Montana Fish, Wildlife & Parks

2300 Lake Elmo Drive
Billings MT 59105

March 22, 2005

TO: Environmental Quality Council
Director's Office, Dept. of Environmental Quality
Montana Fish, Wildlife & Parks*
Director's Office
Parks Division
Fisheries Division
Wildlife Division
Lands Section
Design & Construction
Legal Unit
Regional Supervisors
Mike Volesky, Governor's Office
Sarah Elliott, Press Agent, Governor's Office*
Montana Historical Society, State Preservation Office
Janet Ellis, Montana Audubon Council
Montana Wildlife Federation
Montana State Library*
George Ochenski
Montana Environmental Information Center
Wayne Hirst, Montana State Parks Foundation
FWP Commissioner Shane Colton
Sharon Moore, DNRC Area Manager, Southern Land Office
Other Local Interested Peopleor Groups
* (Sent electronically)

RECEIVED
APR 05 2005
LEGISLATIVE ENVIRONMENTAL POLICY OFFICE

Ladies and Gentlemen:

The enclosed draft Environmental Assessment (EA) has been prepared for the introduction of sterile tiger muskies into Lake Elmo and Lake Josephine in Billings. This will add a limited trophy fishery in these two important urban lakes, increase angling opportunities and the opportunity to fish for tiger muskies in Region 5, and improve the quality of the fisheries in those lakes. Questions and comments will be accepted until **April 25, 2005**, and may be sent to Ken Frazer, Regional Fisheries Biologist, Fish, Wildlife & Parks, 2300 Lake Elmo Drive, Billings MT 59105; or sent by e-mail to kfrazer@mt.gov.

If you have questions or need additional copies of the draft EA, please contact Montana Fish, Wildlife & Parks at 247-2940.

Thank you for your interest,

Harvey E. Nyberg
Regional Supervisor

Enclosure

MONTANA FISH WILDLIFE & PARKS

MEPA/NEPA CHECKLIST
ENVIRONMENTAL ASSESSMENT

Introduction of tiger muskies into Lake Elmo and Lake Josephine as a biological control and to increase angling opportunities

PART I. PROPOSED ACTION DESCRIPTION

1. Type of Proposed State Action:

The action proposed by this EA is to introduce sterile tiger muskies (the F1 hybrid of female muskellunge, *Esox masquinongy* X male northern pike, *E. lucius*) into Lake Elmo and Lake Josephine in Billings. Goals of this proposal are to improve the quality of the fisheries in these two important urban lakes by using tiger muskies as a biological control on the sucker and stunted panfish populations in the lakes; to increase angling opportunities in both lakes by adding a limited trophy fishery; and to increase the opportunity to fish for tiger muskies in Region 5.

2. Agency Authority for the Proposed Action:

Montana Fish, Wildlife and Parks (MFWP) "...is hereby authorized to perform such acts as may be necessary to the establishment and conduct of fish restoration and management projects..." under statute 87-1-702.

3. Name of Project:

Tiger Muskie Introduction for Lake Elmo and Lake Josephine

4. Estimated Commencement Date: Summer 2005

Future stocking will be based on management needs.

5. Location and Description of area Affected by Proposed Action (county, range and township):

Lake Elmo

Lake Elmo is a 65-acre lake located in the Billings Heights in the northeast corner of Billings (T 1 N, R 26 E, Sec. 10, 15). It is the center of Lake Elmo state Park managed by MFWP. Lake Elmo State Park attracts many recreationists throughout the year, and a significant portion of these recreational users are anglers. Lake Elmo is a natural lake that was expanded as a storage reservoir on the Billings Bench Water Association (BBWA) irrigation system. The water users control water levels in Lake Elmo during the irrigation season. Water from the Yellowstone River is fed into and stored in Lake Elmo via the BBWA canal. During the irrigation season, stored water is released downstream as needed to meet irrigation demands. These irrigation releases result in continually fluctuating water levels in Lake Elmo during the irrigation season. The BBWA is very aware of the recreational use on Lake Elmo, however, and does an excellent job managing water levels to minimize recreational impacts.

Lake Elmo was first stocked with fish in the early 1930's, and has been actively managed as a fishery since 1984. Early plants into Lake Elmo included yellow perch, crappie, sunfish and largemouth bass, all of which established self-sustaining populations that have persisted in the lake at some level ever since. Although Lake Elmo does produce an occasional nice crappie or yellow perch, most of the crappie, yellow perch and sunfish in the lake are stunted. In general, the reproductive success of these panfish appears to outpace the food supply available in the lake, and the resulting fishery has been of only limited interest to most anglers. Largemouth bass have never been very successful in Lake Elmo due to the fluctuating water levels and resulting lack of cover. A serious effort was made to establish a largemouth bass fishery in Lake Elmo beginning in 1984. Large numbers of largemouth were stocked into Lake Elmo through the mid-1990's, and although these stocked bass did well through the summer and fall, few of them successfully survived the winter. A few largemouth are still found in Lake Elmo and some of them successfully reproduce, but a good largemouth bass fishery has never been established in the lake. Channel catfish were also stocked into Lake Elmo in 1984, and have been planted annually, when available, since 1988. A channel catfish fishery has been established in the lake with fish over 10 lbs being caught.

Fisheries management at Lake Elmo took a major turn in 1998 when catchable-sized rainbow trout were stocked for the first time. The rainbows did well and attracted a huge increase in angler use at the lake. Lake Elmo is now managed as a combination put-and-take trout fishery and channel catfish fishery. Annual planting requests for Lake Elmo include 9,600 catchable rainbows split between spring and fall plants, and 7,800 channel catfish stocked in the fall. Yellow perch, crappie and pumpkinseed sunfish populations continue to fluctuate on an annual basis in the lake. Most of these fish are stunted and of only limited interest to anglers. Because Lake Elmo receives its water directly from the Yellowstone River via the BBWA canal, any fish species found in the Yellowstone River in the vicinity of the ditch intake can potentially end up in Lake Elmo. As a result, much of the fish biomass in Lake Elmo is tied up in sucker flesh. White suckers are very abundant in Lake Elmo along with lower numbers of longnose and shorthead redhorse suckers. Lake Elmo also contains a fairly abundant carp population.

