National Park Service
U.S. Department of the Interior
Glacier National Park
West Glacier, Montana

# Finding of No Significant Impact

## Continued Lake Trout Suppression on Quartz Lake & Lake Trout Removal and Bull Trout Conservation in the Logging Lake Drainage

### Background

In compliance with the National Environmental Policy Act of 1969 (NEPA), the National Park Service (NPS) prepared an Environmental Assessment (EA) to examine alternatives and environmental impacts associated with a proposal to continue lake trout suppression on Quartz Lake and begin lake trout removal and bull trout conservation in the Logging Lake drainage in order to conserve two of the park's historically robust bull trout populations. Bull trout are listed as a threatened species under the Endangered Species Act. Approximately one-third of the nation's bull trout populations inhabiting natural, undammed lake systems are found in Glacier National Park; the park therefore has a critical role in the regional recovery and long-term conservation of the species.

Bull trout populations in the park are increasingly at risk due to invasive non-native lake trout. In the Action Plan for Conservation of Bull Trout in Glacier National Park, developed by the U.S. Fish and Wildlife Service (USFWS) and Montana State University to conserve the long-term abundance, distribution and genetic diversity of bull trout in the park, Fredenberg et al. (2007) concluded that "protection from near-term decline in the face of lake trout invasion is critically important to the conservation of bull trout in the park". As the park's apex aquatic predator, bull trout join other top, iconic predators such as the grizzly bear in representing the pristine, natural character of the park's backcountry and recommended wilderness. Bull trout are part of a historic fishery that is fundamental to Glacier National Park's biodiversity and the park's designation as a biosphere reserve and World Heritage Site, and have long been an integral component of the park's culture and visitor use.

Bull trout and non-native lake trout are generally viewed as incompatible where they occur together, with lake trout typically displacing bull trout and harming existing fisheries (Donald and Alger 1993, Fredenberg 2002, Martinez et al. 2009). Fredenberg (2002) concludes that in lakes of the Rocky Mountains, conversion of unique bull trout ecosystems to lake trout dominated systems appears to be a common result once lake trout are established; competition and predation are the most likely mechanisms. Because they live longer and spawn in lakes where they likely benefit from expansive juvenile rearing habitat, lake trout also have a reproductive advantage over bull trout and westslope cutthroat trout, which spawn in streams and tributaries where spawning and rearing habitat is generally more limited and is vulnerable to events such as flooding, fire, and drought. Additionally, lake trout inhabit deeper waters than native fish species and have the potential to adversely impact terrestrial species that depend on shallower water-dwelling native fish for food, such as bald eagles and common loons.

In Glacier National Park, data from lakes that have been monitored over time show that lake trout are increasing in abundance and bull trout are in decline, and lake trout have largely replaced bull trout as the top level aquatic predator (Downs et al. 2011). In some park lakes, bull

trout populations appear to be at imminent risk of functional extinction, meaning their populations would no longer be self-sustaining and would not play a significant role in the ecosystem. On the west side of the park, lake trout have invaded nine of twelve lakes to which they have access. Quartz and Logging Lake are two of the park's premier bull trout supporting lakes, but are at risk of losing their historically robust bull trout populations to non-native invasive lake trout.

Climate change could compound these challenges, as changes in stream flow combined with warmer water temperatures will likely stress bull trout and other native fish and favor invasive non-native species. Climate change impacts are difficult to predict. But changes in habitat conditions such as alterations of water temperature and flow patterns, including mid-winter flooding of spawning areas, are expected and would likely adversely impact bull trout populations and ultimately favor non-native species such as lake trout and brook trout. With its high elevation watersheds, Glacier National Park will provide important habitat refugia for bull trout and other native fish from the stressors of climate change. Ensuring the availability of habitat that is free of lake trout and other aquatic invasive species will be essential in maintaining this safeguard.

In 2005, non-native invasive lake trout were detected in Quartz Lake. At the time, Quartz Lake supported the most viable and uncompromised bull trout population among the park's larger lakes. In 2009, Glacier National Park and the U.S. Geological Survey (USGS) began an experimental project on Quartz Lake to reduce or eliminate lake trout. Results from this work have been promising, with identification of lake trout spawning areas and annual removal of spawning adults. This data suggests that the project has already successfully removed a high percentage of spawning adults and thereby reduced the size of the adult lake trout population in Quartz Lake (Muhlfeld and Fredenberg 2009; D'Angelo et al. 2011; V. D'Angelo, personal communication). Suppression efforts began at Quartz Lake before lake trout became well enough established to cause a decline in the lake's bull trout population. Currently, Quartz Lake still hosts the most viable bull trout population remaining among the larger lakes in the park. Continued lake trout suppression at Quartz Lake is therefore necessary to maintain what currently appears to be a relatively healthy aquatic system.

Logging Lake follows Quartz Lake as a high priority for bull trout conservation, as also identified in the Action Plan for Conservation of Bull Trout in Glacier National Park (Fredenberg et al. 2007). Once considered one of the most productive bull trout fisheries in the park, Logging Lake is now at imminent risk of losing bull trout as a functional part of the aquatic ecosystem due to invasive non-native lake trout. Lake trout are well established at Logging Lake, however, and the Logging Lake bull trout population is therefore far more compromised. Because suppression at Quartz Lake is successfully removing lake trout and because hatchery-reared bull trout can be used to reestablish a population in lakes with suitable habitat, there is reason to believe lake trout suppression and bull trout conservation efforts at Logging Lake will be successful over time.

Therefore, the continuation of lake suppression on Quartz Lake and lake trout removal and bull trout conservation on Logging Lake are necessary to protect bull trout and other native fish.

## Selected Action

The EA evaluated a no action alternative (Alternative A) and three action alternatives, including Alternative B (continue lake trout suppression at Quartz Lake), Alternative C (remove lake trout and conserve bull trout in the Logging Lake drainage), and

Alternative D (Alternatives B and C combined). Alternative D, continue lake trout suppression at Quartz Lake and remove lake trout and conserve bull trout in the Logging Lake drainage, is the preferred alternative and the NPS's selected action because it best meets the purpose and need for the project as well as the project objectives to:

- Continue to recover and protect the park's imperiled bull trout populations from invasive non-native lake trout, and thereby assist with bull trout conservation efforts on a regional scale.
- Increase the resiliency of the park's bull trout populations in the face of the potential added stressors associated with climate change.
- Continue the development of lake trout suppression techniques that could be used in other locations within and outside the park.
- Maintain a stable native fish complex to support fish-dependent predators such as common loons and bald eagles.
- Conserve and maintain the natural condition of the park's recommended wilderness by protecting native fish populations and the ecological integrity of the backcountry lakes they inhabit.

Under Alternative D, using methods developed on Quartz Lake since 2009, lake trout suppression will continue on Quartz Lake and lake trout removal and bull trout conservation will be conducted in the Logging Lake drainage. Work could occur simultaneously at both lakes during approximately the same time of year, depending on area-specific needs and logistics. Netting (e.g. gill netting and trap netting) and angling will be the primary method for removing lake trout, but other experimental lake trout suppression techniques (e.g. electroshocking, spearfishing, and others) may also be employed as they are developed.

