fishing spots and facilities in the three counties. A number of WIN members have expressed interest in producing an up-

to-date version of this brochure that includes a larger portion of the watershed. If the WRTG determines that the privately produced map should be supplemented with another product, care should be taken to insure that it has a regional focus. Promoting the region as a package of fishing experiences makes it a more valued destination for visitors. The variety of options offered increases the likelihood of overnight visits, which significantly multiply the economic benefits of tourism. Brochures and promotional materials might include the following information:

- boat and canoe launching areas
- popular fishing spots
- camping and lodging facilities (a complete list has already been compiled and appears on WIN's Saginaw Bay Birding website -- www.saginawbaybirding.org)
- charter services and bait shops
- tournaments, contests, and festivals

After it establishes the goals of promotional efforts, it is strongly suggested that the WRTG partner with WIN's Marketing Task Group to develop specific promotional projects. This group includes tourism professionals who have significant expertise in this area.

Outreach to urban populations presents its own challenges. Ken Dodge, MDNR's Urban Fisheries Biologist, conducts programs to enhance the urban fishing experience in the watershed. For example, the "fishing days" program provides rods, reels and tackle so kids can enjoy a day of summer fishing. The program introduces kids to the sport, connects them to their surroundings, and helps insure that in the future there will be an urban constituency to support protection of the resource. WIN might be able to help Mr. Dodge conduct the program in downtown areas in Flint and Saginaw. WIN might also assist downtown community centers such as Trinity St. John in Saginaw with incorporating fishing and other water related recreational opportunities into their preexisting youth programs. WIN's Youth Task Group could assist the WRTG in developing such projects.

⇒ A number of the people interviewed stressed the importance of promoting fishing among young people. Lake and stream fishing for panfish and suckers were identified as great activities to get kids excited about the sport. MDNR conducts a Young Angler program to involve youth ages 12 - 16 interested in fishing. With appropriate precautions regarding fish consumption, WIN might consider supporting existing activities, like St. Charles' sucker tournament, the annual ice fishing clinic held at the Bay City State Recreation Area, the annual children's tournament in Saginaw, and young angler education activities at fairs and festivals.

⇒ Finally, to assist local residents interested in working to enhance local rivers, WIN might develop a directory of subwatershed organizations. It could be posted on the WIN website. WIN might also work with the Partnership for the Saginaw Bay to convene an annual meeting of these groups to exchange information and project ideas.

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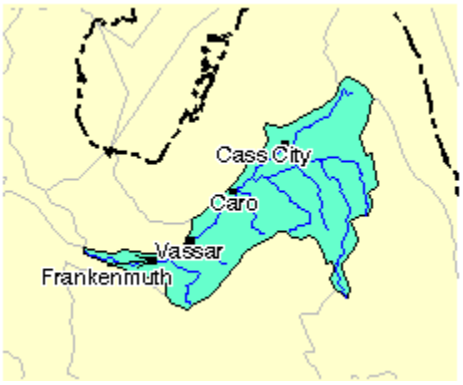
The Tributaries:

This section summarizes specific project opportunities and challenges in the tributaries and their watersheds. The watersheds are listed alphabetically.

The Cass River



Geography: The Cass River flows from western Sanilac County, west through central Tuscola County, and joins the Saginaw River just east of the confluence of the Tittabawassee, Saginaw, and Shiawassee.

Organizations: Tuscola 2001 in Caro is the only group we were able to identify. According to Betty Pattullo, with MSUE and Tuscola 2001, the Cass River Partnership is no longer active.

Resources: The Cass is popular among canoeing locals for its relatively long stretches of unobstructed flow. Most anglers are also local. Vassar hosts an annual "RiverFest" that includes a canoe race. The Cass is not as well known for fishing or recreation as other rivers in the watershed and has few active fishing groups, but is an important source of fishing recreation for local anglers.

Challenges: The first major impoundment on the river is at Frankenmuth. Fish passage is not possible past the dam. Another large dam owned by Michigan Sugar significantly blocks fish passage at Caro. The Cass is lacking in significant public access sites and canoe launches and has not been cultivated as a fishing resource.

