APPENDIX A

Nimemile TMDL Fish Passage Assessment and Recommendations for Forest-Managed Lands

INTRODUCTION

Persistence of native fish populations is the outcome of multiple complex interactions of habitat features and quality (e.g. large woody debris, pool quality and quantity, and substrate quality) and natural processes such as large woody debris recruitment, sediment generation and transport; and landscape scale characteristics such as subpopulation distribution, migration and connectivity (Rich et. al., 2003 and Rieman and McIntyre, 1993). Fish population and habitat connectivity at watershed and sub-watershed spatial scales (e.g., Ninemile and tributary systems), and at larger landscape scales such as the Middle Clark Fork, is an example landscape-scale characteristic necessary to maintain native fish life histories (population segment interaction, refugia, and migratory patterns); however, these demographics must be considered in the context of other habitat and process components within a watershed.

The Lolo National Forest (Forest) has committed extensive resources assessing fish passage and habitat connectivity associated with road culverts over the last three years in the Ninemile watershed. The Ninemile watershed, and associated sub-watersheds, is an important Westslope cutthroat production area for the Middle Clark Fork. Ninemile also has the potential to produce bull trout in the upper watershed and in some portions of downstream subwatersheds where good quality habitat, connectivity, and thermal regimes exist.

Main stem Ninemile has unimpeded physical connectivity to the Clark Fork except for possible thermal barriers (temperature data to be presented) and dewatering that may exist in mid to late summer both on the main stem and the lower end of tributary streams. Tributary streams to Ninemile Creek are highly dissected by roads that often create complete, or at least selective (certain life stages or certain times of the year based on flow conditions), fish passage impediments at culvert crossings. These passage impediments often prevent individuals from carrying out daily and seasonal migration that is important to their production, reproduction and persistence. Within Ninemile subwatersheds there are typically multiple fish passage impediments in tributary streams with one barrier often situated near the mouth, generally associated with non-Forest roads and ownerships, and more at various locales up the tributary on Forest managed land. This fragmentation of watersheds, and its direct effect on fish passage has substantial implications for native cold-water fish beneficial use support within the Ninemile Watershed.

The Clean Water Act under which TMDLs are prescribed also calls for forest road crossings to be designed, constructed, and maintained such that they do not …"disrupt the migration or other movement of those species of aquatic life inhabiting the waterbody (40 CFR 232.3 (c)(6)(vii))". Although improving fish passage and habitat connectivity alone cannot assure that beneficial uses such as native cold-water fisheries will improve (via the Clean Water Act), habitat connectivity can be a critical component, and one that needs strong consideration within the context of watershed and their beneficial use impairments. Often a fish passage remedy

(removing a crossing, upsizing and pipe, or installing a bridge) serves to reduce the risk of channel and habitat impairment from confinement and fine sediment generation at these locations, thus providing multiple benefits.

This document presents information that primarily relates to road culverts that present a problem for native fish population segments in the Ninemile watershed. Data used in this report are primarily from efforts pursuant to the 2002 Post Burn Environmental Impact Statement project (project was litigated in District court in 2002 and is currently under appeal at the Ninth Circuit court); a Forest-wide culvert evaluation (2002 and 2003); and some surveys that were conducted last year (2002) in anticipation of the Ninemile TMDL effort.

OBJECTIVES

The objectives of this write-up are: 1) to very specifically focus on fish passage barriers on National Forest lands throughout the Ninemile watershed, 2) to lay out a framework that others within the TMDL working group can use to tier off of for assembling and linking fish passage information on Non-Forest land, and 3) to provide a draft priority list of the most important fish passage barriers for remedy that can be used as the working group moves to develop a water quality restoration plan. Other issues such as road-sediment-crossing issues will be addressed in part by road assessments done by Land and Water, and modeling efforts by both the Forest and Land and Water.