Lake Josephine

Lake Josephine is a 20-acre lake located on the southern edge of Billings along the Yellowstone River (T1S, R26E, Sec. 16C). Lake Josephine is an old gravel pit that was reclaimed and developed into a park, which is managed by the Billings Parks and Recreation Department. No swimming is allowed in Lake Josephine, so angling and nonmotorized boating are the main recreational opportunities associated with the lake. Lake Josephine is a popular family fishing lake attracting a lot of young anglers. The fish populations found in Lake Josephine are similar to those reported for Lake Elmo with the exception of the stocked rainbow trout. Like Lake Elmo, Lake Josephine supports good populations of stunted crappie, yellow perch and sunfish, which can all provide exciting fishing for young anglers. No records are available of when these fish were first stocked into Lake Josephine. Also like Lake Elmo, Lake Josephine receives irrigation water from the Yellowstone River and, during extreme high water on the Yellowstone River, can actually become part of the Yellowstone River because it is located in the Yellowstone River flood plain. Any fish found in this section of the Yellowstone are likely to be found in Lake Josephine. Again, suckers constitute a large part of the fish biomass found in Lake Josephine. The fishery in Lake Josephine has been actively managed since 1987 when FWP first

stocked largemouth bass into the lake to supplement an existing bass population. Largemouth bass are well established in Lake Josephine, and it has been one of the most consistent bass fisheries in Region 5 for quite a while. Because the large number of small panfish in Lake Josephine prey on young bass, it receives a plant of 10,000 largemouth bass every-other year to supplement ongoing natural reproduction. Once bass get large enough to avoid predation by small panfish, they grow very well in Lake Josephine. Reports of 5 lb plus bass are fairly common from Lake Josephine. Even though Lake Josephine supports a robust largemouth bass population to prey on the small panfish in the lake, the bass do not provide enough predation to prevent stunting. Channel catfish were stocked into Lake Josephine for four years in the early 1990's. Stocking was discontinued due to genetic concerns of stocked catfish mixing with wild catfish populations in the Yellowstone River. Catfish from these plants or from the Yellowstone River are now successfully reproducing in Lake Josephine and have established a fishery.

6. **Project Size: Estimate the number of acres that would be directly affected:**

This project directly affects two lakes already managed by MFWP in Billings as urban fisheries. Lake Elmo is approximately 65 acres and lake Josephine is approximately 20 acres.

7. **Map/site plan:** See attached Figure 1.

8. **Listing of any other Local, State or Federal agency that has overlapping or additional jurisdiction:**

Both lakes are on land owned by MFWP. Lake Elmo is within Lake Elmo State Park. Water in Lake Elmo is controlled by BBWA. Lake Josephine is within Riverfront Park managed by the Billings Parks and Recreation Department.

9. **Narrative summary of the proposed action or project including the benefits and purpose of the proposed action:**

Purpose, Need and Scope of Project

This proposal is designed to provide significant recreational benefits to both Lake Elmo and Lake Josephine with very little potential negative impacts. Both lakes contain stunted populations of yellow perch, crappie and sunfish, along with strong populations of white suckers and fewer longnose and shorthead redhorse suckers. Both lakes are small and have fairly rapid water exchange rates, which limit plankton production. The small panfish in both lakes compete directly with populations of larger suckers for a limited food supply. Incidental zooplankton sampling has shown that plankton populations in both lakes are extremely sparse, even during the warm summer months when productivity should be at its highest. This limited zooplankton supply also impacts the primary game species in both lakes.

Smaller largemouth bass in Lake Josephine are dependent upon, and compete for, this same plankton and benthic food base. This competition reduces growth rates and survival of young bass, which ultimately limits the population of adult bass in the lake. The larger bass not only provide an important recreational fishery in Lake Josephine, they are also the main predator in the lake that helps provide some control on panfish numbers. The rainbow trout being stocked into Lake Elmo also depend upon this same limited food supply. White suckers have been shown to compete directly with both rainbow trout and kokanee for zooplankton and benthic

