Region 2
3201 Spurgin Road
Missoula, MT 59804

August 10, 2018

Dear Interested Citizens:

Thank you for your thoughtful reviews, comments and suggestions on a proposal by Montana Fish, Wildlife & Parks, in collaboration with the U.S. Forest Service, to conduct pilot investigations in the North Fork Blackfoot River (NFBR) watershed within the Scapegoat Wilderness. As detailed in the draft Environmental Assessment (draft EA), the objectives of these pilot investigations are to determine the upstream extent of hybridized Rainbow Trout, evaluate the persistence of rotenone in the basin's streams to allow determination of drip-station spacing, and determine the lowest effective dose of rotenone required to achieve a fish kill, while minimizing effects on nontarget organisms. This pilot study would provide information to guide planning for a proposed fish removal project in the NFBR watershed upstream of a barrier waterfall (North Fork Falls). Currently, the existing fishery, which is comprised of hybrids of Rainbow Trout, Yellowstone Cutthroat Trout, and Westslope Cutthroat Trout, with Rainbow Trout providing the dominant genetic contribution, poses a threat to nonhybridized Westslope Cutthroat Trout in the watershed downstream of the project area. Proposed plans for full treatment of the watershed above the falls and establishment of the fish assemblage native to the Blackfoot River watershed will be addressed in a separate draft EA.

Enclosed is a decision document in which I explain my rationale for approving the proposed action to proceed with the pilot studies in select streams in the North Fork Blackfoot River watershed. Upon completion of the public involvement process and by inclusion of information in this decision notice, FWP accepts the draft EA as final. The decision document also includes public comment, along with FWP's responses, which further explain and clarify the actions proposed for this project. Comments addressing concerns relating to the Wilderness Act will be addressed in a separate decision memo issued by the U.S. Forest Service.

Please feel free to contact me at 406-542-5500 with any questions. Thank you for your interest and participation.

Sincerely,

Randy Arnold

RA/sr

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DECISION NOTICE for the DRAFT ENVIRONEMNTAL ASSESSMENT: Pilot-Level Bioassays and Fish Distribution Testing for the Proposed North Fork Blackfoot River Native Fish Restoration Project

August 10, 2018

Proposal

Montana Fish, Wildlife & Parks (FWP), in collaboration with the U. S. Forest Service, proposes to conduct pilot-level investigations to guide planning for a potential future action aimed at establishing secured habitat for native salmonids. The goal of the project is to provide information that will guide planning for treatment of the entire North Fork Blackfoot River watershed upstream of a barrier waterfall (North Fork Falls, Figure *1*). Currently, the project area supports a population of Rainbow Trout × Yellowstone Cutthroat Trout × Westslope Cutthroat Trout hybrids, with Rainbow Trout providing the dominant genetic contribution. The existing fishery is a source of genetic contamination threatening nonhybridized Westslope Cutthroat Trout in the watershed downstream of the North Fork Falls. The hybrid trout are poorly adapted to the cold waters of the project area and are present at low densities in about half of the available stream habitat. The distribution of low proportions of Westslope Cutthroat Trout genes throughout the watershed suggests this native species was present historically, and planting records show numerous plants of Rainbow Trout, Yellowstone Cutthroat Trout, and undifferentiated Cutthroat Trout. Other headwaters streams in the Blackfoot River watershed have indigenous Westslope Cutthroat Trout upstream of barrier falls, which provides additional evidence that Westslope Cutthroat Trout could have been present historically.

The objectives of this action are to determine the persistence of rotenone in stream in the project area, field verify distribution of fish in the watershed, and determine the concentration of rotenone that will achieve a fish kill, but minimize mortality of nontarget organisms, including amphibians and aquatic invertebrates. Actions to meet the objectives are as follows:

- Determine the duration of time rotenone remains at a lethal concentration. This information will be used to guide spacing of drip stations throughout the basin if the proposed North Fork Blackfoot River native fish restoration project moves forward in succeeding years;
- Determine the upstream extent of fish distribution using rotenone;
- Conduct bioassays to determine the effective concentration that will be lethal to fish but minimize effects on nontarget organisms.

Streams tentatively slated for pilot studies are high-gradient, headwater streams, and include Lost Pony, Scotty, Blondie, Sourdough, and East Fork Meadow creeks (Figure 1). The resulting data will allow calculation of the quantity of rotenone required to treat all fish-bearing stream habitat in the project area and field verify the upstream extent of fish within the watershed. Potassium permanganate will be applied at the downstream extent of the study reaches to deactivate rotenone within ½-hour stream travel time, which will spatially limit the amount of stream habitat exposed to rotenone.

Alternative 1 – No action

Under the no action alternative, no bioassays or ground-truthing of the fish distribution would occur in 2018. Furthermore, determination of persistence of target concentrations of rotenone would not occur. Failure to conduct these investigations in 2018 would not preclude the proposed North Fork Blackfoot River native fish restoration project from occurring. This basin-level effort will be evaluated in a separate draft EA. If the proposed field tests are not conducted in 2018, they would need to be conducted later if the proposed basin-wide native fish restoration would proceed.

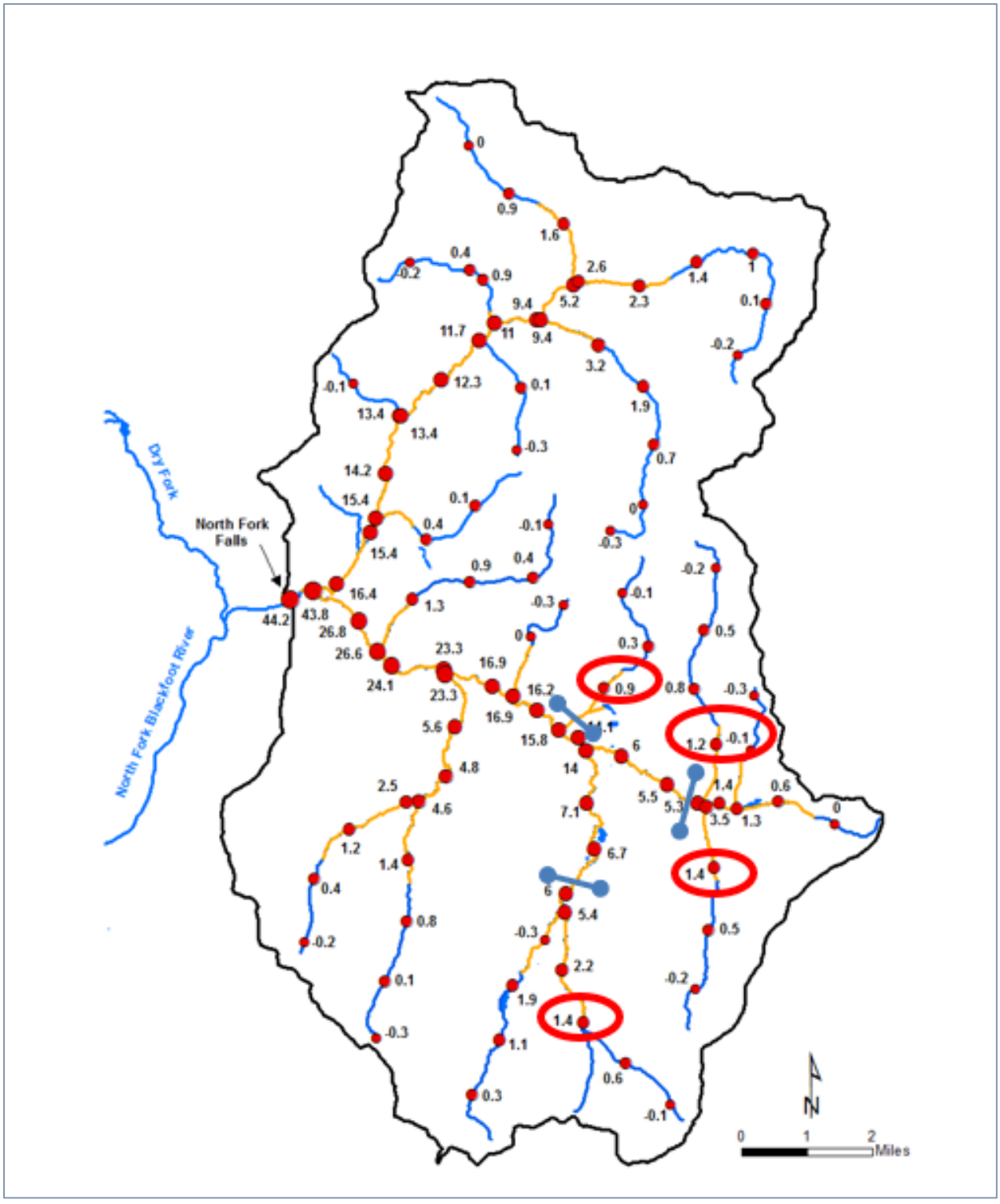


Figure 1. Map of the North Fork Blackfoot River watershed upstream of the North Fork Falls. Perennial streams (blue), overlapping distribution of hybrid trout (orange) and estimated stream discharge (red dots with numeric values by stream mile) for the North Fork Blackfoot River drainage upstream of the North Fork Falls. Map is from the estimated budget for the North Fork Project, January 2014. Red ovals show potential sites for bioassays and ground-truthing the fish distribution model; blue bars show potential deactivation sites.