Fisheries staff will capture, radio-tag, and track lake trout as the fish move around the lakes and begin to stage at spawning areas. This information will be used to target spawning concentrations of adult lake trout for removal. The gill nets will be deployed on suspected lake trout spawning locations to remove as many lake trout as possible. Gill nets will also be used to locate and target juvenile/sub-adult lake trout rearing areas during both spring and fall. Net sets will generally be deployed for short durations, typically less than six hours, and will not be set overnight (barring unforeseen circumstances, such as stuck nets that require more time to pull, or severe weather that would prohibit crews from being on the water, for example). In general, nets will typically be set at depths greater than 60 feet. Mesh sizes for gill nets will be based on information gained from the ongoing Quartz project and other similar studies (e.g. lake trout removal efforts on Swan Lake, Montana), and sized to maximize the capture of lake trout while minimizing the capture and mortality of non-target fish species. Netting methods will be modified should by-catch of other non-target species become unacceptably high.

A motorized boat will be used at both lakes to deploy and retrieve nets, as well as to tag and track radio-tagged fish. The boat will be no longer than 25 feet in length and the motor is anticipated to be 90 horsepower or less. Smaller horsepower "twin" motors may be employed to improve safety. A portable generator may be used to power a gill net "lifter" to retrieve nets. Netting operations will occur in both spring (May-June) and fall (September-October) and target both adult and juvenile lake trout. Netting activities could occur at any time of the day or night.

Because of the more advanced status of the lake trout invasion at Logging Lake, measures will also be taken to conserve and rejuvenate bull trout in the Logging Lake drainage. As many as possible of the few remaining juvenile bull trout in the Logging Lake system will be captured in

their natal habitat (where they were hatched) in Logging Creek (Logging Lake inlet stream) and transported upstream to Grace Lake on foot or by pack stock. The Logging Creek bull trout spawning area will also be surveyed for the presence of spawning adults. To further conserve bull trout in the Logging system, as many as possible of the remaining adults in Logging Creek will be captured and spawned. The fertilized eggs will be transported to Creston National Fish Hatchery (or other appropriate conservation rearing facility) where they will be reared by the USFWS under a captive propagation plan. After hatching in the conservation rearing facility, the juvenile bull trout will be stocked into Grace and Logging Lakes. Along with the juveniles translocated from Logging Creek, the facility-reared fish will help establish a self-sustaining bull trout population safe from lake trout. Bull trout may be marked with PIT tags before being moved into Grace Lake and their movements will be tracked with passive PIT tag antennae located along Logging Creek between Logging and Grace Lakes. The antennae will be removed at the end of each field season.

Fish translocation will likely occur over an approximately five year period. Translocation/bull trout stocking will be adaptive and experimental in nature and could occur at any time of year that the lakes are ice-free. We will be attempting to maximize survival of translocated/stocked fish, and survival may be influenced by factors that vary by season, including lake productivity, prey availability, and water temperature. Translocation and stocking will likely be discreet events, occurring for only a few days each year the project is underway.

If enough bull trout (eggs or juveniles) cannot be secured from Logging Lake to start a Logging Lake-specific conservation population in Grace Lake or to support bull trout supplementation in Logging Lake following lake trout suppression, a "nearest neighbor" approach may be implemented in the future. The "nearest neighbor" approach could involve supplementing native bull trout stock from Logging Lake with eggs or juveniles from other nearby populations that have undergone similar evolutionary/natural selection/environmental pressures, or which have the closest genetic profile to the natal stock and will therefore be more likely to survive and persist. Although the intent of this project is to specifically conserve Logging Lake bull trout (and their unique evolutionary and genetic legacy), supplementing with other locally adapted stocks could be necessary due to the small number of bull trout that appear to persist in Logging Lake. It may also have some advantages as it will preserve and secure additional Glacier National Park-specific bull trout life history and genetic diversity.

The intent of the bull trout conservation measures just described will be to move as many bull trout as possible from Logging Creek/Lake into Grace Lake (and/or eggs into the conservation rearing facility) so the last few bull trout won't be exposed to potential netting by-catch mortality during lake trout removal efforts in Logging Lake. Removing individual bull trout from the hazards of netting operations on the lake will enable more aggressive netting, whereby more nets and longer net sets can be employed to more efficiently remove lake trout.

Fish population monitoring will occur regularly at both Quartz and Logging Lakes, and will include periodic assessment of lake trout population size and/or catch rates. Adult bull trout abundance in both lakes will also be monitored annually using bull trout redd counts. Novel genetic techniques using bull trout fin tissue may be applied to estimate and monitor adult bull trout population size. Juvenile bull trout abundance will be routinely assessed in spawning and rearing areas using electrofishing and/or snorkeling. Similar techniques will be used to evaluate the success of bull trout translocation into Grace Lake. In addition, periodic standardized gill netting begun in 2000 will likely continue on both lakes to provide information on relative abundance of lake and bull trout as well as other native species and to identify trends in fish populations. However, gill netting scheduled for 2015 on Quartz Lake will be postponed in order to reduce impacts/mortality to bull trout. Redd counts will serve as the primary monitoring tool for bull trout abundance in the interim. Trend gill netting will be resumed on Quartz Lake

towards the end of the study period as an assessment measure. Trend netting will be suspended on Logging Lake until at least 2016, depending on the outcome of bull trout translocation.

Equipment and supplies will be packed in on livestock whenever possible. A helicopter will fly a boat to Logging Lake; if the boat currently stationed at Quartz Lake needs to be replaced, it will be hauled in by helicopter. Crews will maintain the boats and motors at the lakes, but the motors may need to be flown out periodically for dealer maintenance and repair. Helicopters will deliver the boats and other materials and equipment via long-line sling loads. Efforts will be made to transport bull trout eggs and juveniles in and out of the Logging drainage by foot or pack stock. However, if it is determined that the risk of losing the eggs or harming the young fish is too high due to water temperature increases, oxygen loss, or carbon dioxide buildup, the eggs and juveniles may need to be transported by helicopter. Helicopter flights will not be used to transport bull trout juveniles/eggs except as a last resort necessary for the success of the translocation. Up to five flights per year could be required for the first several years of the project. The number of annual flights will be expected to decline over time as the translocation phase is completed. Previously scheduled administrative flights will be used whenever possible. In accordance with conservation measures implemented for other administrative flights in the park, flights for the project will not occur before 1 May or after 1 October. Standard park-specific NPS administrative helicopter flight policies and procedures will be followed for all flights. Flight times are not anticipated to exceed approximately 30 minutes one way between West Glacier and the staging area (likely in the Polebridge vicinity), and approximately 30 minutes round trip between the staging area and Quartz or Logging Lake. (The use of helicopters and other motorized equipment was evaluated in the Minimum Requirements Decision Guide.)

Fisheries staff will generally be onsite for five to seven days per week during suppression periods, and will use the patrol cabins at the foot of the lakes as bases of operations. When not in use, the boats will be stored on shore near the patrol cabins (and/or boat house at Logging Lake) where they will be out of sight from the trail or campground, possibly on temporary, low-profile, removable roller-style ramps (logs and a winch system, for example, may be feasible, but an aluminum or metal ramp may be necessary). Such a ramp may also serve as a beaching site while the project is in operation in order to avoid damage to the boats or lakeshore. During prolonged non-use periods (such as wintertime), the boats will be covered with a boat cover, camouflage netting, and/or other appropriate but visually unobtrusive material to protect them from snow loads. Fuel and oil will be stored in spill and bear proof containers near the cabins, and the crew will implement measures to prevent other AIS from entering park waters. During the project, signs will be placed at trailheads leading to Quartz and Logging Lakes informing hikers of the project and associated activity. Backcountry campsites and fishing will remain available to park visitors. Backcountry permits issued for the areas will include information about the project.

