Appendix B

Barrier Information Worksheets completed by MN DNR Fisheries personnel.

Red River Basin
Fish Passage Environmental Assessment

Barrier Information Worksheet

1. **Barrier Name:** Christine Dam
2. **Worksheet Author:** Arlin Schalekamp
3. **Waterway name:** Red River of the North
4. **Barrier location:** T136N, R48W, Sec. 18
5. **Ownership:** City of Fargo
6. **Owner contact information:**
7. **Crest width:** 205 feet
8. **Crest height:** 10 feet
9. **Year constructed:** 1937
10. **River miles upstream:** 346.4
11. **River miles downstream:**
12. **Original purpose of the barrier:**
    Reserve water supply.

13. **Current purpose/use/function of the barrier:**
    Non functional

14. **Describe any other upstream barriers if present:**
    Kidder Dam, White Earth Dam (397.8 RM)

15. **Names and lengths of major tributaries upstream:**
    Whiskey Creek, Otter Tail River - 190.0 miles, Bois De Sioux

16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:**
    The dam is a hazard because it is a low head dam. Not sure about where it ranks for priority.

17. **Describe habitats at the barrier and how they may be affected by a removal or modification:**
    Habitats at the barrier is now a pool consisting of a rock-rubble substrates. Removal would create riverine habitats.

18. **Describe upstream habitats and species likely to use them:**
    River reaches upstream contain riverine habitats that include pools, runs, and riffles with diverse substrates and cover.

19. **List species in the Red River system most likely to benefit from removal of this barrier:**
    Game and non-game species endemic to the Red River.

20. Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):

Carp have invaded areas upstream and downstream so there are no risks involved.

21. Discuss potential sediment issues associated with removal of this barrier:

Removal of this barrier may create a high sediment load for a short time.

22. Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:

Unknown, this is a question that an engineer and/or a hydrologist must answer.

23. Discuss the historical and cultural issues related to this barrier:

24. Describe local support for removal and/or modification of this barrier:

The city of Fargo supports the removal of the dam along with the MNDNR and ND Game and Fish.

Red River Basin
Fish Passage Environmental Assessment

Barrier Information Worksheet

1. **Barrier Name:** Hickson Dam
2. **Worksheet Author:** Arlin Schalekamp
3. **Waterway name:** Red River of the North
4. **Barrier location:** T136N, R48W, Sec. 19
5. **Ownership:** City of Fargo
6. **Owner contact information:**
7. **Crest width:** 200 feet
8. **Crest height:** 17 feet
9. **Year constructed:** 1937; modified in 1970
10. **River miles upstream:** 332.6
11. **River miles downstream:**
12. **Original purpose of the barrier:**
    Reserve water supply

13. **Current purpose/use/function of the barrier:**
    Non-functional

14. **Describe any other upstream barriers if present:**
    Christine Dame (RM - 346.4), Kidder Dam (RM - 397.8), and White Earth Dam

15. **Names and lengths of major tributaries upstream:**
    Whiskey Creek, Otter Tail River - 190.0 miles, Bois De Sioux

16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:**
    The dam is a hazard because it is a low head dam. Not sure about where it ranks for priority.

17. **Describe habitats at the barrier and how they may be affected by a removal or modification:**
    Habitats at the barrier is now a pool consisting of rock-rubble substrates. Removal would create riverine habitats.

18. **Describe upstream habitats and species likely to use them:**
    River reaches upstream contain riverine habitats that include pools, runs, and riffles with diverse substrates and cover.

19. **List species in the Red River system most likely to benefit from removal of this barrier:**
    Game and non-game species endemic to the Red River.

20. Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):

Carp have invaded areas upstream and downstream so there are no risks involved.

21. Discuss potential sediment issues associated with removal of this barrier:

Removal of this barrier may create a high sediment load for a short time.

22. Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:

Unknown, this is a question that an engineer and/or a hydrologist must answer.

23. Discuss the historical and cultural issues related to this barrier:

24. Describe local support for removal and/or modification of this barrier:

The city of Fargo supports the removal of the dam along with the MNDNR and the ND Game and Fish.