FISH PASSAGE IMPROVEMENT EFFORTS COMLETED BY THE FOREST

Substantial effort and improvement for fish passage has already occurred in the Ninemile watershed on National Forest land. In 2001, four important crossings on the Foothills road (Big Blue, Camp, Soldier and East Fork Burnt Fork) were replaced with three sunken pipe arches and one bridge, all designed to accommodate fish passage and passage of the 100 year flow event. In 2003, three pipes on the main Ninemile road near the mouth of tributary streams with Ninemile Creek (Big Blue, Camp, and Soldier- a bridge already existed on lower Burnt Fork) were all replaced with bridges with similar design objectives mentioned above for the Foothills road structures. This work was accomplished with Forest Service BAER funding. All four of these stream systems were extensively burned in the 2000 Ninemile fire and were at risk of failure at these crossing sites without the improvements. The improvements also served as critical fish passage benefits that basically made each of the four systems above, all important native fish production areas to varying degrees, nearly 100 percent free of fish passage impediments.

Priorities set under this evaluation considered existing fish production potential, potential additional migratory and production areas created, native and non-native fish population characteristics, and other existing watershed stressors that could influence fish production and future potential.

OTHER APPLICABLE FOREST PROJECTS

The Ninemile watershed TMDL is in a unique situation. The timing of the TMDL and required Water Quality Restoration Plan are such that they overlap with two Forest landscape-scale projects and analyses: the Post Burn and Frenchtown Face EIS's. These two projects have or will result in NEPA environmental analyses that cover nearly three quarters of the Ninemile watershed. This means that when and if the EIS's are final, if litigation is resolved favorably for the Forest, environmental assessment and compliance for activities such as road closure, stream crossing removal or upgrade other watershed improvements will be complete and implementation can proceed. This also means that some projects identified in the TMDL Water Quality Restoration Plan may be funded in whole or part through these projects.

FISH PASSAGE ASSESSMENT

Nearly 50 culverts throughout the Ninemile Watershed, primarily on Forest Service land pose passage problems for fish. Table A-1 lists 26 of the most important passage problems where the greatest amount of fish benefit from a remedy would be realized (it takes into consideration fish population composition and watershed production potential, and the amount of habitat that would be gained by a remedy). The highest priority projects are typically in watersheds where know native fish production is moderate to strong, and a solution (or solutions where multiple barriers exist in one tributary) could reconnect the entire tributary watershed to main Ninemile. Examples are Moncure and Cedar creeks where lower end pipes are fish barriers (Table A-1), preventing fish from moving up into a large portion of the watershed that is unroaded and has good quality habitat (Table A-1). Another example is Stony Creek where four passage barriers (Table A-1) are a relatively high priority for remedy because the fixes would again reconnect the entire tributary watershed and allow fish to move into some of the best upstream quality habitat of Stony Creek. Other important priority areas include barriers along the Foothills Road at Beecher and West Fork Burnt Fork crossings that would compliment the extensive passage improvement work to date in this part of the Ninemile watershed.

Table A-1 also identifies whether a culvert and passage solution is part of an existing Forest environmental analysis and project. These pipes and passage remedies have been, or are being analyzed, using NEPA instruments. In these situations, passage solutions have typically been further developed than where a pipe is not covered by an existing Forest landscape project. Problem pipes analyzed in the Post Burn and Frenchtown Face projects have been identified for either removal or replacement (Table A-1). Pipes are identified for removal if they are on roads where the Forest is proposing to close the road. Pipe removal and crossing restoration is typically much less expensive than upgrading a crossing structure and typically provides a long-term maintenance-free solution to barrier concerns.

TableA-1. Top 26 Fish Passage Barriers and Proposed Treatment for Remedy, Ninemile Watershed.