Alternative 2 – Conduct bioassays, rotenone persistence studies, and fish distribution validation in 2018 using a liquid formulation of rotenone and the deactivating agent, potassium permanganate (proposed action)

The proposed action involves applying a liquid rotenone formulation, likely CFT Legumine™, and potassium permanganate at several sites in the East Fork North Fork Blackfoot River drainage on the Helena/Lewis & Clark National Forest in 2018. The restoration project is anticipated to be implemented in 2019 pending approval through the Montana Environmental Protection Act (MEPA) and the National Environmental Protection Act (NEPA) review and comment procedures.

Conducting the proposed rotenone and potassium permanganate bioassays and fish distribution tests a in 2018 would provide information that would facilitate planning for the restoration project. Results of the tests would provide information that would help refine estimates of the quantity of liquid rotenone formulation and potassium permanganate necessary for the restoration project, and establish the upstream limits for rotenone application, and determine the effective spacing of drip stations. Without this information, if the restoration project proceeds, the quantity of piscicide and potassium permanganate needing to be transported into the area would not be based on actual test data, which would likely lead to transporting significantly more of each than necessary to ensure an adequate supply.

Alternative 3 – Conduct bioassays, rotenone persistence and fish distribution testing in the same year the proposed basin-wide restoration project is implemented using a liquid rotenone formulation, and the deactivating agent potassium permanganate.

This alternative would provide the same information as the proposed action but would not be timely for planning for the restoration project. These tests would need to be done 2-4 weeks before the restoration project begins; however, arrangements for purchasing CFT Legumine and potassium permanganate need to be made months in advance. Personnel commitments similarly would have to be made months in advance. Therefore, to plan for the uncertain results from the tests, it would likely require purchasing more chemicals than needed and arranging for more personnel than will be needed.

Alternative 4 – Conduct only serial dilution bioassays in 2018

This alternative would meet the CFT Legumine label requirements for bioassays, but would provide no information toward estimating fish distribution, drip station spacing or concentration of potassium permanganate necessary to deactivate the rotenone. In this alternative, potassium permanganate deactivation stations below the bioassay and fish distribution test sites would likely not be necessary as all treated waters could be contained within test buckets.

Public Review Process

A draft EA[1] for the proposed project was available for public review and comment for a 30-day period from May 30 through June 28, 2018. Legal notices were published once each in the *Blackfoot Dispatch* (Lincoln, May 30), *Independent Record* (Helena, May 30), *Missoulian* (May 30), and *Seeley Swan Pathfinder* (May 31) newspapers. FWP distributed 84 copies of the EA and 49 email-notifications of the EA's availability to nearby landowners and interested individuals, groups and agencies. The EA was available for public review on FWP's website (http://fwp.mt.gov), under "Recent Public Notices" beginning May 30, and comments could be made directly on the EA's webpage or submitted to Region 2 FWP in Missoula. A statewide news release was distributed on May 31.

[1] Draft EA is available (accessed 29 June 2018) on FWP's website at:
http://fwp.mt.gov/news/publicNotices/environmentalAssessments/speciesRemovalAndRelocation/pn_0077.html

Public Comment Overview

Public Comment

FWP received comments from 16 individuals or organizations; 13 of the comments were e-mails, 1 comment came by U.S. Mail, and 2 commenters phoned in their comments (see Appendix A: Public Comment). Eight commenters were in support of the proposal, 6 commenters were in opposition, and 2 commenters did not specify support or opposition the project. Comments came from 4 nongovernmental organizations, and the rest were from private citizens.

Of the nongovernmental organizations, Montana Trout Unlimited, Hellgate Hunters & Anglers, and the Montana Wildlife Federation were in support of the project. Wilderness Watch opposed the action. Many of Wilderness Watch's concerns were related to designated wilderness and the Wilderness Act. The U.S. Forest Service has authority over designated wilderness and will respond to those comments in a separate notice. FWP addresses Wilderness Watch's science-related comments below. Among private citizens, 5 were in support of the project, and 3 were opposed.

Public Hearing

FWP and the U.S. Forest Service held a public meeting in Missoula on Wednesday, June 6 at 6:30 p.m. in the Bitterroot Room of the Hilton Garden (3720 Reserve Street). One member of the public (from Bonner) and one Fish & Wildlife Commissioner (Missoula) attended the hearing, in addition to several personnel from agencies involved in the project. No public comments were submitted during the meeting.

Summary of Public Comment Received

- Of the 16 public comments received, 8 commenters supported FWP's proposed action, 6 commenters were in opposition, and 2 commenters did not specify support or opposition.
- Of the commenters who identified their location 4 were from Missoula, and Billings, Clancy, "Flathead Indian Reservation," Great Falls, Helena, and Noxon each had 1 commenter. Five commenters were from unknown locations.

Comments supporting the proposal included support for the project and specific support for native fish conservation. One commenter specifically approved of the use of rotenone and potassium permanganate.

Opposition included objections to the use of rotenone, criticism of FWP's management of mule deer and walleye, perception that the project was designed for the benefit of out-of-state residents, and perceptions that Bull Trout were not valued and too much money was being spent on Bull Trout conservation.

An additional comment was against restocking of Bull Trout because they eat Cutthroat Trout. This comment is taken as support for the pilot work given the interest in Cutthroat Trout. The issue of what species to translocate will be evaluated as part of a future EA.

One commenter suggested using electrofishing instead of piscicide to remove fish from the project area.

Response to Public Comment

The following comments and FWP responses encompass specific questions, suggestions or comments received during the public comment period. Our responses address comments in opposition to the proposed action. Several comments addressed concerns over nontarget species and toxicity and persistence of rotenone, which were also reflected in comments provided by Wilderness Watch. We refer

the reader to the comprehensive response we prepared for Wilderness Watch's comments. All comments are available in Appendix A.

Response to Individuals

Comment: *I've worked in hydrology down in Arizona and also up here in Montana and Glacier National Park. I think damages caused by that fish toxin are too great to be used at all, versus just doing regular electric fishing testing--if you wanted to take the fish out that way, it seems more appropriate. The toxin reaches are further out than your study requirements.*

FWP Response: Please refer to the FWP's response to Wilderness Watch's comments on persistence and toxicity of rotenone. This draft EA is a pilot study of the persistence of rotenone in relatively short reaches with deactivation of rotenone at the downstream end if necessary, so this comment is not relevant to the current action.

Regarding the efficacy of rotenone compared to electrofishing, FWP has prepared a white paper that summarizes the research on electrofishing, also known as mechanical removal, versus the use of a piscicide (Endicott 2015; this paper will be posted on FWP's website with this decision notice). In short, electrofishing can be effective in extremely limited circumstances, where less than 3 miles are targeted for removal, the habitat is simple, or debris and streamside vegetation is removed using chain saws. Plant and debris removal requires considerable effort and may result in substantial short-term and long-term alterations in water quality, water temperature, fish habitat, and channel stability. Our current estimate is that 45 of the 85 miles of occupiable stream habitat upstream of the waterfall supports fish, and extensive habitat surveys (Pierce et al. 2018[2]) describe extremely complex habitat in most streams, with substantial loading of large woody debris from the wildfires in 1988. Numerous beaver impoundments create additional complex habitat. Mechanical removal would not be effective given the spatial extent of occupied habitat and its extreme complexity, and would substantially increase the cost, time, and number of workers necessary to achieve the overall objective. Moreover, removal of vegetation and debris would require the use of chainsaws to alter many miles of habitat over weeks or months. The noise and exhaust of chainsaws, along with the increase in fieldworkers, is incompatible with wilderness values.

Comment: *FWP is trying to create an out-of-state wonderland.*

FWP Response: The pilot study is not expected to impact the fishery, so it should not influence use or residency of users.

Comment: *Poisoning waterways seems like a huge disruption of the water, its animals, and the riparian zone for a limited benefit. It is likely the cutthroat will come under competition from other species within a few years.*

FWP Response: See response to Wilderness Watch for FWP's response to affect to water and aquatic animals. We are not proposing to alter any part of the riparian zone. The proposed pilot work does not propose to restock cutthroat trout, and nonhybrid cutthroats are likely not present above the falls. Restocking Westslope Cutthroat Trout would be evaluated as part of a future EA. The project area is protected from invasion of nonnative fishes by a 50-ft waterfall, so the area will be secure from competing species.

Comment: *Commenter is against spending any more money on bull trout restoration.*

FWP Response: This proposal is pilot work and does not propose Bull Trout restoration actions. However, it is being contemplated to use the information gathered during this pilot work to eventually support translocating Bull Trout to above the falls. FWP believes that the North Fork Bull Trout are valuable to the Blackfoot River, upper Columbia River and range wide Bull Trout conservation. The cost of the project will also support Westslope Cutthroat Trout conservation and angling opportunity. An

[2] This document will be posted on FWP's website with this decision notice.

enhanced fishery is likely to provide benefit to the ecosystem as well because many animals feed on fish, including birds and small and large mammals.

Comment: *FWP should protect current fisheries and spend money on kids fishing events.*

FWP Response: FWP invests considerable time and money protecting fisheries and supporting kids fishing events. Conserving native fishes is also an important goal for FWP, many Montanans, and sporting and conservation groups. Moreover, state and federal law requires FWP and federal partners to implement projects to conserve native trout. FWP believes spending money on this project is worthwhile.