Red River Basin
Fish Passage Environmental Assessment

Barrier Information Worksheet

1. **Barrier Name:** Otter Tail Power Dam
2. **Worksheet Author: Michael Larson**
3. **Waterway name:** Red Lake River
4. **Barrier location:** T150N, R46W, Sec. 35
5. **Ownership:** Otter Tail Power Company
6. **Owner contact information:** Fergus Falls, Minnesota
7. **Crest width:**
8. **Crest height:** Approximately two feet
9. **Year constructed:** 1914-1916
10. **River miles upstream:** Sixty-three miles of the Red Lake River
11. **River miles downstream:** Sixty-three miles of the Red Lake River
12. **Original purpose of the barrier:** The dam was constructed for hydropower production but lost during the 1950 flood event. The dam was partially removed in 1951.
13. **Current purpose/use/function of the barrier:** The structure has no purpose. The dam is a public safety hazard.
14. **Describe any other upstream barriers if present:** The Thief River Falls dam is 63 miles upstream. The dam is a significant barrier to fish movement. The dam is 140 ft. wide and 18 ft. high. The dam is owned by the city for hydropower production.
15. **Names and lengths of major tributaries upstream:** The Clearwater River is the largest tributary upstream (149.1 miles long). The Thief River is located upstream of the dam in Thief River Falls (71.0 miles long).
16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:** The dam is a hazard for navigation and public safety during low to moderate flows. The Red Lake River Corridor Working Group is presently seeking funding partnerships to address dam removal. Otter Tail Power has funded a preliminary removal plan. The plan is address the removal in 2005-2006.
17. **Describe habitats at the barrier and how they may be affected by a removal or modification:** The substrates will most likely not change due to the removal of the crest. There is a small plunge pool downstream of the crest. It could be maintained with a rock weir or it will probably fill in slightly as the substrates move downstream.
18. **Describe upstream habitats and species likely to use them:** Approximately 30 upstream from the dam is a historical lake sturgeon spawning site. Minnesota DNR is reintroducing lake sturgeon into the Red River basin including the Red Lake River so as these fish become sexually mature hopefully the river system will have connectivity to spawning sites. Channel catfish, walleye, and smallmouth bass will also benefit by the removal of the dam. High gradient reaches of the Red Lake and Clearwater Rivers are upstream of this site. These beach ridge sites provide some of the best spawning substrates for these riverine species.

19. **List species in the Red River system most likely to benefit from removal of this barrier:** Lake sturgeon, walleye, smallmouth bass, channel catfish, suckers, redhorse, and many other riverine species.
20. **Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):**
21. **Discuss potential sediment issues associated with removal of this barrier:** There is very little sediment upstream of the dam. The removal will have no impact on sediment load for the Red Lake River. The Red Lake River has a high sediment load at this time.
22. **Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:** The project to remove the remaining crest will incorporate bank and soil stabilization. Bank failure is a low probability.
23. **Discuss the historical and cultural issues related to this barrier:** No issues have been discussed at this time.
24. **Describe local support for removal and/or modification of this barrier:** Red Lake River Corridor Group supports the removal for safety, navigation and economic development opportunities.

Red River Basin
Fish Passage Environmental Assessment

Barrier Information Worksheet

1. **Barrier Name:** Argyle Dam
2. **Worksheet Author:** Dennis Topp
3. **Waterway name:** Middle River
4. **Barrier location:** T156N, R48N, Sec. 15
5. **Ownership:** Unknown (According to Craig Regalia, 2001, DNR may have been involved with construction)
6. **Owner contact information:** Unknown
7. **Crest width:** Approximately 50 feet.
8. **Crest height:** 5 feet
9. **Year constructed:** About 1934
10. **River miles upstream:**
11. **River miles downstream:**
12. **Original purpose of the barrier:** Unknown.

13. **Current purpose/use/function of the barrier:** There is a city park located at this site. Part of the park is located in the center of a cut-off oxbow, that was flooded when the dam was built. The oxbow is mostly filled with sediment now. The dam is in very poor shape.

14. **Describe any other upstream barriers if present:** To the best of my knowledge, there are no upstream barriers. The dam at Old Mill State Park was removed several years ago.