Opportunities: The WRTG should continue outreach to identify groups and individuals interested in the resources of the Cass River. Boating or fishing could be another attraction for the three million tourists who visit Frankenmuth each year. The Cass River Partnership project identified specific sites where canoe and boat launches could be developed and where information signs would be beneficial. WIN could partner with Tuscola 2001 to implement some or all of these recommendations. Given the Cass's long stretches of open flow, it might be a good candidate for inclusion in a water trail, and could be promoted as part of a 'Canoe Saginaw Bay' package. These projects could be explored with the Saginaw County Convention and Visitors Bureau.

WIN might also take a more active role in the effort being led by the Friends of the Shiawassee National Wildlife Refuge to bring a U.S. Fish & Wildlife Service (USFWS) Great Lakes Visitors Center to the region. Partners working on the project include Refuge staff, Bridgeport Township, the Saginaw County Convention and Visitors Bureau, Saginaw Basin Land Conservancy, and The Conservation Fund. The USFWS Center would promote the national wildlife refuges within the Great Lakes, as well as other natural resources and recreational opportunities in the Saginaw Bay watershed and the Great Lakes region. The proposed site is on the Cass River, adjacent to I-75. This location is ideal to attract some of the more than 3 million people who exit I-75 at this point each year to visit Frankenmuth. It would also help to attract travelers heading north to fish, boat, and hunt. As part of the project the USFWS plans to install public walking trails along the Cass, which would improve access to and awareness of the river in this area. The contact for the project is Ed Becker, President of the Friends of the Shiawassee National Wildlife Refuge (See Appendix B).

The Chippewa River

Geography: The Chippewa River lies in the Tittabawassee watershed. A map of the Tittabawassee watershed appears below. The Chippewa runs from Osceola County through the northeastern section of Mecosta County, and flows through Mt. Pleasant and drains most of Isabella County. It flows through central Midland County, and meets the Tittabawassee at the City of Midland.

Organizations: The Chippewa Watershed Conservancy.

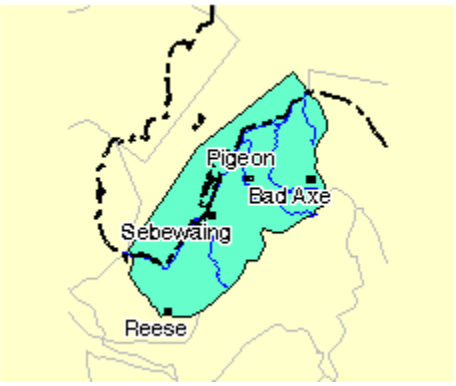
Resources: Significant stretches of the Chippewa in Isabella and Midland Counties retain their natural character. Public ownership along the river corridor helps maintain this character. Two active canoe liveries are operated in Isabella County upstream of Mt. Pleasant. Mt. Pleasant also maintains a riverside walking trail.

Challenges: Riverfront development threatens to alter the natural character of the river. Additionally, existing development (houses, farms, businesses) does not incorporate buffer strips, native plants, or other natural features to reduce damage from runoff.

Opportunities: Recreational kayakers, canoers, and fishermen use The Chippewa. Each group has a stake in its protection and improvement. These individuals and the members of the Chippewa Watershed Conservancy could be strong proponents for native planting, buffer strip installation, and other projects to protect or enhance the river.

East Coastal Basin

Geography: The rivers in the East Coastal Basin are generally narrow and shallow, with heavily eroded stream banks. They are, effectively, drains for the northern Thumb's agricultural lands. Each of the rivers feeds directly into the bay. They are: Quanicassee, Wiscoggin, Sebewaing, Shebeon, the Pigeon, and the Pinnebog.



Organizations: The Innovative Farmers of Michigan are working actively to promote best management practices in the Thumb and reduce the impact of agricultural runoff on the rivers in the East Coastal Basin and on Saginaw Bay.

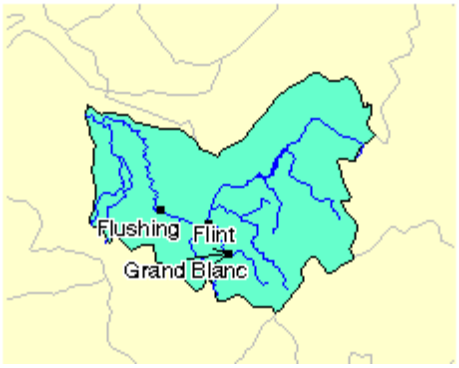
Resources: The town of Bay Port is home to an active commercial fishing port. The Quanicassee has been known to support natural reproduction of walleye and northern pike. Because residents live and businesses operate in close proximity to the Bay, they feel a stronger connection to it than many others in the watershed do. Drawing upon this tie to the resource, WIN might find new constituencies for its projects. Marinas and charter services, for example, have a strong interest in the resource.