Response to Wilderness Watch on Persistence of Rotenone, Effects on Nontarget Organisms, and Perceived Potential for Failure

Comment: *Rotenone must not be used to poison the streams.*

Rotenone kills organisms other than the targeted non-native fish, and those lost species can remain absent for more than five years. Rotenone is a poison that kills all organisms that utilize gills during part of their life cycle. These organisms include not only the targeted nonnative fish, but amphibians, macroinvertebrates, and other non-target organisms that use gills, perhaps even including the Columbia Spotted Frog in its tadpole stage. See (Mangum, F. A. and J. L. Madrigal. 1999. Rotenone effects on aquatic macroinvertebrates of the Strawberry River, Utah: a five year summary. Journal of Freshwater Ecology 14:125-135. See also Don C. Erman, Comment: Rotenone Toxicity to Rainbow Trout and Several Mountain Stream Insects. North American Journal of Fisheries Management, 32:1, 53-59 (Feb. 21, 2012). See also Dalu T, Wasserman RJ, Jordaan M, Froneman WP, Weyl OLF (2015) An Assessment of the Effect of Rotenone on Selected Non-Target Aquatic Fauna. PLoS ONE 10(11): e0142140.doi:10.1371/journal.pone.0142140.)

A 5-year study on a river in Utah (Mangum and Madrigal 1999) found that: "up to 100% of Ephemeroptera, Plecoptera, and Trichoptera [mayflies, stoneflies and caddis flies] were missing after the second rotenone application. Forty-six percent of the taxa recovered within one year, but 21% of the taxa were still missing after five years. At least 19 species were still missing five years after the rotenone treatments." Especially in a designated Wilderness, chemicals like rotenone would bring a significant trammeling to the wilderness character of these two lakes and accompanying streams in violation of the basic tenants of the 1964 Wilderness Act (16 U.S.C. 1131-1136).

FWP Response:

The second sentence of this comment incorrectly states "rotenone is a poison that kills all organisms that utilize gills during part of their life cycle." While all *species* that respire with gills are susceptible to rotenone, all gilled *organisms* will only be killed if exposed to rotenone at levels far in excess to what is proposed for the pilot studies. Such was the case for the Strawberry River project (Mangum and Madrigal 1999), where the concentration, duration, spatial extent of piscicide application, and temporal spacing of a second treatment deviated markedly from what is proposed in the draft EA. In the Strawberry River watershed, rotenone was applied at a concentration of 150 ppb, which is triple the 50 ppb proposed for bioassays in the North Fork Blackfoot River; drip stations ran for 48 hours, as compared to the 4 hours proposed in the draft EA; and this exceptionally high concentration and duration was repeated a month later. The draft EA proposes treating segments of a few select streams and miles of untreated stream upstream of the treated reaches would provide a source of recolonization through drift. Aerial adults from untreated areas downstream would also contribute to recolonization of the discrete treatment reaches.

The comment references species that were reported by Mangum and Madrigal (1999) to be still missing five years after the rotenone treatment in the Strawberry River watershed and likened this to "significant trammeling" of wilderness. These researchers reported that across 3 sampling stations, up to 8 taxa were missing from samples 5 years posttreatment. They also concluded statistically significant decreases in the density of 6 select taxa occurred compared to baseline samples. This research has numerous

deficiencies that prevent it from providing scientifically supportable conclusions. Moreover, their treatment protocols differed substantially from piscicide projects in current practice. We will review their methodology, assumptions, and flaws in the study design, and this should alleviate any concerns that species will be extirpated by the proposed bioassays.

One limitation of Mangum and Madrigal's (1999) investigation is its unsupportable and unscientific assumption that taxa missing from samples were missing from the stream. Streams provide diversity in habitat complexity and in the number of invertebrate species they support. Rarity of many taxa is common; however, the number of species within a reach can range from hundreds to thousands. Given the substantial potential for rarity, complexity of the habitat, patchiness in distribution, and seasonality of life history stages, no stream has had a census, or complete inventory, of all species present (Entrix 2010). A taxon missing from the sample is not necessarily missing from the stream. Moreover, sampling results do not prove absence.

Natural monthly and yearly variability of species present in streams is considerable. Monthly sampling of the same location in the Logan River, Utah, for 10 years provides a case study of community composition dynamics across time (Vinson et al. 2010). Little variability in numbers of species or genera occurred among sampling events; however, the presence of individual genera or species showed considerable variability. Over 60 genera had been collected at this site; yet, the number of individual genera captured regularly was about 40% of the total number of genera found cumulatively. The list of genera continued to grow, with a new one appearing about every 2 months. The genera accumulation curve had been increasing steadily and showed no sign of flattening out. These results underscore the limitations of using presence or absence of a given species in drawing conclusions on the influence of rotenone treatment on species composition. Taxa pop in and out of presence in samples naturally.

The sampling methodology employed by Mangum and Madrigal (1999) further limits the ability to conclude that taxa were "missing" from the stream. These investigators used Surber samplers, which collect invertebrates from a 1-ft^2 area of riffle, with 3 replicates per site. Surber samplers are a commonly used tool to collect macroinvertebrates and are useful in conducting reconnaissance investigations; however, they are not an appropriate method to attempt to calculate biomass or inventory the invertebrates present. To estimate the number of invertebrates with a statistical certainty within 5% of the mean, nearly 450 Surber samples would be required (Chutter 1972). The tremendous variability in abundance among samples suggests similar variability in species collected and limits the inference that is possible on the presumed absence of a taxon from 3 replicate Surber samples per site.

The small sample size of 3 replicate Surber samples per station also calls into question Mangum and Madrigal's conclusions on the putative reduction in abundance in the 6 select taxa. The article states abundance of these taxa was reduced, although they do not present baseline data or posttreatment data on the abundance of these taxa, and they provided a single *p*-value for multiple comparisons. Peer-reviewed journals present these types of results quantitatively in tabular or graphical form, allowing the reader to critically review the results. The one-sentence qualitative narrative of a complex set of results does not allow for review or interpretation. This inadequate reporting is atypical of a peer-reviewed journal and is a critical flaw in allowing review and interpretation of the effects of rotenone on these select taxa.

The lack of a control watershed is another limitation in the Mangum and Madrigal (1999) investigation, is inconsistent with the scientific method, and does not allow for prediction based on their data. Without collecting macroinvertebrates in streams that have not been treated, attributing the presumed absence of taxa to piscicide treatment, and not related to natural variation among sampling events or environmental conditions, is not possible.

Given the great natural variability of taxa present among samples, and the flawed sampling method, Mangum and Madrigal's (1999) assumption that absence of a taxon from a sample meant that it was missing from the stream is unsupportable. The Logan River study shows that the great variability among samples limits inference on taxa present. The putative missing taxa accounted for 10% or less of the baseline species present, and Mangum and Madrigal (1999) did not report their abundance in the pre-project samples, so it is not possible to determine if the "missing taxa" were rare or abundant. Rare taxa

would be more likely to be missing from subsequent samples than abundant taxa, regardless of a history of piscicide exposure. Considering Vinson et al.'s (2010) findings, the presumed absence of 10% of taxa may be attributable to natural variability. Mangum and Madrigal (1999) made no mention of gained taxa, which would have been likely, given Vinson et al.'s (2010) findings of a gradual accumulation of genera across time.

This comment is also misleading because, by omission, it does not reference the literature review provided in the draft EA, which summarizes numerous peer-reviewed articles that investigated the toxicity of rotenone to aquatic organisms, recovery of aquatic macroinvertebrates following rotenone treatment, and descriptions of life history strategies of stream-dwelling invertebrates that make them resilient to disturbance associated with rotenone treatment. Nor does it reference the investigations from Montana or the Intermountain West, or investigations using the formulation of rotenone under current use, or concentrations and durations of rotenone exposure typical of current practice.

The relevant studies examined response of aquatic invertebrates to application of rotenone and potassium permanganate under current practice protocols and found macroinvertebrates experience minor to moderate reductions in numbers, rapid recovery of biomass shortly after treatment, and recovery of the community within a year (Skorupski 2011). Researchers in Norway applied the same formulation of rotenone as proposed in the draft EA and found full recovery of invertebrates and no effect on amphibians (Kjærstad et al. 2016; Arnekleiv et al. 2015). Field and laboratory studies on the effects of rotenone on amphibians confirm the toxicity of rotenone to gilled tadpoles; however, juvenile, metamorphs, and adults do not experience a lethal effect (see draft EA for citations). Moreover, field studies documented explosive reproduction of Columbian spotted frogs the year following treatment in a mountain lake (Billman et al. 2012), and amphibian populations were not diminished in a spatially extensive rotenone project in the South Fork Flathead River watershed (Fried and Boyer 2018).

In general, drawing conclusions on the effects of rotenone on aquatic invertebrates has been challenging given variability in concentration and duration of rotenone treatment among studies. Nevertheless, as detailed in the draft EA, the weight of evidence indicates macroinvertebrates respond with slight to moderate reductions in abundance and richness, and some taxa are more sensitive than others. Stream-dwelling aquatic invertebrates evolved in disturbance prone ecosystems and have a variety of mechanisms to recolonize following disturbance, with community recovery occurring within a year.

Because taxa present show inherent variability over time and space, calculated metrics of biological integrity other than an accounting of taxa present provide a more robust means of determining the effects of rotenone on macroinvertebrates. Montana DEQ has developed biological indicators that examine several metrics associated with stream health (Jessup et al. 2006). Most other states and some federal agencies have developed similar tools. These assessments do not include analysis of taxa that have not been sampled since treatment; they employ a statistically-based tool that describes the relative health of a stream based on its benthic assemblage. Note that no other studies have employed the analyses conducted by Mangum and Madrigal (1999).