15. **Names and lengths of major tributaries upstream:**

16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:** The dam is in disrepair. Anglers fish the area below the dam, and kids swim in the plunge pool. This is a major safety hazard. It is on the dam safety list, but I do not know what the priority level is.

17. **Describe habitats at the barrier and how they may be affected by a removal or modification:** The river banks below the dam are unstable because of changes is hydrology and sediment transport caused by the dam. There is a small plunge pool just below the dam that offers some relatively deep pool habitat for a variety of fishes that congregate below the dam. If the dam is removed, three boulder weirs would be

constructed to help stabilize the site, and to maintain a pool of water. These weirs would function like riffles, and would create some unique habitat. They would also provide safer areas for anglers to fish.

18. **Describe upstream habitats and species likely to use them:** There is high quality, gravel, riffle habitat upstream of this dam that will be consistently available to migrating riffle-spawning fish if the barrier is removed.

19. **List species in the Red River system most likely to benefit from removal of this barrier:** Riffle spawning fish will benefit because of the re-connection to high quality riffle habitat upstream. Among large fish species that will benefit are: smallmouth bass, walleye, lake sturgeon.

20. **Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):** Not a big concern.

21. **Discuss potential sediment issues associated with removal of this barrier:** There is not much accumulated sediment in the pool.

22. **Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:** Removal of the dam and construction of boulder weirs will REDUCE erosion downstream of the site.

23. **Discuss the historical and cultural issues related to this barrier:**

24. **Describe local support for removal and/or modification of this barrier:** There is local support for removal. The dam is in terrible shape.

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Barrier Information Worksheet

1. **Barrier Name:** Lake Breckenridge Dam
2. **Worksheet Author:** Arlin Schalekamp
3. **Waterway name:** Otter Tail River
4. **Barrier location:** T132, R47, Sec. 11
5. **Ownership:** City of Breckenridge
6. **Owner contact information:**
7. **Crest width:** 59 feet
8. **Crest height:** 17 feet
9. **Year constructed:** 1935
10. **River miles upstream:** 181.9
11. **River miles downstream:** 8.1
12. **Original purpose of the barrier:**
    City water supply

13. **Current purpose/use/function of the barrier:**
    Non-functional

14. **Describe any other upstream barriers if present:**
    Orwell Dam (40.4), Dayton Hollow Dam (44.5), Pisgah Dam (52.7), Central Dam (54.2), Hoot Lake Power Plant Weir (56.1), Diversion Dam (68.6), Friberg Dam (76.1), Phelps Mill Dam, Otter Tail Lake Outlet Dam, Rush Lake Outlet Dam, Big Pine Outlet Dam, Little Pine Outlet Dam. These are the dams located in Otter Tail County only.

15. **Names and lengths of major tributaries upstream:**
    Pelican River, Dead River, and Toad River.

16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:**
    This dam is a hazard because it is a low head dam. Not sure about where it ranks for priority.

17. **Describe habitats at the barrier and how they may be affected by a removal or modification:**
    There is currently a fish bypass constructed at the dam. Habitat at the barrier is now a pool consisting of rock-rubble substrates. Removal would create riverine habitats.

18. **Describe upstream habitats and species likely to use them:**
    River reaches upstream contain riverine habitats that include pools, runs, and riffles with diverse substrates and cover.

19. List species in the Red River system most likely to benefit from removal of this barrier:

Game and non-game species endemic to Red River watershed.

20. Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):

Carp have invaded areas upstream and downstream so there are no risks involved.

21. Discuss potential sediment issues associated with removal of this barrier:

Removal may create a high sediment load for a short time.

22. Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:

Unknown, this is a question that an engineer and/or hydrologist must answer.

23. Discuss the historical and cultural issues related to this barrier:

24. Describe local support for removal and/or modification of this barrier:

The City of Breckenridge has approached the DNR regarding removal.