Lake trout removal will continue on Quartz Lake for six to eight years. Lake trout suppression and bull trout conservation at Logging Lake is experimental in nature, also requiring a six to eight year time frame to determine if suppression, translocation, and hatchery rearing efforts are succeeding. The project will occur in cooperation with the USFWS. At Quartz Lake, where lake trout suppression has already been under way since 2009, removal efforts may occur less often or at a lower intensity should modeling or other data indicate that a reduced effort will be effective in keeping lake trout at sufficiently low abundance. At Logging Lake, if results indicate that efforts are successfully recovering bull trout, lake trout suppression actions at some level may need to continue into the foreseeable future. But as with Quartz Lake, the frequency or intensity of netting activity at Logging Lake could decrease in the future, depending on results. Future lake trout suppression and bull trout conservation beyond the six to eight year time frame

addressed in the EA may continue at both Quartz and Logging Lakes, especially if results indicate that efforts are successfully recovering bull trout. The nature of future lake trout suppression and/or bull trout conservation efforts is unknown at this time, and any future action at either Quartz or Logging Lake beyond eight years will require additional environmental analysis and review.

## Mitigation Measures

The following mitigation measures will minimize the degree and/or severity of adverse effects and will be implemented during the project:

*Fisheries*

- Handling stress and injury to unavoidably captured native fish will be minimized. Any bull or westslope cutthroat trout captured alive in nets will be carefully revived and released, as possible.
- Gill nets will be checked at least once every 6 hours to minimize mortality to non-target fish species (subject to unforeseen delays, such as weather). Trap nets will be checked at least every 24 hours.
- Information gained from other lake trout removal projects will be used to minimize catch and mortality of non-target species.

*Wildlife, Threatened and Endangered Species, Species of Concern, and Special Status Species*

- Project personnel will be trained on appropriate behavior in the presence of bears and other wildlife and will adhere to park regulations concerning proper storage of food, garbage, and other attractants.
- All lethally taken lake trout or other fish mortalities will be disposed of by sinking in deep water to avoid creating an attractant to wildlife.
- Pit toilets will be utilized by staff to eliminate human waste as a wildlife attractant.
- The motorboat will be inspected for fuel and oil leaks prior to use each day and spill prevention materials will be kept on site for cleanup of spilled fuel or oil (such fluid spills are potential unnatural attractants to wildlife species).
- The boat motor and generator will be selected, in part, to minimize noise.
- Helicopter flights will adhere to the conservation measures described in the park's programmatic biological assessment for administrative flights (NPS 2013).
- Timing and location of administrative helicopter flights will consider impacts on wildlife species, including nesting bald eagles and common loons.
- Montana's Common Loon Conservation Plan (Hammond 2009) recommends avoiding human activity within ¼ mile of nesting loons. If loons are nesting during project implementation, every effort will be made to observe this buffer.
    - Active nests will be identified as early in the spring as possible.
    - Project personnel will be educated in identifying loon nesting habitat and nesting disturbance behavior. Any suspected nesting behavior will be reported to park wildlife staff for verification. The area will be avoided to the greatest extent possible until the potential nest site could be evaluated.
    - In areas where the ¼ mile active nest site buffer cannot be observed (due to

narrow areas of the lake, for example), activities will occur in a manner that is as least disturbing to loons as possible. These may include travel at "flat wake" speed, maintaining the maximum distance possible while traveling through the area, or no netting within the ¼ mile buffer.

- If trap nets are used and deployed in shallow waters, they will be modified to provide a means of wildlife exclusion and/or escape.

- If bald eagles are nesting during project implementation, project personnel will avoid whenever possible approaching within 1/4 mile of an active nest when no visual buffer is present and within 1/8 mile when a visual buffer is present (per recommendation from the Montana Bald Eagle Management Guidelines, Montana Bald Eagle Working Group, 2010).

*Water Resources*

- A spill plan will be developed and followed in case of a fuel leak either on the ground or in the lake. Work crews will inspect the boat engines, fuel lines, and fittings as well as other equipment such as the generator prior to commencement of activities each day. Appropriate absorbent supplies will be on site to address a spill both on shore and on the water. Bulk fuel will be stored within in larger spill/bear proof containers. Within these containers, fuel will likely be stored in 5 to 6-gallon gas cans.
- Crews will implement best practices to prevent entry of aquatic invasive species into park waters.

*Natural Sound*

- Flat-wake speed will be used within 300 yards of the patrol cabins and campgrounds.

*Visitor Use and Experience*

- Signs informing visitors of the motorized activity on the lakes and providing information about the suppression efforts will be posted at the trailheads to Quartz and Logging Lakes as well as the backcountry permit office.

## Alternatives Considered

Four alternatives were evaluated in the EA including the no action alternative and three action alternatives. Under Alternative A, no action, the NPS would not continue lake trout suppression at Quartz Lake, nor would the park conduct lake trout removal and bull trout conservation in the Logging Lake drainage. Selection of the no action alternative would require an environmental impact statement (EIS) due to major impacts. Under Alternative B, the park would continue lake trout suppression at Quartz Lake. Under Alternative C, the park would remove lake trout and conserve bull trout in the Logging Lake drainage. Alternative D, continue lake trout suppression at Quartz Lake and remove lake trout and conserve bull trout in the Logging Lake drainage (Alternatives B and C combined), is the preferred alternative, as described in the previous section.

The EA also evaluated four alternatives that were eliminated from detailed study, including 1) conducting lake trout removal and suppression at lakes with better access, such as Kintla Lake, Lake McDonald, or Bowman Lake, or where motorized boat use is permitted; 2) conducting lake trout removal with non-motorized equipment; 3) conducting netting and telemetry operations using a motorized inflatable boat; and 4) introducing one or more fish species (such as cisco

and burbot) that prey on the early life forms of lake trout and are a preferred prey for adult lake trout.

Additionally, two alternatives suggested during public review of the EA and alternative means of disposing of the fish have also been considered and eliminated from detailed study and are included below:

**Enlist public participation in lake trout suppression efforts, to include spear fishing.** Currently, fishing is free in the park and there is no limit on lake trout in park waters west of the Continental Divide. Therefore, by allowing anglers to catch an unlimited number of lake trout on the west side of the park, the park has enlisted the public to assist with lake trout suppression. However, visitor angling on either Quartz or Logging Lakes will not be sufficient to reduce lake trout abundance to the point necessary to protect native fish populations for the long term. This alternative has therefore been dismissed. However, any lake trout removed by members of the public will aid the overall effort, and spearfishing and other experimental lake trout suppression techniques may be employed as they are developed.

**Employ a piscicide treatment of Logging Lake.** A piscicide has been dismissed because the probability of a successful piscicide treatment at Logging Lake would be highly uncertain given the current state of the science and knowledge of such treatments. While piscicides have been used on other lakes in Montana, Logging Lake is a much bigger, deeper lake than where piscicides have so far been tried. The approach would also require the destruction of the entire native fish community, and treating Logging Lake with a piscicide would be extremely costly (estimated at over two million dollars). This alternative has therefore been dismissed.

**Alternative options for disposing of fish.** Alternative options for disposing of fish have been dismissed because they would not be feasible, would create a wildlife attractant, or would present a health hazard. Leaving fish carcasses to decompose on the lakeshore would create an attractant for bears and other wildlife. Offering the fish to the public for consumption was dismissed due to the relatively high mercury content in lake trout, and because it would not be possible to keep the fish alive or fresh during the time required to pack them out of the remote backcountry locations.