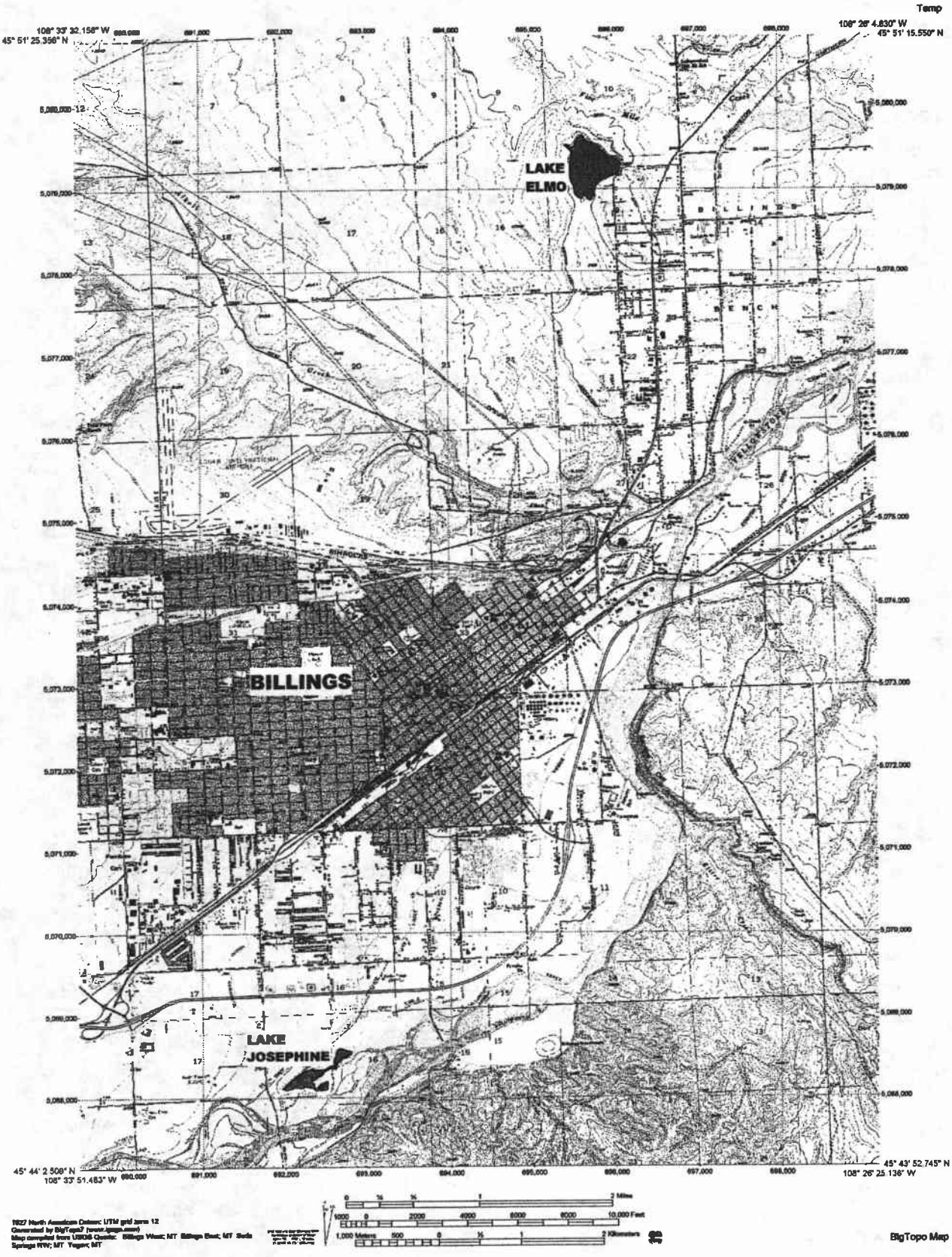

Figure 1. Locations of Lake Elmo, northeast corner of Billings, and Lake Josephine, south of Billings.

organisms (Barton and Bidgood 1980, Schneidervin and Hubert 1987). All three species select for Daphnia in the zooplankton population, however white suckers tend to select Daphnia at a slightly smaller size than is preferred by rainbow or kokanee (Schneidevin and Hubert 1987). A large white sucker population can crop off Daphnia before they reach the size preferred by the salmonids. Because rainbows are stocked into Lake Elmo at a larger size, this competition may not seriously impact survival of these stocked fish, but it does limit growth rates.

The main purpose for introducing tiger muskies into Lake Elmo and Lake Josephine is to provide a large predator that will prey primarily on the large suckers found in both lakes. Previous studies suggest that, in the absence of a large predator such as northern pike or muskie, white sucker populations are largely self-regulating (Colby et al. 1987). Microcrustaceans are important in the diet of small suckers (Olson 1963). Beyond this very early life history stage, all size groups of suckers compete for a common forage base (Olson 1963, Johnson 1977, Chen and Harvey 1995). As a result, intraspecific competition controls the dynamics of a sucker population. In closed systems like Lake Elmo and Lake Josephine, this competition can control the recruitment of small suckers, leaving a population composed predominantly of large older suckers. Because large white suckers constitute a major component of the competition in both lakes, reduction of these fish would be an important step in improving the overall fisheries in both lakes.

Benefits

Tiger muskies were selected for this program for several reasons. First, tiger muskies are a sterile hybrid. An extensive literature review into the reproductive potential of the tiger muskie revealed no documentation of their reproducing in the wild (Satterfield et al. 1994). Using a sterile fish helps limit several potential impacts from this type of project, and provides better control on the number of large predators present in both Lake Elmo and Lake Josephine. Second, tiger muskies select for large prey (Engstrom-Heg et al. 1986), and the size of the prey taken continues to increase as the tiger muskies grow. Plans are to stock tiger muskie at 6 to 9 in long, so they would be large enough to avoid predation by the large number of small panfish present in both lakes. On the other hand, these stunted panfish populations would provide an immediate prey base for the tiger muskies. As the tiger muskies grow, they would soon be large enough to start preying on the abundant white sucker populations found in both lakes. Third, tiger muskies prefer soft-rayed fish as forage (Tomckoet al. 1984, Engstrom-Heg et al. 1986, Storck and Newman 1986) and, were found in prey selection experiments to select white suckers over other prey species when the suckers were the largest fish present.

Considerable evidence supports that tiger muskie can be effective predators in reducing sucker populations in lakes. One of the best local examples is Lebo Lake located just south of Two Dot, MT. Lebo Lake was first planted with trout in 1936 and was managed as a trout lake until 1982. It was a popular trout fishery with a history of producing some very large trout. Lebo Lake was chemically renovated to eliminate suckers and a stunted panfish population when the lake was drawn down for dam repairs in 1963. Suckers were not completely eliminated from the system and, once the lake refilled, the white sucker population expanded rapidly into the newly enlarged reservoir. As the sucker population expanded, the trout fishery declined until trout stocking was discontinued in 1982. Tiger muskies were stocked into Lebo Lake in 1988, 1989 and 1991 as a biological control on the white sucker population. The first plants were successful, and the effect

on the sucker population was almost immediate. Initial impacts were evident on small suckers, but it appeared the size of suckers selected as prey grew as fast as the tiger muskie. Within four years, the white sucker population was almost totally eliminated from Lebo Lake.

Gill net sampling in Lebo Lake between 1980 and 1987 produced average catches of between 13 and 82 white suckers less than 12 in long per net. In the fall of 1989, after tiger muskies had been in the lake for one year, catch rates for suckers less than 12 in dropped to 3.8 fish per net. In 1990 the catch rate declined again to only 1.2 white suckers less than 12 in per net (Frazer et al. 1992).

The overall catch rate for 20 gill nets fished in Lebo Lake between 1980 and 1987, prior to the introduction of tiger muskie, averaged 52.7 white suckers per gill net. Forty-seven gill nets fished between 1989 and 1997 caught an average of 10.3 white suckers per gill net. Most of these suckers were captured in 1989 and 1990 before the tiger muskies were large enough to feed on the larger suckers in the lake. The white sucker catch for 31 gill nets fished in Lebo Lake between 1992 and 1997 averaged only 2.5 suckers per net. Average catch rates for white suckers in 15 gill nets fished in the fall of 1995, 1996 and 1997 was below one white sucker under 12 in per net each year, and between 0.67 and 1.5 white suckers 12 in and longer per net for the three years (Frazer et al. 1992).