The second citation (Erman 2012) provided in this Wilderness Watch comment is comment on a laboratory study of toxicity of 2 formulations of rotenone on Rainbow Trout and several mountain stream insects (Finlayson et al. 2010). The study also evaluated toxicity of these products when combined with a chemical synergist. The authors of the latter paper concluded the toxicity of rotenone was greatest to trout with an LC_{50} of 5.3 ppb of CFT Legumine™ after 8 hours exposure, and an LC_{50} of 6.2 ppb Nusyn-Noxfish™. The synergist did not increase toxicity of rotenone to Rainbow Trout. Aquatic insects were more tolerant to both formulations of rotenone, when the formulations were not combined with the synergist, and the LC_{50}s for aquatic insects ranged from 34 to 174 ppb with CFT Legumine and 13 to 74 ppb for Nusyn-Noxfish. The authors compared laboratory studies with observations in Silver King Creek where 3 annual treatments of 16-23 ppb for 6 to 18 hours were successful in eradicating Rainbow Trout hybrids, but aquatic insect communities experienced little change. Finlayson et al. (2010) recommended using the lowest rotenone concentration and duration needed to accomplish the treatment objective and avoid using the chemical synergist. An objective of the proposed action is to determine the lowest

concentration of rotenone needed to meet the objective of achieving a fish kill, while minimizing effects on aquatic invertebrates.

Erman's (2012) major comments on Finlayson et al. (2010) addressed their putative failure to adhere to recommended laboratory protocols, variability in sizes of fish being tested, and failure of the authors to report larval insect stage or instar. He concluded these deficiencies precluded drawing inference from the study's results. His comments are more complicated than this summary of the major points, and Finlayson et al. (2012) provide a detailed rebuttal that is too lengthy and complex to replicate here. Interested parties are encouraged to read these papers.

In rebutting Erman's (2012) comment on their study, Finlayson et al.'s (2012) first point was to clear up a misconception that leads to bias against rotenone projects that Erman (2012) perpetuated in his paper. Erman (2012) claimed the purpose of the Silver King Creek project was to remove all fish except the native Pauite Cutthroat Trout from the basin. This statement can be misleading, as the reader may assume species other than the Rainbow Trout were present, and project coordinators were interested solely in Pauite Cutthroat Trout, to the exclusion of other species that may have been there. Piscicide projects are often criticized as seeking to establish a monoculture of the preferred fish, to the detriment of an assemblage of fish. In Silver King Creek, only Rainbow Trout and perhaps a few Pauite Cutthroat Trout that washed down from occupied habitat upstream of the project reach were present in the project reach. Pauite Cutthroat Trout were the only species native to the project area. The project did not affect any other species of fish.

Regarding the criticism of not adhering to recommended protocols in conducting the laboratory studies, Finlayson et al. (2012) pointed out that the recommended protocols addressed "*generalized* discussions of toxicity testing", not specific testing protocols. Finlayson et al. (2012) used a standardized testing method that was approved by the American Society of Testing and Materials (ASTM 2001) and the U.S. Environmental Protection Agency (USEPA 2002). Moreover, the testing did adhere to the generalized recommendations designed to prevent confounding factors, such as decreased concentrations of dissolved oxygen, increased concentrations of potentially toxic metabolites, and conspecific aggression relating to overcrowding. Survival of control organisms indicated the testing protocols were consistent with the generalized discussions of toxicity testing (Finlayson et al. 2012)

Finlayson et al. (2012) also addressed Erman's (2012) criticism of size differences among Rainbow Trout used in toxicity testing. Erman (2012) cited Sprague (1990) who stated an increase in toxicant tolerance as fish grow from 1 gram to 10 grams; however, Erman (2012) failed to add Sprague's (1990) other statement that other investigations had not found an apparent size effect on sensitivity to toxicants. Furthermore, Finlayson et al. (2012) cited 20 years of field observations and other studies that have not found a relationship between fish size and sensitivity to rotenone.

Erman's (2012) concern over the different instar stages of larval sensitivities cited a study of the uptake of, not sensitivity to, an organophosphate insecticide (Finlayson et al. 2012). Organophosphate insecticides are chemically dissimilar to rotenone, an isoflavonoid, so this comparison may have no relevance to rotenone projects. Finlayson et al. (2012) agreed that differences among instar stages may exist, but these are probably minor compared to differences in rotenone sensitivity between trout and stream invertebrates (Vinson et al. 2010). Moreover, Finlayson et al. (2010) selected invertebrate taxa known to be highly susceptible to rotenone poisoning, so the results of their toxicity testing are likely a worse-case scenario with respect to the invertebrate assemblages.

In their rebuttal to Erman (2012), Finlayson et al. (2012) concluded Erman (2012) apparently misinterpreted the objectives, analytical methods, and results of the toxicity tests. They felt the issues raised by Erman (2012) had little relevance to their results, conclusions, and recommendations. They also pointed out the need for an increased dialogue between proponents and opponents of piscicide projects so that efforts are spent restoring resources, not creating unrealistic scientific expectations and bureaucratic impasses.

The third citation (Wasserman et al. 2015) in this Wilderness Watch comment is an investigation to evaluate toxicity of rotenone to a variety of aquatic invertebrates in South Africa. The researchers were working on native fish conservation in headwater streams in South Africa's Cape Floristic Region, an area of high biological diversity and freshwater fish endemism. Maintaining biodiversity in this sensitive ecosystem is a conservation goal. Nonnative fishes were the primary threat to the endemic fishes of the area. Concerns for the potential for rotenone to adversely affect native, nontarget aquatic organisms prompted in vitro bioassays to evaluate the tolerance of various taxa to rotenone treatment.

Due to the geographical and evolutionary distance between South Africa's Cape Floristic Region and the Northern Rockies, overlap in genera was limited, although *Baetis* mayflies, *Anax* dragonflies, *Physa* snails are common to Montana and the region of concern in South Africa. Several species of zooplankton were evaluated, although these results are not relevant to the draft EA, as zooplankton are lake-dwelling and no lakes would be affected by the proposed action.

The investigation entailed bioassay of invertebrates in the laboratory with varying concentrations of rotenone for 6 or 18 hours. The 6-hour duration was more like the 4-hour exposure proposed in the draft EA. The *Baetis* mayfly experienced on average 60% mortality at exposure of 50 ppb rotenone for 6 hours. This response is consistent with field investigations in the Intermountain West that show considerable mortality of *Baetis* during piscicide treatments. Nevertheless, *Baetis* are early colonizers, and they rapidly recolonize streams following piscicide treatment (Cook and Moore 1969; Wallace and Gurtz 1986), which gives them a short-term advantage. Neither dragonfly naiads nor snails were found in extensive sampling of aquatic invertebrates in streams in the North Fork Blackfoot River project area (Pierce et al. 2018); nevertheless, the study cited by the commenter and other investigators have found dragonflies and snails to be resilient to rotenone (Chandler and Marking 1982; Haak et al. 2014; Wasserman et al. 2015).

A relevant consideration when evaluating rotenone projects as distant as South Africa is the extent to which nonnative fishes have altered fish assemblages worldwide, and that conservation actions involving rotenone are being implemented across continents. Fisheries managers are grappling with the homogenization of the world's fisheries, and the cost of inaction is the loss of biodiversity and extinction. Globally, freshwater fishes are the most threatened large taxon in the world (Carrizo et al. 2013), and 33% of the 5,125 assessed freshwater fishes are threatened with extinction (Reid 2013). In North America, freshwater fishes have a higher rate of extinction than terrestrial vertebrates, and the extinction rate estimates are 112 to 855 times higher than natural extinction rates (Burkhead 2012). An estimated 53 to 86 species of freshwater fish are predicted to go extinct in North America by 2050 (Burkhead 2012). In the western U.S. and Mexico, nonnative species are a contributing factor to the decline of all the 29 imperiled freshwater *Oncorhynchus* (Jelks et al. 2008). These introductions often act in concert with other human-caused alterations of the aquatic environment; nevertheless, introductions of nonnative fishes on a global scale are among the primary drivers of a loss of biodiversity and fish extinctions (Gozlan et al. 2010).

Although research shows aquatic invertebrates to be resilient to rotenone treatment, concern for these organisms is consistent with maintaining biodiversity and protecting rare species. Montana Fish, Wildlife & Parks and the Montana Natural Heritage Program conducted extensive sampling of aquatic invertebrates at 25 sites across 18 streams in the North Fork Blackfoot River project area (Pierce et al. 2018). No species of concern were found, although a few genera that cannot be identified to species until the adult life-stage were present include potential species of concern. Fish currently occupy an estimated 45 miles of the available 80 miles of stream habitat, which means many miles of headwater stream would not be treated during the proposed action. Drift from untreated headwaters and reproduction of aerial adults from untreated reaches downstream would recolonize treated reaches. Stream invertebrates evolved under a regime of frequent disturbance and their numerous mechanisms of recovery are well-documented. FWP piscicide policy requires posttreatment monitoring, which would evaluate the response of invertebrate communities to the proposed action.