## Environmentally Preferable Alternative

According to the CEQ regulations implementing NEPA (43 CFR 46.30), the environmentally preferable alternative is the alternative "that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferable alternative."

All three action alternatives, including Alternative B (continue lake trout suppression at Quartz Lake), Alternative C (remove lake trout and conserve bull trout in the Logging Lake drainage) and Alternative D (continue lake trout suppression on Quartz Lake and remove lake trout and conserve bull trout in the Logging Lake drainage), protect and preserve natural resources to some degree and could be considered environmentally preferable for several reasons: 1) the long-term persistence of native fish species will help reflect the overall ecological integrity of either or both the Quartz and Logging drainages, recommended wilderness, the park, and the

Flathead watershed; 2) one or two important potential refugia for native fish from the combined stressors of climate change and invasive non-native species will be protected; 3) native fish populations in either or both the Quartz and Logging drainages will be protected for the long-term; 4) a top aquatic predator, the bull trout, will continue to play a significant role in the predator-prey dynamics of either or both Quartz and Logging Lakes; 5) the park will be in keeping with other efforts by state and federal agencies to protect functional native fish populations throughout the western United States; 6) Quartz Lake, one of the last remaining strongholds in the Flathead Basin for the threatened bull trout, and/or Logging Lake, once one of the most productive bull trout fisheries in the park, will be protected for the long term; 7) valuable opportunities for scientific research of one or two ecologically sound aquatic systems will be maintained; 8) outdoor educational opportunities inherent within one or two unique and increasingly rare aquatic ecosystems will endure for future generations; 9) and backcountry angling opportunities will remain undiminished by significant changes to fish species composition and abundance.

Of the three action alternatives, Alternative D will protect threatened bull trout and other native fish on the widest scale. Alternatives B and C will also provide long-term protection for bull trout and native fish within their respective areas. But their implementation will protect only one aquatic ecosystem, whereas Alternative D will extend protection to two systems and thus be of greater overall benefit to bull trout and native fish throughout the region. Of the three action alternatives, Alternative D is therefore the environmentally preferable alternative.

By contrast, Alternative A (no action) is not the environmentally preferable alternative because, although there will be no activities that will disturb elements of the biological and physical environment, 1) the integrity and persistence of native fish populations in the Quartz and Logging systems will be permanently compromised by non-native invasive lake trout; 2) the potential effects to native fisheries will be adverse, major and long-term; 3) bull trout, a threatened species and top aquatic predator, will be significantly, adversely affected and at risk of functional extinction in Quartz and Logging Lakes; 4) two important refugia for native fish from the combined stressors of climate change and invasive non-native species will be at risk; 5) the overall ecological integrity of the Quartz and Logging drainages, recommended wilderness, the park as a whole, and the Flathead watershed will be diminished; 6) the park will not be in keeping with numerous state and federal efforts to protect functional native fish populations throughout the western United States; 7) scientific research, outdoor education, and angling opportunities within the Quartz and Logging drainages will be permanently compromised.

## Why the Selected Action Will Not Have a Significant Effect on the Human Environment

As defined in 40 CFR §1508.27, significance is determined by examining the following criteria:

***Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.***

Implementation of the preferred (selected) alternative will result in some adverse impacts, especially to recommended wilderness. But the overall long-term benefit of the project, particularly to bull trout and native fish populations, outweighs these negative effects. Through a rigorous evaluation of the trade-offs, the park has determined that the negative impacts to recommended wilderness will not be significant. The severely detrimental effects to bull trout and native fish populations from taking no action against non-native invasive lake trout would, however, be significant, especially in the face of long-term stressors to native fish from climate change.

The adverse impacts that will occur from the project are summarized as follows: Incidental netting mortality and the removal of juvenile bull trout/eggs from Logging Lake will have short-term, site-specific to local, adverse impacts to fisheries that are minor to moderate for bull trout and minor for westslope cutthroat trout and other native fish. Disturbances from motorboat use, helicopter flights, and the presence of project personnel at a time when human activity is typically low will have negligible to minor, short-term, site-specific to local and possibly regional adverse impacts to wildlife, bald eagles and common loons. There will be negligible to minor, short and long-term, and site-specific to local adverse impacts to grizzly bears due to disturbances from human activity, including motorboat use and helicopter flights. The use of motorboats, motorized noise during netting, and roundtrip helicopter flights at two and possibly three backcountry lakes will have adverse impacts to recommended wilderness that are moderate, short and long-term, site-specific and local. Intermittent, temporary noise from a motorboat, portable generator, and helicopter flights will have moderate adverse, short-term, site-specific and local impacts to natural soundscapes. There will be minor to moderate, short-term, site-specific and local adverse impacts to visitor use and experience from project noise and activity that will be disruptive to visitors seeking a primitive wilderness experience.

The beneficial impacts are summarized as follows: Conserving bull trout and native fish populations at Quartz and Logging Lakes for the long term will be the primary benefit of implementing the preferred (selected) alternative. The successful large-scale removal of lake trout will decrease competition and predation by lake trout and will have moderate, long-term, site-specific to regional beneficial impacts on native fish assemblages, including bull trout and westslope cutthroat trout; the increased resiliency of native fish populations will improve long-term fish population sustainability in the face of climate change. The preservation of two intact native fisheries and shallow water-dwelling fish that are more accessible to fish-dependent predators will have site-specific to local and possible regional long-term beneficial impacts that are negligible to minor for wildlife and common loons and minor for bald eagles. There will be moderate, long-term, and site-specific to regional beneficial impacts to recommended wilderness from the preservation of two native fisheries and protection of the natural condition and unique ecological, scientific, and educational value of the wilderness resource. The preservation of angling opportunities as well as opportunities for non-anglers to visit two ecologically intact backcountry locations will have moderate, long-term, site-specific and local beneficial impacts to visitor use and experience.

***The degree to which the proposed action affects public health or safety.***

There will be no impacts to human health and safety from the selected action; the topic was dismissed from further analysis in the EA.

***Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.***

Quartz and Logging Lakes are ecologically critical areas that provide essential habitat for native fish; foraging and nesting habitat for several bird species, including bald eagles, osprey, and common loons; and foraging and denning habitat and travel corridors for other wildlife. The remoteness of the lakes makes them especially valuable for wildlife security, and a number of terrestrial species that inhabit or travel within the Quartz and Logging drainages depend on the lake's native fish populations for food. Quartz Lake is one of the last remaining strongholds in the Flathead Basin for the threatened bull trout, and Logging Lake was once one of the most productive bull trout fisheries in the park. The ecological value of both lakes will become increasingly important as they provide important habitat refugia for native fish species faced with

the stressors and challenges of a changing climate. (Effects to wildlife and fisheries are previously described in this document under *Impacts that may be both beneficial and adverse.*)

Quartz and Logging Lakes are located within recommended wilderness. The lakes are within areas that are largely untrammeled, with rugged, remote, and spectacularly scenic wild country. The soundscape is generally characterized by natural sounds, and development is limited to hiking trails, backcountry campgrounds, and backcountry patrol cabins. Many visitors to Quartz and Logging Lake come to experience a sense of solitude and enjoy numerous recreational opportunities, including hiking, backcountry camping, and fishing. The wilderness resource in the Quartz and Logging drainages also offers unique opportunities for outdoor education, and the upper drainages provide especially valuable opportunities for scientific research on intact terrestrial and aquatic ecological systems, including those which support bull trout and other native fish species. (Effects to recommended wilderness, natural soundscapes, and visitor use and experience are previously described in this document under *Impacts that may be both beneficial and adverse.*)

There are wetlands at both Quartz and Logging Lake, as lakeshores are considered wetlands under the USFWS "Classification of Wetlands and Deepwater Habitats of the United States", Report FWS/OBS-79/31 (NPS 2012). The project will occur on the open water of Quartz and Logging Lakes and will not affect lakeshores or wetlands; a statement of findings for wetlands is therefore not required.