Eight frame traps were fished overnight in Lebo Lake in 1988, the first year tiger muskies were introduced into the lake. Four traps were fished in the spring and four in the fall. These traps caught a total of 3,159 white suckers for an average catch rate of 395 white suckers per net. Eight trap nets fished two per year in the fall between 1994 and 1997 captured a total of 42 white suckers for an average catch rate of 5.3 per net. These traps were fished in the same areas of the lake that the 1988 traps had been set.

Lebo Lake also provided the opportunity to evaluate the effects sucker removal could have on a trout fishery in the lake. In July of 1993, one of the landowners at Lebo Lake planted 8,000 Arlee rainbows into the lake. Half of these rainbows averaged 5.5 in long and half were 8.8 in long. Three rainbows captured in gill nets on October 19, 1993 averaged 12.7 in long and 0.81 lb. Four rainbows from this plant captured during fall sampling in 1994 averaged 20.4 in long and 4.81 lb. Two rainbows captured in the fall of 1995 were 23.4 in and 26.0 in long and weighed 9.1 and 9.8 lb. No additional trout were planted into Lebo Lake due to limited public access; however, these data showed how trout could thrive in the lake once sucker numbers were significantly reduced.

The first attempt to use tiger muskies as a biological control on suckers in Montana was in H C Kuhr Reservoir near Chinook. This 125-acre reservoir on private land was a good trout fishery until white suckers appeared in the lake in the early 1980's. As the sucker population expanded, trout growth and survival became poor (Gilge 1996). When tiger muskies were introduced in 1987, the lake contained a huge white sucker population along with some other minnows. Within three years, tiger muskies totally eliminated the white sucker population in the lake, then growth rates and condition factors of the tiger muskies in the lake began to decline (Gilge, personal communications). Kuhr Reservoir has since winterkilled and was started over as a trout lake.

The Colorado Department of Natural Resources has been managing a number of waters with tiger muskie since the mid-1980's. They have documented a number of lakes where tiger muskies have successfully controlled populations of white suckers and common carp (Satterfield et al. 1994). Tiger muskies were first introduced, in very low numbers, into Horseshoe Reservoir in Colorado in 1986. This 160-acre reservoir had been a trout fishery until it was overrun with white suckers. White suckers made up 95% of the gillnet catch from Horseshoe Reservoir in 1988 at 57 per net night, while trout had dropped to 1.7% of the catch at 1.8 per net night. In 1995, 9 years after tiger muskies were first introduced, the white sucker catch had dropped to 2.8 per net night while the trout catch had increased to 13.5 per net night. After having tiger muskies in the reservoir for 10 years, the relative abundance of white suckers had dropped approximately 95% in fall gill net samples. At the same time, the relative abundance of trout in fall gill net samples had risen 375% (Melby 1996). Angler catch rates were up for trout, and the average size of the trout caught was larger than before tiger muskies were introduced. All of this was accomplished without increasing stocking rates for trout (Melby, personal communication). At the same time the tiger muskies have provided a popular "trophy" fishery in Horseshoe Reservoir, producing reasonable numbers of tiger muskies over 40 in long and 20 lb in weight (Melby 1996).

Deadmans Basin Reservoir is one of the latest examples where tiger muskies have been stocked as a biological control on an overabundant white sucker population in Montana. Evaluations are continuing, and they have been complicated by persistent drought conditions that have plagued Deadmans since 1999. Recent data indicates, however, that tiger muskies are having the desired impacts. Like Lebo Lake, Deadmans was a popular trout reservoir that was eventually overrun by white suckers. It received annual plants of rainbow trout and kokanee but, by the late 1990's, angler use and success had dropped significantly. The average size of rainbow captured in gill nets was down to 11 in, and white suckers were the dominant species in most gill net sets. Small plants of tiger muskies were made into Deadmans for three consecutive years beginning in 1998. Gill net catch rates for white suckers first started to show a significant declining trend in the spring of 2000 after tiger muskies had only been in the lake for two seasons. This trend has continued with white sucker catch rates dropping from a high of 49.6 per net in the spring of 1999 to only 5.3 per net in the spring of 2004. This decline was also noted in fall gill nets, where the white sucker catch rate dropped to only 2.2 per net in the fall of 2003. At the same time, the average size of the remaining white suckers has shown a steady increase indicating the tiger muskies are selecting larger white suckers as the predator increases in size (Olsen and Frazer 2005). As the sucker competition has been reduced, the average size of rainbows being caught in gill nets has been increasing, and rainbow and kokanee catch rates have improved (Olsen and Frazer 2005). Tiger muskies are now providing a popular secondary fishery at Deadmans, with many anglers going to Deadmans specifically targeting tiger muskie. Anglers are starting to catch tiger muskies over the 40 in minimum size limit.

Another reason for selecting tiger muskies for this project is their rapid growth rate and their popularity as a trophy fish. Even though opportunities to fish for tiger muskies are very limited in Montana, they are becoming popular with a growing number of anglers. The low number of tiger muskies that are proposed to be stocked into Lake Elmo and Lake Josephine would limit the potential of a secondary tiger muskie fishery in both lakes. Yet this project would allow anglers to occasionally hook into a trophy sized fish in these popular urban lakes.

Potential Impacts and Limitations

Reproduction

As stated earlier, many of the potential impacts of this proposal are greatly reduced by using a sterile hybrid as a biological control. Using tiger muskies allows the number of large predators in the system to be closely controlled by adjusting the number of fish stocked and, if necessary, by adjusting regulations to increase harvest on fish already planted. Using a sterile fish makes it relatively easy to reverse the management alternative, if it proved to be undesirable in either Lake Elmo or Lake Josephine. By discontinuing stocking and, if appropriate, increasing harvest of established tiger muskie, these fish could be removed from the system in a relatively short period of time. Because tiger muskies will not reproduce, continued stocking would be required to maintain this fishery once it became established.

Initial plans would be to establish a tiger muskie density of about one fish per acre in both lakes, 65 fish in Lake Elmo and 20 fish in Lake Josephine. Future population levels could be controlled fairly closely based on management needs.