The commenters list gilled Columbia spotted frogs (*Rana luteiventris*) as having potential to be adversely affected by the proposed action. The draft EA clearly states headwater streams are proposed for application of rotenone, and these swift, running waters do not provide habitat for larval Columbia spotted

frogs. Extensive herpetological surveys in the basin's streams did not find gilled Columbia spotted frogs (Pierce et al. 2018). Rocky Mountain tailed frogs (*Ascaphus montanus*) are the only gilled amphibian likely to be present in treated waters, and the draft EA describes the life-history strategies and physiological tolerances that make these frogs resilient to rotenone projects. Concern over the potential for amphibians to be negatively affected by rotenone is valid; however, the evidence shows these organisms would not be affected, or would experience minor, short-term effects, and natural recovery would mitigate for any losses.

Comment: *Rotenone can persist in the ecosystem. In Sequoia-Kings Canyon National Parks in California, the National Park Service (NPS) acknowledged in its 2013 Restoration of Native Species in High Elevation Aquatic Ecosystems Plan and DEIS that rotenone has half-life of 20 days in cold water (DEIS at 217), that it "completely degrades" within 1-8 weeks (DEIS at 217). Twenty days' duration where rotenone is still exposing wildlife, humans, and environmental resources to a toxicant is a significant time of persistence. As a result of longer duration of rotenone, other species (and humans) are likely to be more at risk of being affected by rotenone.*

FWP Response: Our review of the literature investigating the relationship between rotenone and temperature indicates more rapid degradation of rotenone than stated above (see comment 2a, page 12). The duration of persistence indicated above is only possible in cold water with minimal exposure to light, such as the bottom of a lake. The dominant role that photolysis (sunlight) plays in quick degradation was experimentally demonstrated by Brown (2010) who found that under conditions of bright sunlight in June, water up to 10 cm deep and containing 15 ppb rotenone was almost totally degraded and non-toxic to fish within 2-3 hours. Furthermore, other factors expedite the breakdown of rotenone in the environment, including hydrolysis, dilution, alkalinity, and binding with organic matter. In streams in Montana, all these factors combine to produce a half-life that is more typically in the range of 1-5 hours, based on measurements taken during actual piscicide treatments (Skaar et al. 2017). Indeed, an objective of the pilot study is to estimate the rate at which rotenone breaks down in these streams, which would guide spacing of drip stations to ensure waters maintain target concentrations to promote effective removal of fish from the streams should the next phase proceed. Application of potassium permanganate at the downstream end of the treatment reaches would ensure that any remaining rotenone would be fully degraded after 30 minutes stream travel time.

During the pilot studies, fish and sensitive invertebrates would be killed within the test stream segments; however, humans would not be at risk from environmental persistence of rotenone. The draft EA addresses risks to human health in detail and references peer-reviewed studies and the EPA's in-depth toxicological analyses. The effective concentration of rotenone for fish removal projects does not pose a threat to mammals, birds, or reptiles from ingestion of water or animals killed by rotenone. Applicators handling and applying CFT Legumine are the only humans at risk of exposure during this proposed treatment, but personal protective gear (respirators, protective eyewear, and chemical resistant gloves) is sufficient to protect applicators. As an added safety measure, the streams would be closed to public access during the testing to prevent the public from exposure to treated water.

Comment: *Rotenone can have significant failures, requiring additional applications. In 2010, the U.S. Bureau of Reclamation completed its "Proposed Reapplication of Rotenone in Bonita Creek: Supplement to the Environmental Assessment on Native Fish Restoration in Bonita Creek, Gila Box Riparian National Conservation Area, Graham County, Arizona". The supplement was needed so the Bureau could poison Bonita Creek again after the first attempt at fish eradication failed. The Supplement gave a table (Appendix B, List of Stream Renovation Projects in the Lower Colorado River Basin) of other projects in the region. There were 21 projects listed of which 19 had results of the poisoning on fish eradication "success". Of these 19 projects, the average number of poisonings (i.e., number of times the poisoning failed and was repeated) was 1.9 poisonings per stream. Four of the 19 stream projects were poisoned up to 3 times in hopes of eradication. In only 6 cases (32%) was one poisoning considered sufficient for eradication of all fish.*

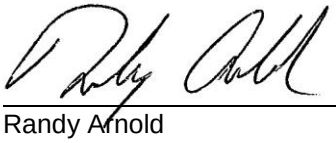
FWP Response: Single treatments in consecutive years are standard procedure in conducting native fish restoration projects in Montana; however, the number of treatments required to meet ultimate project

goals are not relevant for this draft EA, because the purpose is simply to conduct pilot-level bioassays. The pilot studies would allow estimation of the lowest effective concentration of CFT Legumine needed to achieve a fish kill, while minimizing effects on aquatic invertebrates, verify the upstream extent of fish in headwater streams, and determine the necessary spacing of drip stations to ensure the target concentration of rotenone is achieved in the receiving streams. From this perspective, the agencies would expect that commenters concerned about failures would embrace the concept of these pilot studies, because their sole purpose is to collect the kind of information required to plan a successful treatment.

Decision

Based on the analysis in the Draft Environmental Assessment (EA), along with applicable laws, regulations and policies, it is my decision to select the proposed action (Alternative 2) and proceed with the Pilot-Level Bioassays and Fish Distribution Testing Project. FWP expects work to begin in August 2018.

I have determined that the decision to proceed with the proposed action will not have a significant negative effect on the natural or human environment. Therefore, an Environmental Impact Statement will not be prepared. By notification of this Decision Notice (DN) along with the additional information described herein (FWP Responses to Commenters), the draft EA along with the DN is hereby made the final EA. The draft EA with this Decision Notice may be viewed at or obtained from Montana Fish, Wildlife & Parks at the address on page 1. The EA and DN are available for review on FWP's web site http://fwp.mt.gov/ under "News," then Recent Public Notices" (enter "bioassays" in "Search Public Notices").



8/10/2018

Randy Arnold
Region 2 Supervisor
Montana Fish, Wildlife & Parks

Date

Literature Cited

Arnekleiv, J.V., G. Kjærstad, D. Dolmen, and J. I. Koksvik, J.I. 2015. Studies of invertebrates and amphibians in connection with the rotenone treatment of the lake Vikerauntjønna – NTNU Vitenskapsmuseet naturhistorisk rapport 2015-7: 1-47.

ASTM (American Society for Testing and Materials). 2001. Standard guide for conducting acute toxicity tests with fishes, macroinvertebrates, and amphibians: guide E729-96. In 2001 ASTM standards on disc, volume 11.05 (CD-ROM). ASTM, West Conshohocken, Pennsylvania.

Billman, H. G., C. G. Kruse, S. St-Hilaire, T. M. Koel, J. L. Arnold, and C. R. Peterson. 2012. Effects of rotenone on Columbia spotted frogs *Rana luteiventris* during field applications in lentic habitats in southwestern Montana. North American Journal of Fisheries Management. 32:781-789.

Brown, P. J. 2010. Environmental Conditions Affecting the Efficiency and Efficacy of Piscicides for Use in Nonnative Fish Eradication. Montana State University, PhD dissertation. 121 pp.

Burkhead, N. M. 2012. Extinction Rates in North American Freshwater Fishes, 1900–2010. BioScience 62:789-808.

Carrizo, S. F., K. G. Smith, and W. R. T. Darwall. 2013. Progress towards a global assessment of the status of freshwater fishes (Pisces) for the IUCN Red List: application to conservation programmes in zoos and aquaria. International Zoo Yearbook 47:46-64.

Chandler, J.H. and L.L. Marking. 1982. Toxicity of rotenone to selected aquatic invertebrates and frog larvae. The Progressive Fish Culturist 44(2) 78-80.

Chutter, F. M. 1972. A reappraisal of Needham and Usinger's data on the variability of a stream fauna when sampled with a Surber sampler. Limnology and Oceanography 17:139-141.

Cook, S. F., and R. L. Moore. 1969. The effects of a rotenone treatment on the insect fauna of a California stream. Transactions of the American Fisheries Society 83 (3):539-544.

Entrix, Inc. 2010. Paiute cutthroat trout restoration project: Silver King Creek, Humboldt-Toiyabe National Forest, Alpine County, California. Final environmental impact statement/environmental impact report. Prepared for U.S. Fish and Wildlife Service and California Department of Fish and Game. EPA No. FES 10-10.

Endicott, C. L. 2015. White paper: Chemical and mechanical means of fish removal;. Methods, effectiveness, and environmental effects. Montana Fish, Wildlife & Parks, Livingston, Montana.

Erman, D. 2012. Comment: rotenone toxicity to Rainbow Trout and several mountain stream insects. North American Journal of Fisheries Management 32:53-59.

Finlayson, B., W. L. Somer, and M. R. Vinson. 2010. Rotenone toxicity to Rainbow Trout and several mountain stream insects. North American Journal of Fisheries Management 30:10-19.

Finlayson, B., W. L. Somer, and M. R. Vinson. 2012. Rotenone toxicity to Rainbow Trout and several mountain stream insects: response to comments. North American Journal of Fisheries Management 32:60-64.

Fried, L. M., and M. C. Boyer. 2018. Amphibian response to rotenone treatment of ten alpine lakes in Northwest Montana. North American Journal of Fisheries Management 38:237-246.

FWP. 2012. Piscicide Policy. Montana Fish, Wildlife & Parks, Fisheries Bureau. Helena, Montana.

Gozlan, R. E., J. R. Britton, I. Cowx, and G. H. Copp. 2010. Review paper: current knowledge on nonnative freshwater fish introductions. Journal of Fish Biology 76:751-786.

Haak, D. M., B. J. Stephen, R. A. Kill, N. A. Smeenk, C. R. Allen, and K. L. Pope. 2014. Toxicity of copper sulfate and rotenone to Chinese mystery snail (Bellamya chinensis). Management of Biological Invasions 5:371-375.