There is one historic patrol cabin at Quartz Lake, and two historic snowshoe cabins and an historic boathouse at Logging Lake, all of which are listed in the National Register of Historic Places. There are no cultural landscapes at either lake. A light lithic scatter recorded in 1992 near Quartz Lake was determined not to meet the criteria for listing in the National Register of Historic Places (SHPO, consensus determination of eligibility, 2002); the area was again surveyed in 1995 with no new sites identified (Reeves and Shortt 1996). Light lithic scatters have also been recorded at Logging Lake but were determined to be less intensive than more northerly areas (Reeves and Shortt 1996).

There are no farmlands or wild and scenic rivers within the geographic area.

***The degree to which the effects on the quality of the human environment are likely to be highly controversial.***

Eleven comment letters were received during scoping. Nine letters were from private individuals and two were from organizations. Nine letters were supportive of the proposal and two were opposed. Scoping comments were addressed in the EA.

Twenty-five letters were received during the EA public review period. Twelve letters expressed support and six expressed opposition. Opposing comments generally centered on adverse impacts to recommended wilderness, wildlife, visitor use and experience, natural soundscapes, and visual resources. They disagreed with the EA's characterization of beneficial impacts, questioned the chances of successfully suppressing lake trout and/or retaining the project areas' ecological integrity, questioned the value of the tradeoff between adverse and beneficial impacts, questioned the project's consistency with NPS Management Policies and regulations, and/or were of the opinion that the project is not allowed by the Wilderness Act. The NPS disagrees with this opinion for the reasons stated in the *Responses to Comments* section of the Errata Sheets attached to this FONSI. Some opponents questioned portions of the analysis and disagreed with the level of impact determined in the EA. These concerns have been addressed in this FONSI (see *Responses to Comments* in the Errata Sheets). Minor text changes have been made, but no changes were made to the impact determinations nor to the overall decision. Three commenters were of the opinion that the project requires an EIS. Despite these concerns,

impact determinations did not rise to the level requiring an EIS. The project is not a major federal action and will not result in significant impacts. Therefore, while there are dissenting opinions, the project does not rise to the level of controversy that would require an EIS. One commenter raised a concern about how the project will affect the park's fishing regulations; this is addressed in the Errata Sheets under *Responses to Comments*. A total of 76 comments are considered substantive or warranted a response and are addressed in the attached Errata Sheets.

***The degree to which the possible effects on the quality on the human environment are highly uncertain or involve unique or unknown risks.***

Lake trout suppression has been underway at Quartz Lake since 2009, and other state and federal projects designed to reduce the abundance of lake trout and maintain native fish populations are also underway. While removal techniques continue to be refined, a reasonably well established body of knowledge exists regarding how lake trout suppression activity may affect park resources. Similarly, during bull trout propagation and translocation, standard USFWS policies and procedures regarding captive propagation of Endangered Species Act (ESA) listed species will be followed. There are therefore no highly uncertain effects or unique or unknown risks associated with continuing lake trout suppression and conserving bull trout, and the environmental process has not identified any such effects or risks.

***The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.***

Lake trout suppression has been undertaken in the park on Quartz Lake (since 2009), and other state and federal lake trout suppression projects are also underway (e.g. NPS efforts on Yellowstone Lake, Montana Fish, Wildlife and Parks efforts on Swan Lake, and Idaho Department of Fish and Game efforts on Lake Pend Oreille and Upper Priest Lake). Standard USFWS policies and procedures exist regarding captive propagation of ESA listed species. The project will therefore not establish a precedent for future actions with significant effects, nor does it represent a decision in principle about a future consideration. However, information from this project will be used to determine if future action is worthwhile and warranted. Additional environmental analysis will be conducted at that time.

***Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.***

Cumulative effects were analyzed in the EA and no significant cumulative impacts were identified.

***The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.***

There are four historic buildings within the Ares of Potential Effect, including the Quartz Lake Patrol Cabin, the Lower Logging Lake Snowshoe Cabin and Boathouse, and the Upper Logging Lake Snowshoe Cabin, all of which are listed in the National Register of Historic Places. The preferred alternative will involve the use of motorboats on Quartz and Logging Lakes, and the boats will be stored near the Quartz Lake and Logging Lake cabins. The effect on the buildings will be visual, but not out of character with buildings located on a lakeshore, and impacts to

historic structures will be negligible. Based upon previous surveys, the probability of impacting archeological sites is unlikely, and the project will not result in the loss of significant historic properties. Adverse impacts to archeological resources will be minor or less, and there will be negligible adverse impacts to historic structures. The park has reached a finding of "no adverse effect" under Section 106 of the National Historic Preservation Act; the Montana State Historic Preservation Office (SHPO) concurred with this finding on January 6, 2014.

No ethnographic resources have been identified by the Confederated Salish and Kootenai Tribes (CSKT) or the Blackfeet Tribal Business Council in the Quartz or Logging Lake areas, and the Tribal Historic Preservation Officers raised no concerns during scoping or the public comment period.

***The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.***

There are no recorded observations of water howellia or Spalding's catchfly in the vicinity of Logging Lake or Quartz Lake, nor is there known suitable habitat that could potentially support the species; there will therefore be no impacts to Spalding's catchfly or water howellia from the project. Canada lynx habitat modeling indicates the presence of lynx habitat in the Quartz and Logging drainages. The selected action will not, however, affect lynx habitat. Neither Quartz nor Logging Lake provides primary wolverine foraging or denning habitat, and wolverine use is likely sporadic. Lynx and wolverines are highly mobile, wide ranging carnivores; their habitat will not be impacted, and neither species will be affected by the project. The project will have the potential to displace individual grizzly bears from the vicinities of Quartz and Logging Lakes, and could increase the potential for bear-human encounters and conflict. Because of the intermittent, low intensity nature of the project activities overall, impacts to grizzly bears are anticipated to be low. The risk of bear-human conflict will be minimized by strict requirements to secure food and other bear attractants. Impacts to grizzly bears will be negligible to minor, adverse, short and long-term, and site-specific to local. There will be minor to moderate short-term, site-specific to local, adverse impacts to the Quartz and Logging Lake bull trout populations from netting and translocation. However, if the project is successful, bull trout will be protected from the detrimental effects of invasive non-native species; beneficial impacts to bull trout will be moderate, long-term, and site-specific to regional.