Illegal Transplants

Using a sterile hybrid removes another major concern associated with stocking other predatory fish like northern pike or walleye in new waters. Even if tiger muskies were captured from Lake Elmo or Lake Josephine and illegally moved to other waters, they would not establish reproducing populations that could destroy existing fisheries in these waters.

Predation on Stocked Gamefish

It is likely there would be some predation on game species in Lake Elmo and Lake Josephine, but impacts would be minimal. As previously indicated, tiger muskies prefer soft-rayed fish as forage, and have actually selected for white suckers in prey selection experiments. It is anticipated that once tiger muskies grow large enough to prey on the sucker population in both lakes, suckers would become their primary food base. Based on past experience in Lebo Lake and Deadmans Basin, tiger muskies would grow fast enough to start preying on larger suckers by their second summer, and the size of suckers being preyed upon would continue to increase as the tiger muskies grow. The small number of tiger muskies proposed for each lake would also limit the potential predation problem. Because rainbow and channel catfish are already being stocked into Lake Elmo and largemouth bass into Lake Josephine, their stocked levels could be increased to compensate for tiger muskie predation.

Predation on Ducks, Frogs, and other Non-fish Species

Another potential impact from this proposed introduction could be an increase in predation on non-target prey such as baby ducks and frogs. Tiger muskies are a large predator and, like many fish species, are opportunistic in their feeding habits. Given the right circumstances, tiger muskies and most other large predatory fish are known to prey on birds, frogs, small mammals, and other non-fish food items. Incidents of this kind are generally very rare. A report by the Washington Department of Fish and Wildlife presented an annotated bibliography of food habit

reports for northern pike, muskellunge and tiger muskies (Tipping 2000). The combined studies in this bibliography reported findings for 54,204 esocid stomachs, including 49,908 northern pike, 2,860 muskellunge, and 1,436 tiger muskie. In most studies the stomach content included only fish and invertebrates. Other food items found in these 54,204 stomach samples included: one baby redwing blackbird, one baby muskrat, 28 other small mammals, (mostly mice and voles), 44 frogs, several mudpuppies and tadpoles, one snake and 45 waterfowl. Most of the waterfowl were coots, and 45% of the ducks were less than one week old. Research for one study on a waterfowl refuge observed broods of ducklings for 5,535 duckling minutes in a pike lake with no evidence of pike predation. One duckling was actually tethered and towed through a pool full of pike with no attacks. The small number of tiger muskie proposed for Lake Elmo and Lake Josephine combined with the documented low natural occurrences of non-fish predation will limit any potential impacts from non-target predation in either lake.

Injury to Swimmers

Another concern that has been expressed is the potential danger of introducing a large "toothy" predator into a popular swimming lake like Lake Elmo. A few cases of humans being bitten by muskellunge or pike have been documented, but these incidents are extremely rare. Tiger muskies cannot eat anything larger than they can swallow whole, so they will not purposely attack something as large as a person. Although tiger muskies and pike have numerous sharp teeth in their mouth, their teeth are designed for holding slippery prey until it can be swallowed. Unlike the teeth of more notorious fish like white sharks and pirannahs, a pike's teeth are not designed for shearing flesh from larger prey. In the rare cases where a human has been bitten by a member of the pike family, the injuries have generally been minor punctures and superficial lacerations. In these few documented cases, the person was dangling a small part of their body, usually a fingers or toes in the water, and the fish attacked what appeared to be a small prey item. Considering the large number of pike and muskie lakes that are also popular swimming lakes, and the rarity of such attacks, it would be many times more likely that a swimmer in Lake Elmo would be injured by stepping on a piece of glass in the swimming area than by being bitten by a tiger muskie. A fisheries biologist who spent many years managing muskie fisheries in the mid-west, recently indicated he had never even heard of a human being bitten by a muskie or pike (Don Tenant, personal communication).

Escapement

If tiger muskies are established in Lake Elmo and Lake Josephine, some of these fish may escape from the lakes and get into the Yellowstone River. Some fish are known to escape into the irrigation ditch downstream from Lake Elmo. No study has been conducted to determine if any of these fish are able to make it all the way to the Yellowstone River. The ditch system downstream of Lake Elmo is quite small, and much of it flows underground. It is unlikely that many escaped fish would be able to negotiate this ditch system and reach the Yellowstone River.

Lake Josephine is within the floodplain of the Yellowstone River, and this lake system has become part of the river during extreme flow events. When this happens, tiger muskies in Lake Josephine will have direct access to the Yellowstone River. Tiger muskies are not typically riverine fish and prefer lake like environments with limited current. It is unlikely many tiger

muskie would leave the lake environment of Lake Josephine to enter the flowing river, even when the lake was flooded. Low densities of tiger muskies proposed for both Lake Elmo and Lake Josephine would severely limit the numbers of tiger muskies that could potentially get into the Yellowstone River. Again, the single greatest factor limiting potential impacts from escaped fish is the sterile nature of the tiger muskie. Because they would not be able to reproduce, the tiger muskie population in the Yellowstone River would always be limited to the few fish that escaped. Tiger muskies have been collected from a number of river systems in eastern Colorado below reservoirs where they have been stocked, yet they have not established any significant riverine populations in eastern Colorado (Satterfield et al. 1994).

10. List of agencies consulted during preparation of the EA:

Billings Parks and Recreation Department
Billings Bench Water Users Association

PART II. ENVIRONMENTAL REVIEW

1. Evaluation of the impacts of the Proposed Action including secondary and cumulative impacts on the Physical and Human Environment.

A. PHYSICAL ENVIRONMENT

1. LAND RESOURCES Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated*	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. **Soil instability or changes in geologic substructure?		X				
b. Disruption, displacement, erosion, compacton, moisture loss, or over-covering of soil which would reduce productivity or fertility?		X				
c. **Destruction, covering or modification of any unique geologic or physical features?		X				
d. Changes in siltation, deposition or erosionpatterns that may modify the channel of a river or stream or the bed or shore of a lake?		X				
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				
f. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

2. AIR Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated*	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. **Emission of air pollutants or deterioration of ambient air quality? (also see 13 (c))		X				
b. Creation of objectionable odors?		X				
c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally?		X				
d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants?		X				
e. ***For P-R/D-J projects, will the project result in any discharge, which will conflict with federal or state air quality regs? (Also see 2a)		X				
f. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Air Resources (Attach additional pages of narrative if needed):

* Include a narrative explanation under Part III describing the scope and level of impact. If the impact is unknown, explain why the unknown impact has not or can not be evaluated.