Challenges: Streambank erosion and runoff are very significant issues in this watershed. Cleared land and lawns on waterfront home sites often reach to the very edge of the riverbank or shoreline. Drainage and diking of wetlands near the Quanicassee have severely impacted spawning areas and fish habitat.

Opportunities: WIN has supported an Innovative Farmers project to demonstrate farming techniques that reduce runoff and maintain profit levels. WIN should continue to identify similar projects, including a

model buffer strip program. WIN can also work to identify potential wetland restoration and preservation opportunities.

The Flint River



Geography: The Flint River flows from northern Lapeer County, westward into Genesee and through downtown Flint and then northwest into Saginaw County where it feeds into the Shiawassee in the center of the county. The Flint watershed is characterized by agricultural land in Lapeer County and heavy urbanization in Genesee. There are four dams on the River in the Flint area. Two, the Hamilton and Utah, are no longer in use but continue to block fish passage. The others, at Mott Lake and Holloway Reservoir, form water bodies that are used for recreational purposes.

Organizations: Groups active in the watershed include the Flint River Watershed Coalition, the Flint Muddler Minnows, the Flint Valley Steelheaders, and the Flint Dike Control Board.

Resources: A recent study of walleye spawning in the Flint River showed a good deal of natural reproduction. The first impoundment on the river occurs in downtown Flint at the Hamilton Dam so walleye have free run of the river for its entire reach through Saginaw and half its reach through Genesee. A canoeing guide was developed by the Michigan State University Extension (see bibliography for web address). Holloway Reservoir has a little known but very large population of catfish and several other game fish species, including bass, crappies and walleyes.

Challenges: By many accounts, the river is underutilized and additional access sites would be beneficial. There are no ongoing fishing tournaments or fishing events in Flint. The Hamilton and Utah dams block canoe and fish passage in downtown Flint. The Flint River has long shared a reputation with the city of being heavily polluted and an undesirable location for recreational activities.

Opportunities: A new appreciation of the river has begun to develop, perhaps most visibly demonstrated by the incorporation of the river into the logo for the University of Michigan Flint. Additionally, the Flint River Watershed Coalition has discussed holding river-themed events such as a cardboard regatta. The Michigan Department of Natural Resources has provided fishing days for children in several urban areas in Michigan. Flint might be considered a special emphasis area for this program. WIN could assist the Flint River Watershed Coalition, the Genesee County Parks Department, and other area groups in drawing attention to the value of the river and to efforts to improve access and recreational opportunities.

The Pine River

Organizations: Little Forks Conservancy

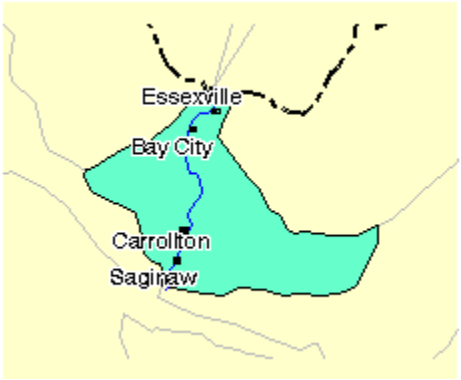
Resources: The headwaters of the Pine River in Isabella and Montcalm Counties are designated trout streams. The mainstem is stocked with brown trout annually by the MDNR. The river is home to a variety of cool water species in western Gratiot County. Water quality in the Pine is high from the headwaters downstream to Alma.

Challenges: One of the most heavily contaminated Super Fund sites in the country is located on the Pine River at St. Louis. The river bottom in this area contains large concentrations of DDT, PBBs, PCBs and an array of other toxic materials. As a result of this contamination, the most stringent fish advisories in the watershed exist on the Pine River. No fish downstream of St. Louis should be eaten.