Treat-ment Priority	Road Number and (Crossing Location)	Tributary Watershed	Potential Treatment (remove or replace)	Associated Forest Project (Post Burn= PB, Frenchtown Face= FTF, Independent= I)	Miles of Habitat Upstream (to likely non-fish bearing water or the next passage impediment)	Tons of fill at risk of delivery to stream if complete failure	Rationale/Comments
1	5520 (T16N R23W sec 19 NENW)	Moncure	replace	I	1.63	126	One of the few watersheds with little road influence, solution would open up entire unroaded watershed to fish. Moderate numbers of cutthroat only populations above and below.
2	16225 (T16N R23W sec 17 SWSW)	Moncure	remove	I	0.53	52	Downstream of 5520 barrier. This culvert could likely be pulled and crossing restored, on old harvest spur. This coupled with above would make Moncure completely connected from Ninemile to headwater.
3	5498 (T176N R24W sec 8 NENE)	St. Louis	replace	PB	1.08	852	Important native fishery in upper Ninemile. Evidence of migratory fish, this would open up stream to fish passage above mine altered segments downstream. Very good water temperatures.

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4	5498 (T17N R24W sec 10 NESW)	West Fork Beecher	replace	PB	0.85	5,856	Important native fishery in upper Ninemile. Very good water temperatures. Would open up entire watershed to fish when coupled with number 5 below.
5	5498 (T17N R24W sec 9 SWNE)	East Fork Beecher	replace	PB	0.71	511	Important native fishery in upper Ninemile. Very good water temperatures. Would open up entire watershed to fish when coupled with number 4 above.
6	5498 (T17N R24W sec 15 SWNE)	West Fork Burnt Fork	replace	PB	0.88	504	Burnt Fork below this point very disturbed from timber harvest, this opens upper end to native fish, lower end of stream heavily dominated by brook trout.
7	5498 (T16N R23W sec 5 NENE)	Little Marion Creek	Replace/remove	I	1.6	398	Important native fishery in mid Ninemile. Fish Wildlife and Park with plans to improve passage at mouth near Ninemile.

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8	5515 (T15N R23W sec 4 SENE)	Cedar	replace	I	2.02	315	Moderate numbers of WCT, and good habitat and valley bottom that is unique (broader bottom with mixed hardwoods) to Ninemile tributaries.
9	456 (T16N R22W sec 33 NWNW)	Stony	replace	FTF	3.64	211	Important native fishery in lower Ninemile. Reconnects lower with good quality habitat in upper watershed.
10	34030 (T15N R22W sec 5 NESW)	Stony	remove	FTF	0.75	50	Important native fishery in lower Ninemile. Would open up entire watershed to fish when coupled with other passage fixes in watershed.
11	18079 (T15N R22W sec 5 NENE)	Stony	remove	FTF	1.14	146	Important native fishery in lower Ninemile. Would open up entire watershed to fish when coupled with other passage fixes in watershed.

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12	5489 (T15N R25W sec 5 NENE)	Stony	replace	FTF	0.14	66	Important native fishery in lower Ninemile. Would open up entire watershed to fish when coupled with other passage fixes in watershed.
13	5520 (T16N R24W sec 11 NESE)	Bird	replace	PB	3.08	8,115	Opens up most of upper Bird, which has moderate habitat quality. Some brook trout present above current pipe.
14	34297 (T17N R24W sec 21 NWNW)	Sawpit	remove	PB	1.55	387	Opens up most of Sawpit, a smaller watershed in upper Ninemile, which has moderate habitat quality. Some brook trout present above current pipe.
15	890 (T17N R23W sec 35 SWSW)	Josephine	replace/remove	I	2.53	519	Excellent habitat upstream of crossing. Site a source of considerable slumping and sediment contribution to stream.