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Barrier Information Worksheet

1. **Barrier Name:** Sand Hill dams and culverts
2. **Worksheet Author:** Gary Huberty
3. **Waterway name:** Sand Hill River
4. **Barrier location:** T147N, R45,46 Var. Sec.
5. **Ownership:** Dams—Sand Hill WSD, Culverts—unknown (probably township)
6. **Owner contact information:** Dan Wilkens, Sand Hill Watershed District, Fertile, MN.
7. **Crest width:** Each of the four dams is approximately 20-25 feet wide.
8. **Crest height:** Each of the four dams has a head of approximately 6-8 feet.
9. **Year constructed:** dams—late 1950's, culverts—unknown
10. **River miles upstream:** 58.9 miles from uppermost barrier, 79.5 miles from lowermost barrier
11. **River miles downstream:** 43.2 miles from uppermost barrier, 22.6 miles from lowest barrier
12. **Original purpose of the barrier:** The four dams were originally constructed to provide grade control in a ditched portion of the stream. The culverts near Fertile were to convey water under 340th Ave. SW (West Mill Crossing). The culverts at the Texas crossing were installed to convey low flows under 150th St. SW, two miles west of Beltrami, MN.
13. **Current purpose/use/function of the barrier:** Same as original.
14. **Describe any other upstream barriers if present:** None documented.
15. **Names and lengths of major tributaries upstream:** Kittleson Creek, approximately 15 miles
16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:** Unknown
17. **Describe habitats at the barrier and how they may be affected by a removal or modification:** Dam modifications would increase the amounts of riffle habitat available below these structures. Habitat immediately upstream would not be affected since head elevations would not be changed.

18. **Describe upstream habitats and species likely to use them:** Upstream habitats include boulders, riffles, pools, overhanging banks, snags, abandoned beaver dens, and seasonally flooded meadows and marshes. Some of the fish species likely to use these habitats include channel catfish, smallmouth bass, walleye, sauger, and northern pike.

19. **List species in the Red River system most likely to benefit from removal of this barrier:** Those listed in the question above and many more, potentially including lake sturgeon. Channel catfish, sauger, freshwater drum, goldeye, and other larger riverine fish species are currently limited to areas downstream from the lowest dam.

20. **Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):** There is potential for introduction of carp upstream of the barriers. Risks are unknown, but, carp presence in similar watersheds in this portion of the state have not appeared to have the detrimental effects that have been reported in the southern third of the state.

21. **Discuss potential sediment issues associated with removal of this barrier:** Removal is not being discussed due to bank stabilization issues. Modification, as proposed, will not change the sediment transport in the current barrier areas. However, the proposed addition of several riffles would likely help stabilize ditch banks downstream from the four dams.

22. **Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:** See previous question.

23. **Discuss the historical and cultural issues related to this barrier:** All four dams and the Texas crossing culverts are located in the straightened portion of the river and are part of a 1950's USCOE project. Channel restoration is not a likely alternative since much of the riparian area was historically part of a large marsh (now agricultural land) through which there was no defined channel to restore.

24. **Describe local support for removal and/or modification of this barrier:** There is a good deal of local support by the Sand Hill Watershed District and others for modification of the barriers, as well as for the addition of several more riffles in the ditched area to stabilize sloughing ditch banks. A Preliminary Restoration Plan (PRP) was submitted and approved (without funding, unfortunately) by the COE in 2003/2004. This plan is a good reference for more background information and is available from Tom Raster in the Fort Snelling office of the COE.

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Barrier Information Worksheet

1. **Barrier Name:** Marsh Creek culvert (County Road 29)
2. **Worksheet Author:** Mandy Erickson
3. **Waterway name:** Marsh Creek
4. **Barrier location:** T144N, R43W, Sec. 21
5. **Ownership:** Mahnomen County
6. **Owner contact information:** Mahnomen County Highway Department
7. **Crest width:** N/A
8. **Crest height:** N/A
9. **Year constructed:** 2002
10. **River miles upstream:** Approximately 42.4
11. **River miles downstream:** Approximately 1
12. **Original purpose of the barrier:** Road crossing

13. **Current purpose/use/function of the barrier:** County Road 29 crossing

14. **Describe any other upstream barriers if present:** No other permanent barriers are present within Marsh Creek. Beaver activity is present within the watershed, and dams are common. During the 2003 survey, a beaver dam was observed downstream of the culvert that was a fish barrier.