The Environmental Protection Agency will begin removing these sediments in summer 1999. EPA and DEQ will be conducting some monitoring of water quality during the clean up, but there is some concern about the adequacy of these efforts. A number of local organizations, including the Saginaw Field & Stream Club, and the Chippewa Nature Center, are very concerned about the clean up process. They worry that it could introduce the toxics from the site into the Pine River, thus impacting the Pine and all areas downstream (including the Chippewa, Tittabawassee and Saginaw Rivers, and the Bay).

Opportunities: WIN is supporting an effort by Saginaw Valley State University to use the clean up of the Pine as a 'learning laboratory' for environmental chemistry students. Students will be involved in a 10-year monitoring program of the Pine River ecosystem. The project will provide valuable field experiences for students. The contact for the project is WRTG member Professor David S. Karpovich. In addition, citizens in St. Louis have expressed a renewed interest in the river as a recreational resource. Although recreational use should be limited until the clean up is complete, this interest might provide an opportunity to include local residents in WIN.

The Saginaw River



Geography: Four major tributaries, the Cass, Flint, Shiawassee and Tittabawassee, feed The Saginaw River. The river runs through the downtowns of Saginaw and Bay City. The Saginaw drains over 80% of the watershed.

Organizations: There is no organization specifically geared toward the Saginaw River. However, Saginaw Bay Walleye Club and the Saginaw Bay Advisory Council have conducted projects on the Saginaw River. With support from WIN, the Partnership for the Saginaw Bay Watershed is conducting a community-based outreach effort to develop benchmarks for a healthy river. This effort will provide the groundwork for a number of projects aimed at de-listing the River as an Area of Concern.

Resources: People are excited about and proud of the reputation of the Saginaw River as a top-notch walleye fishery. Seven well-developed boat launches provide good access, particularly in Saginaw and Bay City. These access points are heavily used -- Saginaw County and Bay County residents have 31,650 registered watercraft. The City of Saginaw has demonstrated a particularly strong commitment to providing fishing opportunities for residents. There are two public and one private boat launch on the river in downtown. Bay City has recently announced it will keep its Veterans Park boat launch open year round to accommodate anglers. The rebound of the walleye population is credited with much of the increased demand for fishing access. The responsiveness of Bay City and Saginaw to anglers' interests has helped make the Saginaw River a popular fishing destination

Challenges: Because it drains 80% of the watershed, the Saginaw bears the brunt of whatever happens upstream. Sediments in the Saginaw are heavily contaminated. Fish advisories warn against consumption

of any carp, catfish, or other bottom feeders. As the result of settlement of litigation with local, state and federal agencies, General Motors will be conducting a dredging operation to remove hot spots in the river. It is slated to begin in summer 2000.

Opportunities: As the reputation of the River as a premier fishing destination grows, adequate public access will be of continuing importance. Current facilities will need to be open and operating. WIN can assist Bay City, Saginaw and other riverfront communities in identifying opportunities to benefit from and meet the demand for public access. WIN can also continue to work closely with the Partnership for the Saginaw Bay Watershed as it develops benchmarks for a healthy Saginaw River. These benchmarks are intended to guide development of projects that improve the resource. WIN should assist and support in developing and launching these projects.

The Shiawassee River

Geography: The Shiawassee stretches from mid-Saginaw County (north of St. Charles), through Chesaning, down into Shiawassee County, through the town of Owosso and into Livingston and Oakland Counties. The Bad River, which flows from eastern Gratiot County through central western Saginaw County, feeds into the Shiawassee.

Organizations: Friends of the Shiawassee River, Friends of the Bad River, the Chesaning Conservation Club, the Shiawassee Flats Citizens and Hunters Association, Shiawassee Flats Advisory Council, St. Charles Wolverine Conservation Club, and Friends of the Shiawassee National Wildlife Refuge.

Resources: The Shiawassee and Bad Rivers host sucker, northern pike, and walleye runs and are also known for bass and crappie. The Shiawassee has long clear runs and is host to a canoe livery. Chesaning has an annual Showboat festival that draws thousands to the River. Local sports groups and civic organizations host a number of fishing tournaments in St. Charles, Chesaning and Owosso.