Jelks, H. L., S. J. Walsh, N. M. Burkhead, S. Contreras-Balderas , E. Diaz-Pardo , D. A. Hendrickson , J. Lyons , N. E. Mandrak, F. McCormick , J. S. Nelson , S. P. Platania , B. A. Porter , C. B. Renaud, J. J.Schmitter-Soto , E. B. Taylor, and M. L. Warren. 2008. Conservation status of imperiled North American freshwater and diadromous fishes. Fisheries 33:372-407.

Jessup, B., C. Hawkins, and J. Stribling. 2006. Biological indictors of stream condition in Montana using benthic macroinvertebrates. Prepared for Montana Department of Environmental Quality. Tetratech, Owings Mill, Maryland and Western Center for Monitoring and Assessment of Freshwater Ecosystems, Logan Utah.

Kjærstad, J. V, J. V. Arnekleiv, and D. M. Speed. 2016. Effects of three consecutive rotenone treatments on the benthic macroinvertebrate fauna of the River Ogna, Central Norway. River Research Applications 32:572-582.

Mangum, F. A., and J. L. Madrigal. 1999. Rotenone effects on aquatic invertebrates of the Strawberry River, Utah; a five-year study. Journal of Freshwater Ecology 14:125-135.

Pierce, R., C. Podner, and P. Saffel. 2018. Aquatic and associated investigations to guide conservation planning of Bull Trout and Westslope Cutthroat Trout in the North Fork Blackfoot River upstream of the North Fork Falls, 2002-2017. Montana Fish, Wildlife & Parks, Missoula, Montana.

Reid, G. M. 2013. Introduction to freshwater fishes and their conservation. International Zoo Yearbook 47:1-5.

Skaar, D. R., J. L. Arnold, T. M. Koel, M. E. Ruhl, J. A. Skorupski, and H.B. Treanor. 2017. Effects of rotenone on amphibians and macroinvertebrates in Yellowstone. Yellowstone Science 25(1): 28-34.

Skorupski, J. A. 2011. Effects of CFT Legumine™ rotenone on macroinvertebrates in four drainages of Montana and New Mexico. Thesis prepared for the degree of Master of Science. University of North Texas. Denton, Texas.

Sprague, J. 1990. Aquatic toxicology. Pages 491-528 *in* C. B. Schreck and P. B. Moyle, editors. Methods for fish biology. American Fisheries Society, Bethesda, Maryland.

USEPA (U. S. Environmental Protection Agency). 2002. Methods for measuring acute toxicity of effluents and receiving waters to freshwater and marine organisms, 5th edition. Prepared by Environmental Monitoring Systems Laboratory, Cincinnati, Ohio, for USEPA, EPA-821-R-02-012, Washington, D. C.

Vinson, M. R., E. C. Dinger, and D. K. Vinson. 2010. Piscicides and Invertebrates: After 70 Tears, Does Anyone Really Know? Fisheries 35: 61-71.

Wallace, B. J., and M. E. Gurtz. 1986. Response of Baetis mayflies (Ephemeroptera) to catchment logging. American Midland Naturalist 115:25-40.

Wasserman, D. T., R. J. Jordaan, M. Froneman, and W.P. Weyl OLF. 2015. Assessment of the effect of rotenone on selected nontarget aquatic fauna. PLoS One 10(11): e0142140 https://doi.org/10.1371/journal.pone.0142140.

Appendix A: Public Comment

All comments on the proposed Pilot-Level Bioassays and Fish Distribution Testing (for the Proposed North Fork Blackfoot River Native Fish Restoration Project) and its Draft EA, received by FWP during the comment period of May 30 through June 28, 2018. (Comments received via E = email, M = mail, Ph = phone.)

Commenter #	Via	Paragraph	Comment
1	E		Sounds good.
2	Ph	1	Think it's really good that we assess the types of fish there in the North Fork, but I am definitely not in favor of using the fish toxin rotenone.
		2	I've worked in hydrology down in Arizona and also up here in Montana and Glacier National Park. I think damages caused by that fish toxin are too great to be used at all, versus just doing regular electric fishing testing--if you wanted to take the fish out that way, it seems more appropriate. The toxin reaches are further out than your study requirements.
		3	I am definitely against you using the toxin.
3	Ph		My comment is also sort of a question as to why you'd re-introduce bull trout. Once I was reeling in a cutthroat trout in a pool in the North Fork, and a bull trout (maybe 2-3 ft long) was eating the (about) 12-inch cutthroat while I was reeling it in. It had most of the fish consumed and the line broke. Cutthroat trout are beautiful fish. I understand that bull trout and [westslope] cutthroat are natural [native] to the North Fork, but unless there is a very compelling reason, we should get rid of bull trout in the North Fork. I don't think bull trout should be re-introduced into the North Fork as part of an eventual fish restoration project. Bull trout eat a lot of fish.
4	E		Sounds like a great project. I'm in full support of identifying, studying, and restoring fisheries to a native compliment such as the project proposed here.
5	E		I'm all for this project. Anything we can do to protect, restore or enhance native fish populations should be a high priority with FWP. Too much time is spent with introduced trout species, which are not Montana's heritage. Hope this project has the support and funding to move forward.
6	E	1	"It calls for biologists to collect data this summer that would help them estimate current fish distribution and calculate the volume and placement of the fish toxin, rotenone, that would be required to remove existing nonnative hybrid fish from the river and tributaries"
		2	What kinda POLITICAL B.S. is that statement.... that process kills ALL FISH. You're just a sack full of political liars... trying to manipulate the public with you 1/2 truths... SHAME ON YOU!!!
7	E		I support the proposed action and hope this effort to return to native fish is successful.
8	E		you have destroyed the mule deer population and are trying to destroy the walleye in canyon ferry. now leave the Blackfoot alone. We are tired of you trying to make a out of state wonderland. Get out of our lives.
9	E		I have great respect for the FWP. As a hunter I benefit greatly from the licensing work you do to provide science-based quotas that make it possible for healthy populations of wildlife throughout Montana. That said, I am skeptical of the overall positive impact of poisoning waterways (however temporarily) to reintroduce native cutthroat. I seems like a huge disruption of the water, its many different kinds of animals, and the riparian zone for a limited benefit. It seems like the cutthroat are likely to come under competition pressure from other species within a few years of such attempts. Just my two cents.
10	M	1	I support implementation of Alternative 2--Conduct bioassays and fish distribution testing in 2018 using a liquid rotenone formulation and a neutralizing agent, potassium permanganate.
		2	I've fly-fished the N. F. Blackfoot above the impressive N. F. Falls, and was disappointed that my "catch" were rainbow-cutthroat hybrids. The hybrids, in my opinion, should be removed to the extent possible, and native fish species re-established above N. F. Falls.

		3	The proposed action is a transient event with no long-term adverse effects. Rotenone and $KMnO_4$ treatment is a viable mitigation tool within the wilderness boundary "necessary to meet minimum requirements" for restoration of native fish populations in the Scapegoat Wilderness area.
		4	Thank you for the opportunity to comment on this native fish restoration project.
11a,b	E		I am against any more money being spent on Bull Trout restoration. It is like throwing money in a fire. The results are so small it's crazy. Examples, look at the millions of dollars spent on a fish ladder at the dam over at Thompson Falls. They keep track of fish using the ladder, and you can count on two hands the number of bull trout that use it. Or the netting of lake trout in Flathead Lake and the other Lake (Seeley or Swan?) A waste of money (but I guess it gives you guys jobs.) No more please!!!! Do you really think that even 2% of Native Americans in MT give a hoot about Bull Trout??? It's only the Tribal biologists and people who have a job related to Bull trout restoration, or feel they can litigate for money (CSKT tribal council going after PPL, Smurfit Stone, etc) that are the vocal voices. Look at how much money the CSKT tribe has litigated from PPL, etc over the bull trout. Tens of millions $, it is insane and basically a big scam.
12	E		I think we should protect what we have and change fishery's that are not in trouble. The money could be spent on kid fishing events. That's your future??
13	E	1	Hellgate Hunters & Anglers would like to voice its support for the proposed pilot study on the North Fork Blackfoot river to assist in planning for a fish restoration project above the North Fork Falls. HHA has a keen interest in this project due to the excellent fishery found in the North Fork Blackfoot River and the potential to restore native Westslope cutthroat trout and bull trout in the upper reaches of the North Fork above the falls.
		2	HHA looks forward to learning more about this project and welcomes additional information as it becomes available. If possible, our Board would like to hear a presentation by FWP to assist us in educating our members.
		3	Should you have any questions, please feel free to contact me directly.
14	E	1	The Montana Wildlife Federation (MWF) is Montana's oldest and largest sportsmen-wildlife conservation organization. We work to protect Montana's public lands, clean waters, and abundant fish and wildlife for the benefit of the hundreds of thousands of Montanans and people all over the nation who hunt, fish, and value Montana's outdoor heritage. I am pleased to express our support for the pilot study for the North Fork Blackfoot River Fish Restoration Project.
		2	The North Fork of the Blackfoot River provides important habitat for native fish species like bull trout and westslope cutthroat trout. Both of these species require intact and protected habitat, especially bull trout, a sensitive species which has the most complex habitat requirements of any cold water fish species in Montana. Bull trout and cutthroat trout also continue to be threatened by interactions with non-native species, habitat degradation, and the loss of thermally suitable habitat due to climate change.
		3	Despite these threats, the North Fork of the Blackfoot River continues to be a stronghold for native fish species. The habitat above the falls on the North Fork provides a unique opportunity to restore bull trout and cutthroat to a place where they will be well protected and supplemental to the population below the falls.
		4	Seeing the potential for protecting native species and for the possibility of increasing angler opportunity, the Montana Wildlife Federation fully supports the department's efforts to determine the viability of the project through a pilot study.
15	E	1	Please accept this letter as public comment by Montana Trout Unlimited regarding the Region 2 draft environmental assessment (DEA) for a Pilot-Level Bioassays and Fish Distribution Testing in the North Fork Blackfoot River (NFBR). We offer these comments on behalf of our more than 4,200 members statewide and in service of our mission to conserve, protect, and restore coldwater trout and their habitats.