15. **Names and lengths of major tributaries upstream:** Various ditches and intermittent streams contribute to Marsh Creek. No tributaries are considered "major".

16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:** There is no dam on Marsh Creek. The fish barrier is a culvert.

17. **Describe habitats at the barrier and how they may be affected by a removal or modification:** There is a relatively deep pool just downstream of the culvert, with the main channel meandering through a wooded corridor. Modification of the culverts would likely not affect the surrounding habitat.

18. **Describe upstream habitats and species likely to use them:** Reach 1 of Marsh Creek is a relatively natural stream, meandering through a wooded corridor, with

riffles, rapids, and pools. Reach 2 meanders through a sedge and grass meadow corridor, with little variation in habitat. Northern pike have historically been found in reaches 1 and 2. Reaches 3 and 4 are predominately channelized and fish habitat is limited. 17 species of fish were sampled in 2003. If fish passage was possible past the culvert at County Road 29, various game species may be able to inhabit Marsh Creek, including catfish, northern pike, and various other species.

19. **List species in the Red River system most likely to benefit from removal of this barrier:** Although very few game species were sampled below the culverts in 2003, the habitat in reaches 1 and 2 would be suitable for catfish, northern pike, and various other game species.

20. **Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):** Introduction of carp to the upper reaches may be an issue, but not serious enough to deter the modification.

21. **Discuss potential sediment issues associated with removal of this barrier:** Increase in the sediment load would not be an issue if the barrier were modified.

22. **Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:** The culverts should be modified, which would not affect the bank or bed stabilization.

23. **Discuss the historical and cultural issues related to this barrier:** None

24. **Describe local support for removal and/or modification of this barrier:** Modification of the culverts would allow fish passage to upper reaches of Marsh Creek. Local anglers and citizens would likely support the modification of the culvert.

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Barrier Information Worksheet

1. **Barrier Name:** Stephen dam
2. **Worksheet Author: Dennis Topp**
3. **Waterway name:** Tamarac River
4. **Barrier location:** T157N, R48W, Sec. 8
5. **Ownership:** City of Stephen
6. **Owner contact information:** Dave Clark, city council man.
7. **Crest width:** 58 feet
8. **Crest height:** 9.1 feet (crest to sill). The deepest area of the plunge pool is another three feet below the sill.
9. **Year constructed:** 1987
10. **River miles upstream:**
11. **River miles downstream:**
12. **Original purpose of the barrier:** City water supply, golf course water supply, aesthetics (visible pool of water), boating recreation.
13. **Current purpose/use/function of the barrier:** golf course water supply, aesthetics (visible pool of water), boating recreation (canoeing). The City is now hooked up to the Rural Water District.
14. **Describe any other upstream barriers if present:** Dam at Florian (forms Florian Reservoir, Marshall County Park).
15. **Names and lengths of major tributaries upstream:** State Ditch 90
16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:** Safety is a big issue with this dam. The area below the dam is a very popular spot for kids to fish.
17. **Describe habitats at the barrier and how they may be affected by a removal or modification:** The river banks below the dam are unstable because of changes is hydrology and sediment transport caused by the dam. There is a small plunge pool just below the dam that offers some relatively deep pool habitat for a variety of fishes that congregate below the dam. If the dam is removed, a series of weirs would be constructed to help stabilize the site, and to maintain a pool of water. These weirs would function like riffles, and would create some unique habitat. They would also provide safer areas for anglers to fish.
18. **Describe upstream habitats and species likely to use them:** Water quality in the pool created by the dam is poor. Fish species found in this reach are considered to be "tolerant" species.
19. **List species in the Red River system most likely to benefit from removal of this barrier:** During a fisheries assessment in August, 2000, we sampled fifteen species of fish below the dam, and only eight species in the pool above the dam. Among the species that would benefit from a removal of the dam are: channel catfish, freshwater drum, goldeye, northern pike, sauger, shorthead redhorse, silver redhorse, walleye, and white sucker.