Challenges: The main pressures on the Shiawassee and Bad Rivers are agricultural runoff, streambank erosion, and sedimentation. Additionally, a dam at Chesaning blocks fish passage as do the radial gates (when closed from late September through December) in the Shiawassee State Game Area. The radial gates at the impoundment are closed and the state game area is flooded to create “wetlands” for waterfowl hunting. The flow of the river was diverted from its original confluence with the Bad for about a ¼ mile west to the location of the radial gates. When the radial gates are closed, fish passage is not possible. Additionally sedimentation is particularly acute just downstream of the radial gates. MDNR staff suggest fish passage is not an issue because there are no major fish runs during the time the gates are closed. Local boaters report that the channel is indiscernible and that the depth of water is extremely low. In some locations, determined boaters essentially paddle through mud. One local reported that bass have "virtually disappeared" and wondered whether sedimentation might be responsible. Others report that bass are still caught occasionally on the Bad. Although the Shiawassee probably always took a shallow, meandering path through wetlands in the region, runoff and sedimentation have impacted it.

Some stretches of the south branch of the Bad that are navigable cannot be used for canoeing because of erosion caused downed trees and logjams. The north branch of the Bad experiences periodic flooding followed by very low flow conditions. Wetlands drained for farmland in the early part of the century used to retain water and maintained a more normal flow of the river.

The Chesaning Dam presents another array of challenges. It completely obstructs the Shiawassee's flow only during the annual Chesaning Showboat Festival. The closure lasts for about one month. At all other times, a normal flow passes over the dam. However, fish passage is not possible because the dam acts as a mini-waterfall, too high for non-jumping species like walleye to pass. As repairs become necessary on the dam, some local residents are considering radial gates instead of a conventional dam. The gates can be open eleven months of the year to provide fish passage and closed just before and during the Showboat Festival.

Opportunities: Immediate project opportunities include an effort on the South Branch of the Bad to improve small boat access. WIN has provided funding to support The Friends of the Bad River's project to remove downed trees and snags to open the river channel for canoeing and recreational use. The Friends' activities in the past have been recognized for excellence by MDNR, and they work to insure that trees and other woody debris remain in the stream to provide fish habitat.

On the north branch of the Bad River, some farmers have found that frequent floods make riverfront land too difficult to maintain. Several of these farmers have participated in the Wetlands Reserve Program, described in Appendix N. Agricultural runoff and the loss of natural flow regulators like wetlands exacerbate streambank erosion on the Shiawassee. WIN may want to explore ways to assist in promoting and enhancing the wetland and conservation reserve programs in the Shiawassee watershed. While streambank restoration efforts are necessary, projects that attempt to solve the root of the problem may be more beneficial in the long run. The Gratiot County Soil and Water Conservation District might be an appropriate lead local partner.

WIN might partner with local organizations to explore fish passage at Chesaning when and if the dam is repaired or replaced.

The Tittabawassee River

Geography: The river and its watershed drain portions of Midland, Gladwin, Osceola, Mecosta, Isabella, and Gratiot Counties. It is the longest river in the watershed. The system includes the Cedar, the Pine, the Chippewa, the Sugar, the Tobacco, the Molasses, and the Big Salt.

Organizations: A number of organizations are active in the watershed, including the Chippewa Land Conservancy, the Little Forks Conservancy, the Northern Tittabawassee River Task Force, the Cedar River Watershed Council, and the Leon P. Martuch Chapter of Trout Unlimited.

Resources: The Tittabawassee supports the largest run of walleye of Saginaw Bay's tributaries. Other species include bass (rock, white, smallmouth and largemouth), northern pike, muskellunge, and trout (particularly in the Cedar, Tobacco, and Sugar Rivers). A number of boat and canoe launches exist in Midland, and access is generally good.

Challenges: Dams and impoundments limit fish passage upstream of Midland. Opportunities to allow fish passage are described below. However, fish passage at the Wolverine Power dams (Sanford, Edenville, Smallwood, and Secord) and at the Tobacco River dams (Beaverton and Chappel) does not appear feasible at this time. The dams are in operation and the installation of fish ladders either is infeasible or

the benefits would be limited. Stream bank erosion continues to be an issue in many areas. Issues relating to contamination in the Pine River are discussed in the separate section on that river.

Opportunities: If the appropriate technology can be identified, providing fish passage over the Dow Dam for walleye could greatly increase spawning habitat, and potentially increase walleye populations. Passage over the Dow Dam would free the Chippewa River for walleye spawning all the way to Mt. Pleasant and the Tittabawassee all the way to Sanford Dam. When water levels are high, walleye are able to pass over the Dow Dam. However this occurs infrequently and during years with low rainfall it does not occur at all.