		2	MTU has a long-term, committed interest and many investments in the NFBR project area. Our state council, Big Blackfoot chapter, and national Trout Unlimited partners have been involved in Blackfoot River project work and advocacy for at least three decades. Collectively we have worked with federal and state agencies, over 200 private landowners, and countless businesses to reconnect or restore dozens of tributaries to the Blackfoot River, improve instream flows through water use efficiencies and legal water use changes. Some of that project work has been in the North Fork. We have helped change Montana mining laws to protect the Blackfoot better and we have advocated for nearly two decades for the best remediation and restoration of past mining in the watershed. These are just some highlights of our work and are intended to provide indicators of our level of commitment to caring for the Blackfoot, whether those efforts are ours or those of partner agencies, such as FWP.
		3	As investors in the Blackfoot, we fully support the investigation of a potential project to eliminate non-native and/or hybrid trout in the NFBR above the falls and to help determine the plans for reintroducing native trout as described in this DEA. Given the challenges of conserving native species such as westslope cutthroat trout and bull trout in this watershed, as described in the DEA, consideration and assessing the possibility of restoring local populations of these fish in areas such as the NFBR are important. MTU has worked with recently retired FWP biologist, Ron Pierce, on assessing the historic fishery and historic stocking of this project area, as part of the preliminary steps leading to this DEA. MTU and one of our chapters also advocated for and helped support the multi-year elimination of non-native and hybrid fish followed by restoration of drainage-specific native trout in the lakes at the headwaters and tributary heads for the South Fork of the Flathead River. That is one example of many similar projects to restore native trout we have supported around Montana's coldwater river basins.
		4	In short, MTU supports moving forward with the Pilot-Level Bioassays and Fish Distribution Testing in the NFBR as proposed in the DEA. We also look forward to reviewing and commenting on the specifics of the actual plan to carry out this project, once this preliminary assessment is completed. Thank you for accepting and considering our comments. Please let us know if there are ways that our organization can help with this stage of the project.
16	E	1	The following comments on the North Fork Blackfoot River Native Fish Restoration Project come from Wilderness Watch, a national wilderness conservation organization. Wilderness watch's headquarters is located in Missoula, with additional staff offices in Idaho and Minnesota. Our mission is to protect the wilderness character of all units of the National Wilderness Preservation System, including the Scapegoat Wilderness. Wilderness Watch appreciates the concern for long-term viability of westslope cutthroat trout expressed by this proposal, however we believe the project as proposed is contrary to the letter and spirit of the Wilderness Act.
		2	**Introduction**
		3	We have read the State of Montana's EA related to this project. The Forest Service lists this stage as scoping but provides no material except for the Montana EA. We are unclear as to how or whether the Forest Service will prepare a NEPA document under the National Environmental Policy Act. This is crucial because the Forest Service has jurisdiction over administration of the Scapegoat Wilderness and the duty to preserve wilderness character in that Wilderness. That duty cannot be shifted to another entity that has no statutory obligation to preserve Wilderness or wilderness character.
		4	**Wilderness Act Background**
		5	Congress defined "Wilderness" as follows:
		6	A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. 16 U.S.C. § 1131(c).

7	Congress stated that Wilderness areas "shall be administered for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness …." *Id.* § 1131(a). Accordingly, "…each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such areas for such other purposes for which it may have been established as also to preserve its wilderness character." *Id.* § 1133(b). Congress and the federal courts have made clear that the goal of advancing recreation and research in wilderness, while allowable and encouraged, cannot trump the overriding statutory purpose to preserve wilderness character. *See id.* §§ 1131(a), (c), 1133(b)-(c); *High Sierra Hikers v. Blackwell*, 390 F.3d 630, 647 (9th Cir. 2004) (affirming that, under the Wilderness Act, the Forest Service may not "elevate[] recreational activity over the long-term preservation of the wilderness character of the land"). Consistent with these statutory mandates, the Forest Service's implementing regulations dictate that in wilderness, "[n]atural ecological succession will be allowed to operate freely to the extent feasible." 36 C.F.R. § 293.2(a).
8	Since the Forest Service did not prepare the EA, there is no analysis of impacts to Wilderness or wilderness character. Aside from a draft minimum requirements decision guide (MRDG), which is not a NEPA document and cannot be substituted for NEPA compliance, only the Land Use section discusses Wilderness and it provides no analysis:
9	The proposed actions in 2018 would occur within the Scapegoat Wilderness area. Application of a piscicide in the waters in designated wilderness area would require evaluation from the U.S. Forest Service, and the results would be issued through completion of a zone Minimum Resource Decision Guide (MRDG; see Appendix) analysis of the potential impacts on wilderness character or values.
10	Furthermore, the draft MRDG is seriously flawed. It states that poisoning a stream has no effect on trammeling on page 13. That contradicts plain language and definitions of words. It is also contradicted by other agency direction. In Monitoring Selected Conditions Related to Wilderness Character: A National Framework. Landres, et al. 2005. RMRS-GTR-151 has this to say about untrammeled, "All actions that manipulate or control ecological systems inside wilderness diminish the untrammeled quality of wilderness character." As examples of such actions the Monitoring Framework includes transplanting animals or plants, and applying herbicides, pesticides or piscicides to remove unwanted species.[1]
11	[1] It is questionable whether an MRDG is an appropriate method to consider actions, though inconsistent with the Wilderness Act, don't use prohibitions in section 4(c) of he Wilderness Act.
12	The Monitoring Framework also cites two of the agency's preeminent wilderness researchers in describing how the untrammeled quality of Wilderness affects management: Cole (2000) states that untrammeled "suggests more about the *process* of management than it does about the *outcomes* of management." (emphasis added). Lucas (1973) states that "If ecological processes operate essentially uncontrolled within the Wilderness frame of reference, the results, whatever they might be, are desirable by definition. The object is not to stop change, *nor to recreate conditions* as of some arbitrary historical date, *nor to strive for change favorable to big game or scenery*. The object is to let nature 'roll the dice' and accept what results with interest and scientific curiosity." (emphasis added). Clearly this poisoning and fish-stocking project impairs wilderness character by harming the untrammeled quality of Wilderness.
13	The proposed action is not consistent with these mandates for the following reasons:
14	**1. Rotenone must not be used to poison the streams.**
15	**a. Rotenone kills organisms other than the targeted non-native fish, and those lost species can remain absent for more than five years.** Rotenone is a poison that kills all organisms that utilize gills during part of their life cycle. These organisms include not only the targeted nonnative fish, but amphibians, macroinvertebrates, and other non-target organisms that use gills, perhaps even including the Columbia Spotted Frog in its tadpole stage. See (Mangum, F. A. and J. L. Madrigal. 1999. Rotenone effects on aquatic macroinvertebrates of the Strawberry River, Utah: a five year summary. Journal of Freshwater Ecology 14:125-135. See also Don C. Erman, Comment: Rotenone Toxicity to Rainbow Trout and Several Mountain Stream Insects. North American Journal of Fisheries Management, 32:1, 53-59 (Feb. 21, 2012). See also Dalu T, Wasserman RJ, Jordaan M, Froneman WP, Weyl OLF (2015) An Assessment of the Effect of Rotenone on Selected Non-Target Aquatic Fauna. PLoS ONE 10(11): e0142140.doi:10.1371/journal.pone.0142140.)