The Section 7 determination of effects are "no effect" for water howellia, Spalding's catchfly, Canada lynx, or wolverine; and "may affect, not likely to adversely affect" for grizzly bears. Glacier National Park initiated informal consultation with the USFWS on August 8, 2012. The USFWS confirmed that the park currently has authorization under Section 10 of the ESA to undertake gill netting operations in bull trout waters. Bull trout translocation and stocking in Logging and Grace Lakes will occur under an amendment to the existing Section 10 permit, and captive propagation of bull trout will be covered under a separate Section 10 permit. Compliance with Section 7 of the ESA is being completed under the Section 10 permitting process. Per discussions with the USFWS, the analysis in the EA of other listed species meets the requirements of a biological assessment under the Section 10 process. The USFWS concurred with the effects determinations in a letter dated January 6, 2014. Glacier National Park consulted informally with the USFWS on July 14, 2014 regarding text changes to the EA in the impacts analysis sections for grizzly bears. The text changes included the time period when bull trout translocation would occur (for a few days per year when the lakes are ice free), better distinguished between this period and the spring-fall work periods for gill netting, and emphasized that helicopter flights during translocation may or may not occur. These clarifications to the text did not change the level of impact or the determination of effects to

grizzly bears. In an email dated July 15, 2014, the USFWS stated that they had reviewed the text changes and that the EA's impact analysis and effects determination are still accurate, that no new effects are anticipated, and that the conservation measures (Mitigation Measures) are still applicable.

Bald eagles and common loons are state-listed species of concern that will be adversely affected by disturbances due to motorboat use, the extended presence of personnel during typically low visitor use periods, and round trip helicopter flights; adverse impacts will be negligible to minor and short-term. Mitigation measures will minimize disturbance in the vicinity of bald eagle and common loon nest sites. The project will also benefit bald eagles and loons, which rely on accessible and/or shallow water-dwelling native fish for food; beneficial impacts will be long-term and negligible to minor for common loons, and minor for bald eagles. Beneficial and adverse impacts will generally be site-specific to local, but could be regional. Transient use of the project area by amphibians including the state-listed boreal toad is likely, especially along the lake shores, and introduced fish can have adverse impacts on amphibian populations; impacts on amphibians or their habitat will be minor or less. Other state-listed species of concern will not be measurably impacted by the project. The majority of the activity will take place on open lake water and will not occur within the immediate habitat of nesting or resident birds, nor of Townsend's big-eared bats and hoary bats; fishers have not been recently detected in the park and may not be present; the project does not involve any activities that would impact northern bog lemmings or their habitat; there are no known records of the northern leopard frog in Glacier National Park; and the nature of the activity is such that it will not affect invertebrate species in any measurable way. Information on state listed species of concern was provided by the Montana Natural Heritage Program (MNHP) in a report dated July 20, 2012.

***Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.***

The action will not violate any federal, state, or local laws or environmental protection laws.

## Public Involvement and Native American Consultation

The EA was made available for public review and comment during a 30-day period ending January 22, 2014. A press release was distributed to several media outlets and a letter announcing the availability of the EA was mailed to individuals and organizations on the park's EA mailing list, including members of Congress and various federal, state, and local agencies. Hard copies of the EA were also mailed to several individuals. An email announcement was sent to a number of interested parties with a link to the EA on the NPS Planning, Environment, and Public Comment (PEPC) website.

Glacier National Park notified the Confederated Salish and Kootenai Tribes (CSKT) and the Blackfeet Tribal Business Council as required by 36 CFR 800. The CSKT Tribal Heritage Resource Office sent an email dated December 30, 2013 stating that they had no concerns, and requesting that the EA be sent to the Fish, Wildlife, Recreation and Conservation Division of the CSKT Natural Resources Department; the park sent a hard copy of the EA to the tribal fisheries office. No additional letters or emails were received from the tribes.

Twenty-five letters were received during the EA public review period. Twelve letters expressed support, six expressed opposition. The remaining seven letters stated neither support nor opposition; these letters included agency and tribal correspondence pertaining to consultation and permits, a letter suggesting the introduction of lake trout predator/prey fish species, and a letter regarding the brook trout fishery in Middle Two Medicine Lake (the Middle Two Medicine Lake fishery is beyond the scope of this project, but the comment was forwarded to the park's

fisheries biologist). Letters were received from the CSKT Tribal Heritage Resource Office; the USFWS; the Montana State Historic Preservation Office; U.S. Army Corps of Engineers; Montana Fish, Wildlife and Parks; the Montana Department of Environmental Quality; the Office of the Minister of Environment and Sustainable Resource Development, Alberta, Canada; Wilderness Watch; the Flathead Valley Chapter of Trout Unlimited; the National Parks Conservation Association; and the Flathead Audubon Society. Of the organizations listed, Wilderness Watch opposed the project and Montana Fish, Wildlife and Parks, the USFWS, the Alberta Office of the Minister of Environment and Sustainable Resource Development, Trout Unlimited, the National Parks Conservation Association, and the Flathead Audubon Society were supportive; some of these organizations provided comments that have been addressed under Responses to Comments in the Errata Sheets.

Opponents to the project raised concerns about adverse impacts to park resources, disagreed with some of the EA's characterizations of beneficial impacts, questioned the chances of successfully suppressing lake trout and/or retaining the project areas' ecological integrity, questioned the value of the tradeoff between adverse and beneficial impacts, and questioned the project's consistency with the Wilderness Act and NPS Management Policies. Three were of the opinion that the project requires an EIS. One commenter raised a concern about how the project will affect the park's fishing regulations.

Supporters of the project cited the importance of native fish conservation, Glacier National Park's value as a preserve for native fish, the detrimental effects of non-native invasive lake trout, increased threats to native fish from climate change, and the importance of maintaining intact ecosystems in the park for the long term. Supporters also offered suggestions pertaining to adaptive strategies, monitoring project activity and results, mitigation measures, the project timeframe, and other suppression techniques and conservation measures. Some supporters raised concerns regarding native fish bycatch, the effects to water quality from sinking dead fish, adverse impacts to wildlife, and the use of motorized equipment in recommended wilderness, and stated the need for a long-term fisheries management plan.

Comments are addressed in the Errata Sheets attached to this FONSI. The FONSI and Errata Sheets will be sent to all commenters, and the FONSI will be made available to the public on PEPC.

## Conclusion

As described above, the preferred alternative does not constitute an action meeting the criteria that normally require preparation of an environmental impact statement (EIS). The preferred alternative will not have a significant effect on the human environment. Environmental impacts that could occur are limited in context and intensity, with adverse and beneficial impacts that range from negligible to moderate, short to long-term, and site-specific to regional. There are no unmitigated adverse effects on public health, public safety, threatened or endangered species, sites or districts listed in or eligible for listing in the National Register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, significant cumulative effects, or elements of precedence were identified. Implementation of the action will not violate any federal, state, or local environmental protection law.

Based on the foregoing, the NPS has determined that an EIS is not required for this project and thus will not be prepared.

Approved:

Sue E. Masica 9/5/14

Sue E. Masica Date
Director, Intermountain Region, National Park Service

# Errata Sheets

## Continued Lake Trout Suppression on Quartz Lake & Lake Trout Removal and Bull Trout Conservation in the Logging Drainage Glacier National Park

According to NPS policy, substantive comments are those that 1) question the accuracy of the information in the EA, 2) question the adequacy of the environmental analysis, 3) present reasonable alternatives that were not presented in the EA, or 4) cause changes or revisions in the proposal.

A total of 76 comments in 11 of the 25 letters received during public review of the EA were considered substantive or warranted a response. Some substantive comments have resulted in changes to the text of the EA, in which case they are addressed in the *Text Changes* section of these Errata Sheets. Substantive comments that required a more thorough response are addressed in the *Responses to Comments* section.

### TEXT CHANGES

A number of text changes have been made to the EA in response to detailed comments about the project and to make minor corrections and clarifications to the document. Italicized and underlined text indicates the section in the EA that has been altered. Strike-out is used to show text that has been stricken; bold text is used to show new text.