** Include a narrative description addressing the items identified in 12.8.6041a (ARM)

*** Determine whether the described impact may result and respond on the checklist. Describe any minor or potentially significant impacts.

**** Include a discussion about the issue in the EA narrative and include documentation if it will be useful.

3. WATER Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated*	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. *Discharge into surface water or any alteration of surface water quality including but not limited to temperature, dissolved oxygen or turbidity?		X				
b. Changes in drainage patterns or the rate and amount of surface runoff?		X				
c. Alteration of the course or magnitude of floodwater or other flows?		X				
d. Changes in the amount of surfacewater in any water body or creation of a new water body?		X				
e. Exposure of people or property to water related hazards such as flooding?		X				
f. Changes in the quality of groundwater?		X				
g. Changes in the quantity of groundwater?		X				
h. Increase in risk of contamination of surface or groundwater?		X				
i. Effects on any existing water right or reservation?		X				
j. Effects on other water users as a result of any alteration in surface or groundwater quality?		X				
k. Effects on other users as a result of any alteration in surface or groundwater quantity?		X				
l. ****For P-R/D-J, will the project affect a designated floodplain? (Also see 3c)		X				
m. ***For P-R/D-J, will the project result in any discharge that will affect federal or state water quality regulations? (Also see 3a)		X				
n. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Water Resources (Attach additional pages of narrative if needed):

* Include a narrative explanation under Part III describing the scope and level of impact. If the impact is unknown, explain why the unknown impact has not or can not be evaluated.

** Include a narrative description addressing the items identified in 12.8.6041a (ARM)

*** Determine whether the described impact may result and respond on the checklist. Describe any minor or potentially significant impacts.

**** Include a discussion about the issue in the EA narrative and include documentation if it will be useful.

4. VEGETATION Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Changes in the diversity, productivity or abundanceof plant species (including trees, shrubs, grass, crops, and aquatic plants)?		X				
b. Alteration of a plant community?		X				
c. Adverse effects on any unique, rare, threatened, or endangered species?		X				
d. Reduction in acreage or productivity of any agricultural land?		X				
e. Establishment or spread of noxious weeds?		X				
f. ****For P-R/D-J, will the project affect wetlands, or prime and unique farmland?		X				
g. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

** 5. FISH/WILDLIFE Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Deterioration of critical fish or wildlife habitat?		X				
b. Changes in the diversity or abundance of game animals or bird species?			X			5b
c. Changes in the diversity or abundance of nongame species?			X			5c
d. Introduction of new species into an area?				X	YES	5d
e. Creation of a barrier to the migration or movement of animals?		X				
f. Adverse effects on any unique, rare, threatened, or endangered species?		X				
g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal or illegal harvest or other human activity)?			X			5g
h. ****For P-R/D-J, will the project be performed in any area in which T&E species are present, and will the project affect any T&E species or their habitat? (Also see 5f)			X			5h
i. ***For P-R/D-J, will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)				X	Yes	5i
j. Other:						

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

5b, 5c. It is possible that stocked tiger muskies could occasionally prey on waterfowl or other nongame species in Lake Elmo or Lake Josephine. This issue is discussed in more detail under potential impacts.

5d. The goal of this project is to introduce a new fish species into Lake Elmo and Lake Josephine. Because tiger muskies are sterile hybrids, it would be possible to eventually remove this species from these lakes if desired.

5g. If this proposal is successful in improving the fisheries in Lake Elmo and/or Lake Josephine it will likely increase angling pressure on the lakes.

5h. The lower Yellowstone River contains pallid sturgeon. If tiger muskies escaped into the Yellowstone they could possible travel downstream into pallid sturgeon water.

5i. See 5d.

B. HUMAN ENVIRONMENT

6. NOISE/ELECTRICAL EFFECTS Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Increases in existing noise levels?		X				
b. Exposure of people to serve or nuisance noise levels?		X				
c. Creation of electrostatic or electromagnetic effects that could be detrimental to human health or property?		X				
d. Interference with radio or television reception and operation?		X				
e. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

7. LAND USE Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Alteration of or interference with the productivity or profitability of the existing land use of an area?		X				
b. Conflicted with a designated natural area or area of unusual scientific or educational importance?		X				
c. Conflict with any existing land use whose presence would constrain or potentially prohibit the proposed action?		X				
d. Adverse effects on or relocation of residences?		X				
e. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

8. RISK/HEALTH HAZARDS Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Risk of an explosion or release of hazardous substances (including, but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or other forms of disruption?		X				
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?		X				
c. Creation of any human health hazard or potential hazard?		X				
d. ***For P-R/D-J, will any chemical toxicants be used? (Also see 8a)		X				
e. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

9. COMMUNITY IMPACT Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Alteration of the location, distribution, density, or growth rate of the human population of an area?		X				
b. Alteration of the social structure of a community?		X				
c. Alteration of the level or distribution of employment or community or personal income?		X				
d. Changes in industrial or commercial activity?		X				
e. Increased traffic hazards or effects on existing transportation facilities or patterns of movement of people and goods?		X				
f. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

10. PUBLIC SERVICES/TAXES/UTILITIES Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Will the proposed action have an effect upon or result in a need for new or altered governmental services in any of the following areas: fire or police protection, schools, parks/recreational facilities, roads or other public maintenance, water supply, sewer or septic systems, solid waste disposal, health, or other governmental services? If any, specify:			X			10a
b. Will the proposed action have an effect upon the local or state tax base and revenues?		X				
c. Will the proposed action result in a need for new facilities or substantial alterations of any of the following utilities: electric power, natural gas, other fuel supply or distribution systems, or communications?		X				
d. Will the proposed action result in increased used of any energy source?		X				
e. **Define projected revenue sources		X				
f. **Define projected maintenance costs.			X			10f
g. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

10a, 10f. Success of this proposal would likely result in increased use at Lake Elmo and Riverfront parks, and could put additional demands on the state hatchery system.