As described above, a new structure to permit walleye passage is being tested in some reaches of the Grand River by Mr. Chris Bunt of the University of Waterloo, Ontario, Canada. WIN might consider bringing together a team of experts and using the Dow Dam as a pilot project to test this cutting edge technology. If successful, the passageway could provide a model not only for other sites in the Saginaw Bay watershed, but for rivers throughout the U.S. and Canada.

Groups such as the Cedar River Watershed Council and the Northern Tittabawassee River Task Force have helped the Saginaw Bay RC&D with streambank erosion inventories. WIN could assist these groups with streambank restoration efforts.

The Western Coastal Basin: The West Coastal Basin of the Bay watershed includes the Kawkawlin River, the Rifle River, The AuGres River, the Tawas River, the Pine (little), Saganing and Pinconning. Each of these rivers feeds directly into the Bay. The basin includes the communities of West Branch, Tawas, Au Gres, Pinconning, and Standish.

The Kawkawlin River

Geography: The north branch of the Kawkawlin flows from northeastern Midland County through central Bay County where it meets with the south branch and flows into Saginaw Bay.

Organizations: The Kawkawlin River Waterfront Property Owners Association is the most active property owners group in the watershed. Many of their efforts have been focused on weed control and keeping the mouth of the river open for boat passage.

Resources: The Kawkawlin supports a walleye spawning run. It is much smaller than the Tittabawassee run, but still contributes to natural reproduction. MDNR maintains three walleye rearing ponds in the watershed. The fingerlings are trucked to Saginaw Bay. Other species in the river include pike and largemouth bass.

Challenges: Weed control has been a particular concern for the Kawkawlin River Waterfront Property Owners Association. Zebra mussels have colonized the Kawkawlin. Public access to the river is limited. There is one public boat launch in Kawkawlin Township, but no launches closer to the Bay.

Opportunities: Interviewees suggested that WIN identify a site in Bangor Township for a public boat launch. A new facility could mitigate property owner complaints about trespassing boaters and anglers

and provide better access to a viable sport fishery. WIN may also be able to support efforts to reduce fertilizer use by waterfront property owners and to encourage the restoration of vegetation on the riverfront.

The Rifle River

Geography: The Rifle flows south through Ogemaw County, then western Arenac County and into Saginaw Bay. The towns of West Branch and Omer are both within the watershed.

Organizations: The Rifle River Restoration Committee includes members of area conservation groups, canoe liveries, RC&D, and the Dept. of Natural Resources. The current chairman of the Rifle River Restoration Committee is also president of the Mershon Chapter of Trout Unlimited.

Resources: The Rifle River's rustic character and long reaches within the Au Sable State Forest support a vibrant canoeing industry. Fly-fishing is growing in popularity on the river. Traditionally, the town of Omer (Michigan's smallest city) has held a sucker festival each year which draws a considerable crowd. In addition to suckers, salmon, steelhead trout, and northern pike are popular sports fish.

Challenges: The main problems on the Rifle River are sedimentation, streambank erosion, and disturbance of natural fish habitat. Each spring, canoe livery operators clear out much of the wood fall to provide clear passage the length of the river.

Opportunities: One suggestion made to improve fish habitat is to work with livery operators to minimize the removal of downed trees from the river. Enough trees could be moved to provide canoe passage, but leaving some wood debris would provide cover and nutrients, enhancing habitat values. The Rifle River Restoration Committee has already identified several projects. WIN could assist the committee in implementing these projects. WIN might also explore whether the Rifle would be an appropriate site to pilot a gravel spawning area restoration project. The project could be conducted in partnership with Trout Unlimited.