*p. 4, paragraph 3 under Purpose and Need, Background:* This data suggests that the project has already successfully removed a high percentage of spawning adults and thereby reduced the size of the adult lake trout population in Quartz Lake. **Suppression efforts began before lake trout became well enough established to cause a decline in Quartz Lake's bull trout population, and the lake remains a relatively healthy aquatic system** ... This proposal seeks to continue lake trout suppression at Quartz Lake for the longer term, which is necessary to further reduce the lake trout population and keep it at a low level**, thereby maintaining a currently healthy bull trout population and protecting the lake as a bull trout stronghold**.

*p. 8, paragraph 4, Canada Lynx under Impact Topics Dismissed from Further Analysis:* The proposed project, however, would not affect lynx habitat ~~and would occur outside the lynx denning period~~.

*p. 9 (paragraph 6) and p. 10 (paragraph 1), State-listed Species of Concern that have been dismissed from further analysis under Impact Topics Dismissed from Further Analysis:* If fishers do frequent areas near Quartz and Logging Lakes, they are not likely to be affected by the project, which ~~would occur outside the denning period and~~ would not affect fisher habitat.

... *p. 10, paragraph 1:* ~~There is~~ **Park files contain** one verified record of a northern bog lemming ~~from the park,~~ collected in the Camas drainage in 1949 (Wright 1950), and two unverified, more recent reports from east of the Continental Divide. **Additionally, University of Montana researchers documented bog lemmings at six sites in the park including Numa Ridge, two sites at Anaconda Cr., Camas Cr., McGee Meadows, and McDonald Cr. (Pearson 1991).**

*p. 12, Water Resources under Impact Topics Dismissed from Further Analysis (insert as new paragraph after paragraph 1):* **We do not anticipate any issues with oxygen depletion as a**

**result of fish decomposition from sinking dead fish in either Quartz or Logging Lakes. Glacier's stream and lake systems are typically well-oxygenated. Sinking dead fish during lake trout suppression on Quartz Lake has been ongoing for five years with no indication of any problems associated with winter oxygen depletion. Dead fish are disposed of in various areas of the lake to avoid the potential for creating "pockets" of low dissolved oxygen as they decompose. In Quartz Lake we are typically removing less than 2,500 fish per year, most of which are less than 16 inches in length. In addition, most (95% or more) of these fish are removed in the spring and are completely decomposed by the time we return to remove adults in the fall. We are sinking less than 50 adult lake trout per year in the fall in Quartz Lake. Given the lake volume of Quartz Lake, we do not feel oxygen depletion as a result of the project is a concern. Similarly, in Logging Lake we anticipate much of the removal of juvenile lake trout to occur in the spring. These fish will decompose in deeper areas of the lake during the summer months and should not be a concern for oxygen depletion. As with Quartz Lake, we intend to focus adult lake trout removal efforts on Logging Lake in the fall. While the potential exists to initially remove (and sink) thousands of adult lake trout in Logging Lake, we expect this number to rapidly decrease over time. Carcasses will be spread around the lake to prevent the development of low dissolved oxygen pockets. Due to the estimated water volume in Logging Lake (103,000 acre-feet), inflow and outflow to the lake, and the seasonal nature of the project, we do not anticipate any problems with dissolved oxygen. If we assume a reasonable estimate of natural mortality of fish populations in these systems of around 30%, annually there are tens of thousands of fish dying each year in these systems and decomposing without issue. In addition, given the remote nature of the project lakes, there are no other reasonable alternatives for disposing of these fish.**

*p. 13, paragraph 3, Air Quality under Impact Topics Dismissed from Further Analysis:* Use of two motorized boats for approximately five days per week for approximately ~~ten~~ **sixteen** weeks per year would add a negligible amount of pollution to the air in the vicinity of Quartz and Logging Lakes.

*p. 14, paragraph 2, Visual Resources under Impact Topics Dismissed from Further Analysis:* Visual resources at Logging, **Grace,** and Quartz Lakes are characterized by natural, scenic vistas of pristine glacial lakes surrounded by densely forested mountains and the rugged, towering peaks of the Continental Divide.

*p. 17, paragraph 4, Alternative B under Alternatives Carried Forward:* Netting (e.g. gill netting and trap netting) and angling would continue to remain the primary removal method, but other experimental lake trout suppression techniques **(e.g. electroshocking, spearfishing, and others)** may also be employed as they are developed. Removal efforts would continue each year for ~~seven~~ **six** to ~~ten~~ **eight** years, with ongoing project assessments. The program would be re-evaluated at the end of ~~ten~~ **eight** years and additional environmental review and compliance would occur should the project be proposed for continuation.

... *p. 18, paragraph 1:* If a replacement boat is needed in the future, it would be hauled in by helicopter **and delivered via long line sling load**.

*...p. 18, paragraph 4*: When not in use, the boat would be stored on shore near the patrol cabin ~~and boat house~~ where it would be out of sight...

*...p. 19, paragraph 8*: When not in use, the boat would be stored on shore near the patrol cabin **and/or boathouse** where it would be out of sight...

... p. 19, paragraph 2: Fish population monitoring in the Quartz drainage would likely continue over time using established netting programs which would survey the lake every five years. **The park would postpone gill netting scheduled for 2015 on Quartz Lake in order to reduce impacts/mortality to bull trout. Redd counts would serve as the primary monitoring tool for bull trout abundance in the interim. Trend gill netting would be resumed towards the end of the study period as an assessment measure.**

p. 19, paragraph 6, Alternative C under Alternatives Carried Forward: Radio-telemetry coupled with experimental netting (e.g. gill netting, trap netting) and angling would be the primary lake trout removal methods, but other experimental suppression techniques **(e.g. electroshocking, spearfishing, and others)** may also be employed as they are developed ... A motorized boat would be flown by helicopter to Logging Lake **(delivered via long line sling load)** and used to conduct netting and telemetry operations.

... p. 21, paragraph 2: Along with the juveniles translocated from Logging Creek, the facility-reared fish would help establish a self-sustaining bull trout population safe from lake trout. **Bull trout may be marked with PIT tags before being moved into Grace Lake and their movements would be tracked with passive PIT tag antennae located along Logging Creek between Logging and Grace Lakes. The antennae would be removed at the end of each field season.**

... p. 21, paragraph 3: **Efforts would be made to transport b**Bull trout eggs and juveniles ~~may be transported~~ **in and out of the Logging drainage** by foot or pack stock. However, if it is determined that the risk of losing the eggs or harming the young fish is too high due to water temperature increases, oxygen loss, or carbon dioxide buildup, the eggs and juveniles may need to be transported by helicopter**; helicopter flights would not be used to transport bull trout juveniles/eggs except as a last resort necessary for the success of the translocation**. ~~We anticipate that~~ **If flights for translocation are necessary,** up to four helicopter flights per year (approximately) for the first few years of the project could be necessary, including flights **to Logging Lake** for boat delivery and**/or** maintenance **and possibly for bull trout transport to Logging and/or Grace Lake** ~~as well as bull trout translocation~~. Fewer flights would likely be necessary during later stages of the project, when the translocation component phases out. **In accordance with conservation measures implemented for other administrative flights in the park, flights for the project would not occur before 1 May or after 1 October.**

... p. 22, paragraph 2: Lake trout suppression and bull trout conservation at Logging Lake is experimental in nature and could be underway for approximately ~~seven~~ **six** to ~~ten~~ **eight** years, as this would be the required time frame to determine whether suppression, translocation, and hatchery rearing efforts are succeeding... If lake trout suppression efforts and/or bull trout conservation were to continue beyond ~~ten~~ **eight** years, it would require additional environmental analysis and review.