** 11. AESTHETICS/RECREATION Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Alteration of any scenic vista or creation of an aesthetically offensive site or effect that is open to public view?		X				
b. Alteration of the aesthetic character of a community or neighborhood?		X				
c. **Alteration of the quality or quantity of recreational/tourism opportunities and settings? (Attach Tourism Report)			X			11c
d. ***For P-R/D-J, will any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted? (Also see 11a, 11c)		X				
e. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

11c. The goal of this proposal is to increase and improve angling opportunities in Lake Elmo and Lake Josephine.

12. CULTURAL/HISTORICAL RESOURCES Will the proposed action result in:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. **Destruction or alteration of any site, structure or object of prehistoric historic, or paleontological importance?		X				
b. Physical change that would affect unique cultural values?		X				
c. Effects on existing religious or sacred uses of a site or area?		X				
d. ****For P-R/D-J, will the project affect historic or cultural resources? Attach SHPO letter of clearance. (Also see 12.a)		X				
e. Other:		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Land Resources (Attach additional pages of narrative if needed):

SIGNIFICANCE CRITERIA

13. SUMMARY EVALUATION OF SIGNIFICANCE Will the proposed action, considered as a whole:	IMPACT *				Can Impact Be Mitigated *	Comment Index
	Unknown *	None	Minor *	Potentially Significant		
a. Have impacts that are individually limited, but cumulatively considerable? (A project or program may result in impacts on two or more separate resources that create a significant effect when considered together or in total.)		X				
b. Involve potential risks or adverse effects which are uncertain but extremely hazardous if they were to occur?		X				
c. Potentially conflict with the substantive requirements of any local, state, or federal law, regulation, standard or formal plan?		X				
d. Establish a precedent or likelihood that future actions with significant environmental impacts will be proposed?		X				
e. Generate substantial debate or controversy about the nature of the impacts that would be created?		X				
f. ***For P-R/D-J, is the project expected to have organized opposition or generate substantial public controversy? (Also see 13e)		X				
g. ****For P-R/D-J, list any federal or state permits required.		X				

Narrative Description and Evaluation of the Cumulative and Secondary Effects on Water Resources (Attach additional pages of narrative if needed):

PART II. ENVIRONMENTAL REVIEW, CONTINUED

2. **Description and analysis of reasonable alternatives (including the no action alternative) to the proposed action whenever alternatives are reasonably available and prudent to consider and a discussion of how the alternatives would be implemented:**

1. Preferred Alternative:
Stock 6 to 9 in tiger muskies into Lake Elmo and Lake Josephine in the summer of 2005 at a rate of one tiger muskie per acre to provide a biological control on white suckers. Monitor changes in the fisheries of both lakes as these tiger muskie mature and adjust future tiger muskie plants to meet management needs.

2. No Action:
Maintain the existing fish populations in Lake Elmo and Lake Josephine with no additional stocking of predators. This alternative would maintain the existing stunted panfish populations and would limit the potential growth and desirability of the stocked gamefish populations in both lakes. This alternative would also eliminate an opportunity to increase the number of tiger muskie fisheries available to Montana anglers.

3. Stock Another Large Predator like Northern Pike:

Northern pike may be able to provide many of the same benefits as tiger muskies. Northern pike are not sterile, however, so all the benefits listed for sterile fish are lost. Because northern pike could potentially reproduce in both Lake Elmo and Lake Josephine, and even in some areas of the Yellowstone River if they escaped, the potential negative impacts would be much greater.

4.Stock Other Predatory Fish like Walleyes or Sauger:

Potential negative impacts of this alternative would outweigh potential benefits. The primary goal of this proposal is to introduce a predator into Lake Elmo and Lake Josephine that would help reduce the abundant white sucker populations in both lakes. The major factor limiting the fisheries in both lakes appears to be too much competition for a limited benthic and zooplankton food base. Large suckers comprise a significant part of the fish biomass in both lakes and, because of their large size and efficiency as planktivores, are a major competitor with game fish in both lakes.

An extensive literature review and personal contact with a number of biologists in surrounding states failed to identify any cases where walleye have been successfully used as a biological control of a white sucker population. In fact, the introduction of walleye or sauger into these lakes could actually increase existing problems. Numerous studies on food habits have found that both young walleyes and white suckers rely on benthic organisms and zooplankton as their primary food base. There is direct competition between these two species when they occupy the same water. In cases where plankton availability is low, which is the case in Lake Elmo and Lake Josephine, walleyes are at a competitive disadvantage because other fish are more efficient

at capturing plankton (McMahn 1992). Roff (1986) found that white suckers' efficiency in benthic foraging may allow them to out-compete percids. When discussing Minnesota walleye lakes, Burrows (1969) reported, "In certain kinds of lakes suckers compete directly with walleye for food. But the sucker is little used by walleye for food." His research involved low-productivity lakes in northeastern Minnesota with limited fish communities, similar to conditions found in Lake Elmo and Lake Josephine. In looking at the relationship between northern pike and walleye in lakes, Colby et al. (1987) reported that the relationship between walleyes and white suckers is primarily competition for benthos, while the northern pike - white sucker relationship is that of predator-prey. The goal of this proposal is to provide a predator for the white sucker populations in these lakes, not another competitor.

Walleyes or sauger would not provide the desired control on the larger white suckers in Lake Elmo and Lake Josephine. As a rule of thumb, walleyes prefer forage smaller than 45% of their total length (Colby et al. 1979). Walleye diet is controlled by the availability of forage species of the proper size. Size more than species determines which forage fish walleye will key into when several different forage species are available (Parsons 1971, Knight et al. 1984). According to the literature, the average length and length range of forage utilized by walleyes generally increases with increasing lengths of walleye up to a maximum forage fish size of about 5.5 in to 6 in. The ratio of forage fish length to walleye length decreased sharply in Lake Erie from 0.44 for 2.5 in walleyes to 0.32 for 6.5 in walleyes then declined slowly to 0.28 for 15.5 in fish (Parsons 1971), indicating that the larger walleyes did not prey on increasingly larger fish. Analysis of walleye food habits in Lake Erie found that age 1 and older walleye selected fish less than 3.5 in as forage throughout the year. The maximum size of forage eaten by walleye up to 20 in and larger was about 5.5 in (Knight et al. 1984). Forney (1974) found that most forage fish in stomachs of walleyes from Oneida Lake during a four-year period ranged from 1.2 to 3.2 in. A majority of the walleye sampled were three- and four-year-old fish. Introducing walleyes or sauger would likely provide some predation on the stunted panfish populations in both Lake Elmo and Lake Josephine, but the increased competition and lack of control on larger suckers would outweigh any benefits.