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Recommended Next Steps*:*

This Report outlines the most significant challenges confronting the fisheries in the Saginaw Bay watershed. It also identifies a number of opportunities to enhance them. The Report emphasizes the priorities and suggestions of residents, anglers and subwatershed organizations. Partnerships will be a critical element in WIN's success in taking advantage of these opportunities. Based on our evaluation, we suggest the following immediate next steps:

1. Conduct a dialogue about WIN's role in promoting fishing opportunities in the Saginaw Bay watershed. Consensus should be reached about the goals of such efforts. Projects to promote canoeing and kayaking might be less controversial initial projects than those promoting fishing might be. If pursued, a working committee focusing on canoeing should consider the following resources. Contact information for individuals and organizations is included in Appendices A & B.
   - Michigan State Extension's canoeing guide to the Flint River
   - Active nonprofit groups interested in paddling and businesses, including
     a) Bay City Kayak Club
     b) Rifle River Restoration Committee
     c) Tuscola 2001
     d) J.R. Watson (avid kayaker, member of Bay City Waterfront Task Force, member of Kawkawlin Waterfront Properties Association)
     e) Hector Chiunti, Michigan Department of Natural Resources, Water Trails programs

   Promotional materials and information should be integrated in or linked to the existing birding webpage.

2. Convene brainstorming session with representatives of all interested subwatershed and fishing organizations to develop list of project ideas.

3. Establish a working committee to examine access projects and work with existing subwatershed organizations to identify appropriate sites. The following individuals and/or organizations should be included in this effort. Detailed contact information is included in Appendix B.
   - Kawkawlin Waterfront Property Owners Association (Contact: Joe Vogl, President)
   - Tuscola 2001 (Contact: Betty Pattullo, Board Member)
   - Genesee County Parks (Flint River access) (Contact: Jim Bassett and Dave Munhall)
   - Midland County Parks (Tittabawassee, Chippewa, Big Salt) (Contact: Bill Gibson)

4. Immediately pursue partnerships with subwatershed organizations and others to implement projects. The following projects are suitable for immediate implementation:
   - Friends of the Bad River -- efforts to clear snags and create river trail between St. Charles & Ringwood Forest [WIN has acted on this recommendation. The Friends should be included as members of the WRTG.]
   - Friends of the Shiawassee National Wildlife Refuge -- join partnership to develop a U.S. Fish & Wildlife Service Great Lakes Visitors Center in Bridgeport Township, Saginaw County. (Contact: Ed Becker -- See Appendix B)
   - Partnership for the Saginaw Bay Watershed -- encourage WIN members to become actively involved in the benchmarking project; stand ready to provide financial and technical support for emerging projects. (Contact: Bill Wright, President, Partnership for the Saginaw Bay Watershed, WRTG Member).

- Rifle River Restoration Committee -- Determine whether WIN can assist in implementation of the Committee's restoration plan (Contact: Katherin Schrouder, MDNR in Bay City (See Appendix B))
- The Dow Chemical Company -- explore possibility to retrofit fish passage structure on the Dow Dam. Form a project team to include representatives of Dow Chemical (Jeff Feerer, Environmental, Health, and Safety Leader, WRTG member), MDNR Staff (Jim Baker, Fisheries Biologist, WRTG member), and selected experts listed in Appendix P.

5. The WRTG might consider establishing committees to convene the organizations working to protect wetlands and to enhance river corridors to explore specific project opportunities. Drain commissioners, or their representatives, should be included in these committees. An appropriate first step might be to work with Doug Young, Gratiot County Soil Conservation District (see Appendix A), to identify a drain or river corridor for an intensive pilot buffer strip program.

6. Identify project champion to implement native planting demonstrations for riverfront and lakefront property owners. Initial candidates might be the Kawkawlin Waterfront Property Association (Contact: Joe Vogl) (given their concerns about weed growth) and the Chippewa Land Conservancy (strong interest in preserving natural river corridors) (Contact: John Mitchell -- See Appendix A).

7. Work with subwatershed organizations to identify specific opportunities to improve in-stream habitat enhancement and protection. Initial candidates might be Trout Unlimited (Contact: John Van Dalen, Leon P. Martuch Chapter, see Appendix A for Mr. Van Dalen and additional Trout Unlimited chapters) and Cedar River Watershed Council (Contact: Walt Hart -- See Appendix A).

8. Expand participation in the WRTG to include representatives of subwatershed organizations, fishing groups and drain commissioners. Target specific groups and divide contacting them among WRTG members. As a first step, we recommend sending all representatives of organizations interviewed for the Scoping Study a copy of this Report, WIN project description forms and a cover letter inviting them to join the WRTG. We propose that letters would be sent to all subwatershed organizations and fishing groups identified in Appendix A.

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