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16	60772 (T16N R23W sec 5 SWNW)	Marion	remove	I	0.36	128	Important native fishery in mid Ninemile. Fish Wildlife and Park with plans to improve passage at mouth near Ninemile. Benefits would be limited unless upstream pipes on private road addressed.
17	17294 (T16N R22W sec 34 NWSE)	Rock	remove	FTF	1.23	99	Native fishery in lower Ninemile. Benefits would be lessened unless downstream pipes on non-Forest roads addressed.
18	476 (T16N R22W sec 26 NWSW)	Rock	replace	FTF	0.52	40	Native fishery in lower Ninemile. Benefits would be lessened unless downstream pipes on non-Forest roads addressed.
19	17209 (T16N R22W sec 27 NENE)	Rock	remove	FTF	0.49	167	Native fishery in lower Ninemile. Benefits would be lessened unless downstream pipes on non-Forest roads addressed.

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20	16833 (T17N R24W sec 27 SESW)	Twin	remove	PB	1.13	478	Smaller watershed with lower road effects, some native fish benefits.
21	17285 (T17N R24W sec 27 NESW)	Mattie V	replace	PB	0.23	2,310	Smaller watershed, high road density, and moderate mine impact, moderate native fish potential.
22	16833 (T17N R24W sec 28 SESE)	Mattie V	remove	PB	0.64	1,520	Smaller watershed, high road density, and moderate mine impact, moderate native fish potential.
23	14256 (T17N R24W sec 27 NWNE)	Mattie V	remove	PB	0.63	36	Smaller watershed, high road density, and moderate mine impact, moderate native fish potential.
24	16832 (T17N R24W sec 27 SENW)	Mattie V	remove	PB	0.42	135	Smaller watershed, high road density, and moderate mine impact, moderate native fish potential.
25	5520 (T16N R24W sec 271 NESE)	East Fork Bird	replace	PB	0.28	5,148	Modest potential for native fish benefit.

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26	16831 (T17N R24W sec 26 SENW)	Twin	remove	PB	1.02	627	Smaller watershed with lower road effects, some native fish benefits.

Butler Creek is one of the only major fish production tributary that is basically unaffected by road crossing-fish passage barriers through most of its watershed. Here are two bridge structures on main Butler but these are less likely to create passage problems for fish. There are however, two other passage concerns. First is a diversion. A portion of Butler Creek is diverted near the Forest boundary on its lower end. This rock diversion creates a fish passage barrier in mid to late summer as flow recede and likely entrains fish earlier in the year. There is an opportunity to cooperate with the landowner and Montana Fish Wildlife and Parks to develop a creative solution that would eliminate the passage barrier and completely or nearly completely eliminate entrainment of young fish out of the stream and onto pastureland. A second passage area of concern is an old abandoned diversion dam on Forest ownership. The dam is located in the NWNE ¼ of section 20. The dam is a cement span structure across bedrock and is about 12 feet high, with a cascade that descends over deteriorating slabs of concrete and wood. This is likely a fish passage barrier. The habitat in this area supports strong numbers of cutthroat trout above and below the dam supported by excellent stable and complex habitat. A closer look at restoration options at this site would help determine if this constricted bedrock site was historically a natural barrier to fish or if not, and if passage could be restored via partial or complete removal of the dam.

CONCLUSION

This report identifies multiple areas on the Forest in the Ninemile watershed where road crossings create fish passage problems as well as sediment yield and failure risks. It also identifies the highest priority pipes for removal or replacement and opportunities for executing passage improvement under ongoing Forest projects (assuming the Forest's Post Burn EIS litigation is resolved favorably for the Forest and that the Frenchtown Face EIS is completed and not held up by appeal and litigation). It highlights the fact that there are numerous passage problems, yet other important passage problems have already been remedied, and that opportunity to fix multiple other passage problems is ripe. These solutions can contribute substantially to reconnecting fragmented tributaries for native fish production in the Ninemile watershed, and they will contribute substantially to the protection and maintenance of the cold-water fishery beneficial use in the Ninemile watershed. This report also serves as a foundation for the Ninemile Watershed group for identifying and implementing fish passage improvement projects on non-Forest land in the Ninemile watershed.

REFERENCES

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