Walleyes and sauger are not sterile fish, and these species could potentially reproduce in either lake. If reproduction were successful, control on the number of predators in these lakes would be lost. The only way these species could be removed from the lakes, if the negative impacts outweighed the benefits, would be to completely drain the lakes or treat them with fish toxicants. It is highly unlikely that either of these options would be possible considering the location and ongoing uses of both lakes.

Another concern with using either species would be escape into the Yellowstone River. As discussed for tiger muskie, eventual escape into the Yellowstone is likely, especially from Lake Josephine. Both walleyes and sauger are more riverine oriented fish than tiger muskie and, because they are not sterile, there is a possibility they could establish viable populations somewhere in the river. Sauger are native to this section of the Yellowstone River and impacts of escapement would probably be minimal. The major concern would be the genetic makeup of the sauger that were used. Ongoing research regarding the genetic makeup of sauger populations throughout Montana indicates there may be some variation among populations. Additional sauger should not be introduced into the upper Yellowstone River until the results of this

genetics work are available to aid in selecting the best donor source. Currently Montana has no reliable source of sauger within the state that could be used for this kind of introduction.

Walleyes are not native to the Yellowstone River, and they can hybridize with the native sauger. The development of a viable walleye population in this section of the Yellowstone River, as a result of escapement of stocked fish, could have serious long-term consequences on the native sauger populations.

PART III. EA CONCLUSION SECTION

1. **Based on the significance criteria evaluated in this EA, is an EIS required (YES/NO)? If an EIS is not required, explain why the EA is the appropriate level of analysis for this proposed action.** No

   This environmental review demonstrated that the impacts of this proposed project are not significant if the preferred alternative is selected. The proposed action has the potential to improve angling opportunities in Lake Elmo and Lake Josephine. The sterile nature of the tiger muskie would allow the proposed action to be reversed over time if desired.

2. **Describe the level of public involvement for this project if any and, given the complexity and the seriousness of the environmental issues associated with the proposed action, is the level of public involvement appropriate under the circumstances?**

   The public will be notified through local newspapers and papers with statewide distribution, and through contact with local sports groups. This EA will also be published on the MFWP web page.

   If public input indicates that more information is desired, an open house will be held in Billings to provide additional information and answer questions.

3. **Duration of comment period, if any. Date when comments are due. Mail or email address to send comments.**

   Public comments will be accepted through April 25, 2005 or for approximately 30 days after announcement is made in newspapers of local and statewide distribution. Comments can be mailed to Ken Frazer, Montana Fish, Wildlife & Parks, 2300 Lake Elmo Drive, Billings, MT 59105, or sent by e-mail to kfrazer@mt.gov.

4. **Name, title, address and phone number of the person(s) responsible for preparing the EA:**

   Ken Frazer, Regional Fisheries Biologist
   Montana Fish, Wildlife and Parks
   2300 Lake Elmo Drive
   Billings, MT 59105

APPENDIX A

PRIVATE PROPERTY ASSESSMENT ACT CHECKLIST

The 54th Legislature enacted the Private Property Assessment Act, Chapter 462, Laws of Montana (1995). The intent of the legislation is to establish an orderly and consistent process by which state agencies evaluate their proposed actions under the "Takings Clauses" of the United States and Montana Constitutions. The Takings Clause of the Fifth Amendment of the United States Constitution provides: "nor shall private property be taken for public use, without just compensation." Similarly, Article II, Section 29 of the Montana Constitution provides: "Private property shall not be taken or damaged for public use without just compensation..."

The Private Property Assessment Act applies to proposed agency actions pertaining to land or water management or to some other environmental matter that, if adopted and enforced without compensation, would constitute a deprivation of private property in violation of the United States or Montana Constitutions.

The Montana State Attorney General's Office has developed guidelines for use by state agencies to assess the impact of a proposed agency action on private property. The assessment process includes a careful review of all issues identified in the Attorney General's guidance document (Montana Department of Justice 1997). If the use of the guidelines and checklist indicates that a proposed agency action has taking or damaging implications, the agency must prepare an impact assessment in accordance with Section 5 of the Private Property Assessment Act. For the purposes of this EA, the questions on the following checklist refer to the following required stipulation(s):

(LIST ANY MITIGATION OR STIPULATIONS REQUIRED, OR NOTE "NONE")

DOES THE PROPOSED AGENCY ACTION HAVE TAKINGS IMPLICATIONS UNDER THE PRIVATE PROPERTY ASSESSMENT ACT?

YES	NO	
_____	X____	1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
_____	X____	2. Does the action result in either a permanent or indefinite physical occupation of private property?
_____	X____	3. Does the action deprive the owner of all economically viable uses of the property?
_____	X____	4. Does the action deny a fundamental attribute of ownership?

YES	NO	
_____	X____	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If the answer is **NO**, skip questions 5a and 5b and continue with question 6.]
_____	_____	5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
_____	_____	5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
_____	X____	6. Does the action have a severe impact on the value of the property?
_____	X____	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally? [If the answer is **NO**, do not answer questions 7a-7c.]
_____	_____	7a. Is the impact of government action direct, peculiar, and significant?
_____	_____	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged, or flooded?
_____	_____	7c. Has government action diminished property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?

Taking or damaging implications exist if **YES** is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if **NO** is checked in response to questions 5a or 5b.

If taking or damaging implications exist, the agency must comply with Section 5 of the Private Property Assessment Act, to include the preparation of a taking or damaging impact assessment. Normally, the preparation of an impact assessment will require consultation with agency legal staff.