20. **Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):** Not an issue at this time. Carp are already present above the dam.
21. **Discuss potential sediment issues associated with removal of this barrier:** There is accumulated sediment in the pool. Placing weirs at the site of the dam removal should minimize the movement of this sediment.
22. **Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:** See number 21.
23. **Discuss the historical and cultural issues related to this barrier:** The community is attached to the pool of water that is created by the dam, mostly because of aesthetics. But, I have also been told they want "canoeable waters" in the city. They do not want a dry river bed running through town. Flows in the Tamarack river are often very low in summer.
24. **Describe local support for removal and/or modification of this barrier:** The community is not in favor of a removal at this time. They did officially support a modification (to a rapids) in 2001. There support was for a modification at the present crest elevation. They opposed a modification at a reduced elevation.

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Barrier Information Worksheet

1. **Barrier Name:** South Branch Buffalo River dams
2. **Worksheet Author:** David Barsness
3. **Waterway name:** South Branch Buffalo River
4. **Barrier location:** Township 139N, Range 47W, Sections 9 and 5
5. **Ownership:** Unknown
6. **Owner contact information:** The owners are unknown but the Buffalo/Red River Watershed District would likely serve as the contact.
7. **Crest width:** Approximately 75 Ft.
8. **Crest height:** 1-2 Ft.
9. **Year constructed:** Unknown
10. **River miles upstream:** Approximately 50 miles
11. **River miles downstream:** Approximately 2 miles to the confluence with Buffalo River.
12. **Original purpose of the barrier:** The original purpose of the dams is unknown. Speculation is that they were perhaps used by the railroad for steam engine watering, or possibly for some agricultural use.

13. **Current purpose/use/function of the barrier:** The dams are not currently used for any purpose.

14. **Describe any other upstream barriers if present:** No other dams are present on the main-stem. There are three small dams that create detention ponds used by wildlife in the headwaters area of Stony Creek, a tributary to the South Branch of the Buffalo River. Two other small dams are located on another tributary, Whiskey Creek, in the city of Barnsville.

15. **Names and lengths of major tributaries upstream:** Stony Creek – Approx. 20 mi., Whiskey Creek – Approx. 22 mi., Deerhorn Creek – Approx. 15 mi.

16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:** Neither of these dams is large enough to create the infamous "drowning machine" associated with the spillways of some dams. The dam crests could be potentially hazardous to navigation at certain water elevations. Neither of the dams is listed on the state's dam safety list.

17. **Describe habitats at the barrier and how they may be affected by a removal or modification:** The dams act as little more than obstructions in river during most flow levels and dams with small pools during low flow. Riverine habitat will not be significantly affected by the dams if they are removed or modified.

18. **Describe upstream habitats and species likely to use them:** There are many miles of river upstream of the dams that consists of runs, riffles, pools, and a variety of habitat that many different species may use at certain times or life stages.

19. **List species in the Red River system most likely to benefit from removal of this barrier:** All the species of the Red River fish community, including gamefish such as walleye, channel catfish, and northern pike, have access to the South Branch of the Buffalo River and can potentially benefit from improved river continuity.

20. **Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):** These small dams are frequently overtopped so that fish can freely migrate past them. They do not serve to prevent upstream migration of any fish species except under low water conditions.

21. **Discuss potential sediment issues associated with removal of this barrier:** Because these are low head dams, massive amounts of silt are not present behind the dams and will not be a significant threat if the dams are removed. The furthest downstream of the two dams does have a moderate amount of sediment accumulated behind it that would need to be addressed if the dam were removed. If the dams are simply modified into rock riffles it will not be an issue.

22. **Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:** Analysis of destabilizing effects had not been done but because the dams are small and relatively inconsequential it is thought that removal will not produce significant impacts.

23. **Discuss the historical and cultural issues related to this barrier:** There is no specific information on when these dams were built or what they were used for.

24. **Describe local support for removal and/or modification of this barrier:** As angling in the Red River and its tributaries becomes more popular, efforts to improve fish migration have usually been enthusiastically supported.