16	A 5-year study on a river in Utah (Mangum and Madrigal 1999) found that: “up to 100% of Ephemeroptera, Plecoptera, and Trichoptera [mayflies, stoneflies and caddis flies] were missing after the second rotenone application. Forty-six percent of the taxa recovered within one year, but 21% of the taxa were still missing after five years. At least 19 species were still missing five years after the rotenone treatments.” Especially in a designated Wilderness, chemicals like rotenone would bring a significant trammeling to the wilderness character of these two lakes and accompanying streams in violation of the basic tenants of the 1964 Wilderness Act (16 U.S.C. 1131-1136).
17	**b. Rotenone can persist in the ecosystem.** In Sequoia-Kings Canyon National Parks in California, the National Park Service (NPS) acknowledged in its 2013 Restoration of Native Species in High Elevation Aquatic Ecosystems Plan and DEIS that rotenone has half-life of 20 days in cold water (DEIS at 217), that it “completely degrades” within 1-8 weeks (DEIS at 217). Twenty days’ duration where rotenone is still exposing wildlife, humans, and environmental resources to a toxicant is a significant time of persistence. As a result of longer duration of rotenone, other species (and humans) are likely to be more at risk of being affected by rotenone.
18	**c. Rotenone can have significant failures, requiring additional applications.** In 2010, the U.S. Bureau of Reclamation completed its “Proposed Reapplication of Rotenone in Bonita Creek: Supplement to the Environmental Assessment on Native Fish Restoration in Bonita Creek, Gila Box Riparian National Conservation Area, Graham County, Arizona”. The supplement was needed so the Bureau could poison Bonita Creek again after the first attempt at fish eradication failed. The Supplement gave a table (Appendix B, List of Stream Renovation Projects in the Lower Colorado River Basin) of other projects in the region. There were 21 projects listed of which 19 had results of the poisoning on fish eradication “success”. Of these 19 projects, the average number of poisonings (i.e., number of times the poisoning failed and was repeated) was 1.9 poisonings per stream. Four of the 19 stream projects were poisoned up to 3 times in hopes of eradication. In only 6 cases (32%) was one poisoning considered sufficient for eradication of all fish.
19	**2. There is no wilderness benefit and this does not meet a wilderness need**
20	**a. Fish may not be native to the upper North Fork**. The MRDG notes, “The proposed 2018 actions may or may not necessary to preserve the natural quality of wilderness character. It is difficult to answer this question not knowing if WCT are indigenous or non-indigenous above the North Fork Falls.” Thus, this plan cannot be seen as a restoration project. There is no wilderness purpose for doing it so it cannot be approved. The MRDG, muddled as it may be, does not point out to any wilderness reason for the poisoning. It does not purport to help out some definition of naturalness at the expense of untrammeled wilderness because it can’t be determined if fish were historically present above the falls.[2]
21	[2] Regardless, neither rules of statutory construction nor the history of the Act permit such an interpretation that find untrammeled wilderness/wildness in conflict with naturalness.
22	What does seem clear is that the bull trout[3] are not native above the falls. There is no critical habitat above the falls. Yet, the EA talks about transplanting them into places where they are not native. This is contrary to Forest Service wilderness policy and may have unintended negative consequences.[4]
23	[3] The EA alleges, “Translocation of Bull Trout into the project area would provide this threatened species a secure watershed with a diversity of habitats, cold water temperatures, and connectivity.” However, there can be no connectivity because of the falls.
24	[4] It should also be noted the MRDG tries to suggest the Endangered Species Act requires this transplant. It doesn’t.

25	In other words, the purpose and need section does not articulate a defensible wilderness-based need for fish poisoning followed by fish stocking and does not indicate how artificial fish stocking is necessary to administer the Teton Wilderness "so as to preserve its natural conditions" and maintain the wilderness as "an area where the earth and its community of life are untrammeled by man." 16 U.S.C. § 1131(c). Indeed, it would be incredibly difficult to articulate a need for artificial fish stocking in wilderness streams that were historically fishless. *See* "Non-Native Trout in Natural Lakes of the Sierra Nevada: An Analysis of Their Distribution and Impacts on Native Aquatic Biota" (noting that "trout stocking serves to maintain an artificial fishery that has substantial impacts on native aquatic biota" and that stocking is necessarily at odds with wilderness, "areas managed for their natural values"); *see also* "Non-Native Fish Introductions and the Reversibility of Amphibian Declines in the Sierra Nevada" (Forest Service publication noting that the introduction of non-native trout into naturally fishless lake ecosystems is a major cause of decline in certain amphibians).
26	Active stocking and manipulation of fish populations in historically fishless streams is directly at odds with the Forest Service's management guidance. See FSM 2323.31 ("Provide an environment where the forces of natural selection and survival rather than human actions determine which and what numbers of wildlife species will exist."); *see also* FSM 2320.2 ("Maintain wilderness in such a manner that ecosystems are unaffected by human manipulation and influences so that plants and animals develop and respond to natural forces."). Given the clear inconsistency with Wilderness Act mandates and the Forest Service's management guidance, the artificial fish-stocking component of the proposed action should not be authorized.
27	**b. Creating more angling opportunities is not a legitimate justification in Wilderness.** The EA states, "Moreover, these hybrids have a predominant contribution of genes from Rainbow Trout, which are poorly suited to the cold waters in the project area, resulting in low densities and poor angling opportunities." Poor angling opportunity is not a legitimate reason to poison wilderness streams.
28	**c. This initial proposal is an experiment and given the overt trammeling, inappropriate in Wilderness as a study, that is connected to a future project.** The EA proposes this project as an experiment to learn more about how to better kill fish in the upper North Fork. Again, there has been no clearly articulated wilderness need for either the ultimate project or this experiment. Research in Wilderness must be done in a manner compatible with Wilderness. Further, there are cumulative impacts and connected action tied to this proposal and the future proposal to poison and kill fish in entire upper North Fork.
29	**National Environmental Policy Act Background**
30	NEPA directs federal agencies to prepare a detailed Environmental Impact Statement ("EIS") for federal actions that may significantly affect the quality of the human environment. 42 U.S.C. § 4332(2)(C). The phrase "human environment" is "interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment." 40 C.F.R. § 1508.14. The purpose of an EIS is two-fold: 1) to ensure that the agency will have available and will carefully consider detailed information on significant environmental impacts when it makes decisions, and 2) to "guarantee that the relevant information will be made available to the larger audience that may also play a role in both the decision-making process and the implementation of that decision." *Robertson v. Methow Valley Citizens*, 490 U.S. 332, 349 (1989); 40 C.F.S. § 1501.2(b).
31	**1. An Environmental Impact Statement may be required.**
32	Pursuant to NEPA's implementing regulations, to determine whether an EIS is required, federal agencies may first prepare a less detailed environmental assessment. See 40 C.F.R. § 1501.4. An environmental assessment should consider several factors to determine if an action will significantly affect the environment, a circumstance that would mandate the preparation of an EIS. 40 C.F.R. § 1508.27. If the agency concludes the action will not significantly affect the environment, it must issue a FONSI to justify its decision not to prepare an EIS. 40 C.F.R. § 1508.13. The FONSI must provide a convincing statement of reasons why the action will not have a significant effect on the environment. *Id.* It is *only* when the proposed action will not have a significant effect on the environment that an EIS is not required. 40 C.F.R. § 1508.13.

33	The proposed action poses significant direct, indirect, and cumulative impacts to the environment and to wilderness character. Because the proposed action has the potential to significantly affect a designated wilderness and anticipates a precedent for future connected authorizations, with attendant cumulative impacts (including future poisoning and stocking actions in the watershed), it will result in cumulatively significant impacts, and result in a violation federal law (including the Wilderness Act). A full environmental impact statement should be prepared. See 40 C.F.R. § 1508.27.
34	**2. The Forest Service must take a hard look at and disclose the direct, indirect, and cumulative impacts of the project.**
35	NEPA requires the Forest Service to take a hard look at the direct, indirect and cumulative impacts of the project. Under NEPA, the direct impacts of an action must be analyzed based on the affected interests, the affected region, and the locality in which they will occur. 40 C.F.R. § 1508.27(a). Indirect effects of a proposed action are effects that are caused by the action but occur later in time or are further removed in distance. 40 C.F.R. § 1508(b). Cumulative impacts are "the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." 40 C.F.R. § 1508.7. Cumulative impacts can result from "individually minor but collectively significant actions taking place over a period of time" and are "the impacts on the environment which result from the incremental impact of the action when added to other *past,* present, and *reasonably foreseeable* future actions regardless of what agency (Federal or non- Federal) or person undertakes such other actions." *Id.* (emphasis added).
36	For the proposed action, please disclose and analyze the full extent of the fish poisoning and stocking proposal. How would the stocking be accomplished? How many times would stocking occur to maintain the recreational fishery? What are the cumulative impacts of such a stocking program where the streams were historically fishless?
37	**Conclusion and Summary of Recommendation**
38	As it currently stands, this proposal is fatally flawed and should be scrapped. If this goes forward, Wilderness Watch strongly urges that Forest Service perform a comprehensive NEPA analysis that takes a hard look at the direct, indirect, and cumulative impacts of this proposal. Then the agencies and the public will be able to make better-informed decisions about this project.
39	Please keep Wilderness Watch informed about this project. We request that you send us copies of decisions and future documents and keep us updated about any additional steps in this project.
40	**Literature Cited**
41	Dalu T, Wasserman RJ, Jordaan M, Froneman WP, Weyl OLF (2015) An Assessment of the Effect of Rotenone on Selected Non-Target Aquatic Fauna. PLoS ONE 10(11): e0142140. doi:10.1371/journal.pone.0142140.
42	Erman, Don, Comment: Rotenone Toxicity to Rainbow Trout and Several Mountain Stream Insects. North American Journal of Fisheries Management, 32:1, 53-59 (Feb. 21, 2012).
43	Knapp, R.A. et al. 2007. "Removal of nonnative fish results in population expansion of a declining amphibian (mountain yellow-legged frog, *Rana muscosa",* Biological Conservation 135: 11-20.
44	Knapp, R.A. and K.R. Matthews. 1998. "Eradication of nonnative fish by gill-netting from a small mountain lake in California." Restoration Ecology 6: 207-213.
45	Mangum, F. A. and J. L. Madrigal. 1999. Rotenone effects on aquatic macroinvertebrates of the Strawberry River, Utah: a five year summary. Journal of Freshwater Ecology 14:125-135.
46	National Park Service, 2012. Mountain Yellow-legged Frog Restoration Project: 2011 Field Season Summary. Sequoia and Kings Canyon National Park.
47	Vredenburg, Vance. 2004. Reversing introduced species effects: experimental removal of introduced fish leads to rapid recovery of a declining frog. PNAS 101 (20), May 18, 2004: 7646-7650.