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Barrier Information Worksheet

1. **Barrier Name:** Elizabeth Dam
2. **Worksheet Author:** Arlin Schalekamp
3. **Waterway name:** Pelican River
4. **Barrier location:** T134, R 43, Sec. 32
5. **Ownership:** Private
6. **Owner contact information:** NA
7. **Crest width:** 366'
8. **Crest height:** 15'
9. **Year constructed:** 1922
10. **River miles upstream:** 65
11. **River miles downstream:** 15
12. **Original purpose of the barrier:**
    Milling

13. **Current purpose/use/function of the barrier:**
    Non-functional

14. **Describe any other upstream barriers if present:**
    One barrier in Pelican Rapids.

15. **Names and lengths of major tributaries upstream:**
    NA

16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:**
    Safety issues appear to be moderate to low. This is a high profile dam (16') so it is unlikely that boaters would "run the dam", however, there may be dangerous currents immediately below the dam that could impact anglers and swimmers.

17. **Describe habitats at the barrier and how they may be affected by a removal or modification:**
    Habitats at the barrier is now a pool consisting of rock-rubble substrates. Removal would create riverine habitats.

18. **Describe upstream habitats and species likely to use them:**
    River reaches upstream contain riverine habitats that include pools, runs, and riffles with diverse substrates and cover.

19. **List species in the Red River system most likely to benefit from removal of this barrier:**
    Game and non-game species found in the Red River watershed would benefit from removal of this barrier.

20. Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):

No risk involved as carp are found upstream and downstream of this barrier.

21. Discuss potential sediment issues associated with removal of this barrier:

Removal of this barrier may create a high sediment load for a short time.

22. Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:

Unknown

23. Discuss the historical and cultural issues related to this barrier:

This dam was a milling dam for the city of Elizabeth at one time.

24. Describe local support for removal and/or modification of this barrier:

Unknown. Ownership is private; however, the dam is in poor condition and in need of repair. Repair costs may be very high and it is unlikely that the current owners are willing or able to address safety/operational issues so removal/modification may be an option for them.

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Fish Passage Environmental Assessment

Barrier Information Worksheet

1. **Barrier Name:** Phelps Mill Dam
2. **Worksheet Author:** Arlin Schalekamp
3. **Waterway name:** Otter Tail River
4. **Barrier location:** T134, R 41, Sec. 35
5. **Ownership:** Otter Tail County
6. **Owner contact information:**
7. **Crest width:** 120'
8. **Crest height:** 15'
9. **Year constructed:** 1873
10. **River miles upstream:** 102
11. **River miles downstream:** 88
12. **Original purpose of the barrier:**
    Milling

13. **Current purpose/use/function of the barrier:**
    Non-functional; esthetic

14. **Describe any other upstream barriers if present:**
    Otter Tail Lake, Rush Lake, and Big Pine Lake water control level dams.

15. **Names and lengths of major tributaries upstream:**
    Dead River

16. **Describe the current safety issues associated with this dam and its priority on the state dam safety list:**
    Safety issues appear to be moderate to low. This is a high profile dam (15') so it is unlikely that boaters would "run the dam"; however, there may be dangerous currents immediately below the dam that could impact anglers and swimmers.

17. **Describe habitats at the barrier and how they may be affected by a removal or modification:**
    Habitats at the barrier is now a pool consisting of rock-rubble substrates. Removal would create riverine habitats.

18. **Describe upstream habitats and species likely to use them:**
    River reaches upstream contain riverine habitats that include pools, runs, and riffles with diverse substrates and cover.

19. **List species in the Red River system most likely to benefit from removal of this barrier:**
    Game and non-game species endemic to Red River watershed.

20. Discuss potential and risks for introduction of unwanted species upstream of the current barrier (e.g. is carp a concern?):

Carp have invaded areas upstream and downstream, so there are no risks involved.

21. Discuss potential sediment issues associated with removal of this barrier:

Removal of this barrier may create a high sediment load for a short time.

22. Discuss potential for destabilizing the bank or bed of the waterway if this barrier was removed:

Unknown

23. Discuss the historical and cultural issues related to this barrier:

This dam was a milling dam for the village of Phelps Mill at one time.

24. Describe local support for removal and/or modification of this barrier:

Unknown. Otter Tail County owns the dam and functions as an esthetic centerpiece for Phelps Mill Park. It is assumed that there is no support for removal; however, modification may be an option.