... p. 22, paragraph 4: In addition, periodic standardized gill netting begun in 2000 would likely continue on Logging Lake to provide information on relative abundance of lake and bull trout as well as other native species. **However, the park would forego the standardized trend netting program on Logging Lake until at least 2016, depending on the outcome of bull trout translocation efforts.**

p. 23, paragraphs 2 and 3, Alternative D (Preferred) under Alternatives Carried Forward: Under

Alternative D, both Alternatives B and C would be implemented. Using methods developed on Quartz Lake since 2009, lake trout suppression would continue on Quartz Lake and lake trout removal and bull trout conservation would be conducted in the Logging Lake drainage. Methods, operations, and anticipated outcomes would be as previously described for Alternatives B and C. Both projects could occur simultaneously during approximately the same time of year, depending on area-specific needs and logistics. **Where appropriate, we would also employ new experimental lake trout suppression approaches being developed on other waters (e.g. electroshocking, spearfishing, and others) in Quartz and Logging lakes to improve our probability of success.** ~~We anticipate that~~ **Helicopter flights would not be used to transport bull trout juveniles/eggs except as a last resort necessary for the success of the translocation. If helicopter flights are necessary during translocation,** up to five ~~helicopter~~ flights per year (approximately, **including those for boat delivery and/or maintenance to Quartz and/or Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake**), ~~including flights for bull trout translocation in the Logging drainage as well as boat delivery and maintenance at both Logging and Quartz Lakes,~~ could be required for the first several years of the project. The number of annual flights would be expected to decline over time as the translocation phase is completed. The intent of using helicopters during bull trout translocation would be to reduce the risk of losing eggs or harming young fish. **In accordance with conservation measures implemented for other administrative flights in the park, flights for the project would not occur before 1 May or after 1 October.**

Lake trout removal would continue on Quartz Lake for ~~seven~~ **six** to ~~ten~~ **eight** years as described in this EA. Lake trout suppression and bull trout conservation at Logging Lake is experimental in nature, also requiring a ~~seven~~ **six** to ~~ten~~ **eight** year time frame to determine if suppression, translocation, and hatchery rearing efforts are succeeding. The project would occur in cooperation with the USFWS. Future lake trout suppression and bull trout conservation beyond the ~~seven~~ **six** to ~~ten~~ **eight** year time frame addressed in this EA may continue at both Quartz and Logging Lakes, especially if results indicate that efforts are successfully recovering bull trout. **At Quartz Lake, where lake trout suppression has already been under way since 2009, removal efforts would occur less often or at a lower intensity should modeling or other data indicate that a reduced effort would be effective in keeping lake trout at sufficiently low abundance. At Logging Lake, if results indicate that efforts are successfully recovering bull trout, lake trout suppression actions at some level may need to continue into the foreseeable future. But as with Quartz Lake, the frequency or intensity of netting activity at Logging Lake could decrease in the future, depending on results.** The nature of future lake trout suppression and/or bull trout conservation efforts is unknown at this time, and any future action at either Quartz or Logging Lake beyond ~~ten~~ **eight** years would require additional environmental analysis and review.

*p. 23, Mitigation Measures, Fisheries (2nd bullet):*

- **Gill ~~N~~nets** would be checked at least once every ~~24~~ **6** hours to minimize mortality to non-target fish species **(subject to unforeseen delays, such as weather). Trap nets would be checked at least every 24 hours.**

*p. 24, Mitigation Measures, Wildlife, Threatened and Endangered Species, Species of Concern, and Special Status Species (5th bullet):*

- The boat motor **and generator** would be selected, in part, to minimize noise.

*p. 24, Mitigation Measures, Wildlife, Threatened and Endangered Species, Species of Concern, and Special Status Species (additional bullet):*

- **Helicopter flights would adhere to the conservation measures described in the park's programmatic biological assessment for administrative flights (NPS 2013).**

*p. 24, Mitigation Measures, Water Resources (1st bullet):*

- ... Work crews would inspect the boat engines, fuel lines, and fittings **as well as other equipment such as the generator** prior to commencement of activities each day...

*p. 26, add three new paragraphs under Alternatives Considered but Eliminated from Detailed Study:*

**Enlist public participation in lake trout suppression efforts, to include spear fishing. Currently, fishing is free in the park and there is no limit on lake trout in park waters west of the Continental Divide. Therefore, by allowing anglers to catch an unlimited number of lake trout on the west side of the park, the park has enlisted the public to assist with lake trout suppression. However, visitor angling on either Quartz or Logging Lakes will not be sufficient to reduce lake trout abundance to the point necessary to protect native fish populations for the long term. This alternative has therefore been dismissed. However, any lake trout removed by members of the public will aid the overall effort, and spearfishing and other experimental lake trout suppression techniques may be employed as they are developed.**

**Employ a piscicide treatment of Logging Lake. A piscicide has been dismissed because the probability of a successful piscicide treatment at Logging Lake would be highly uncertain given the current state of the science and knowledge of such treatments. While piscicides have been used on other lakes in Montana, Logging Lake is a much bigger, deeper lake than where piscicides have so far been tried. The approach would also require the destruction of the entire native fish community, and treating Logging Lake with a piscicide would be extremely costly (estimated at over two million dollars). This alternative has therefore been dismissed.**

**Alternative options for disposing of fish. Alternative options for disposing of fish were considered but dismissed because they would not be feasible, would create a wildlife attractant, or would present a health hazard. Leaving fish carcasses to decompose on the lakeshore would create an attractant for bears and other wildlife. Offering the fish to the public for consumption was dismissed due to the relatively high mercury content in lake trout, and because it would not be possible to keep the fish alive or fresh during the time required to pack them out of the remote backcountry locations.**

*p. 26, paragraph 4, Alternatives, Suggestions, and Concerns from Public Scoping: Comment: Will not trying to maintain low populations of lake trout require an unending netting program that could take place for many years? Response:* Yes. The prospect of lake trout suppression at Logging Lake is a long-term process. For this reason, we are proposing netting commitments for ~~seven~~ **six** to ~~ten~~ **eight** years in both lakes with periodic re-assessment. Future action at either Quartz or Logging Lake beyond ~~ten~~ **eight** years would require additional environmental analysis and review.

*p. 31, Table 3, Environmental impact summary by alternative; Alternative D; Fisheries, bull trout and westslope cutthroat trout:* Short-term, site-specific **to local**, adverse impacts that are minor to moderate for bull trout and minor for westslope cutthroat trout and other native fish would occur due to incidental netting mortality and the removal of juvenile bull trout /eggs from Logging Lake.

*p. 42, addition to Future Actions under Cumulative Impact Scenario:* **The park anticipates the preparation of a fisheries management plan and environmental impact statement (EIS) in the near future in order to develop a comprehensive, park-wide strategy to conserve native fisheries.**

*p. 56 (paragraph 5) and p. 57 (paragraph 1), Cumulative Impacts of Alternative B under Fisheries, Bull Trout, Westslope Cutthroat Trout, Impacts of Alternative B*: In addition, Glacier National Park would likely continue to implement a periodic monitoring program on lakes on the west side of the park~~, potentially including Quartz Lake.~~ ... The next gill net monitoring sampling for Quartz Lake is scheduled to occur in 2015. But additional gill netting combined with this alternative would result in additional mortality to bull trout.~~;~~ **The park would therefore postpone gill netting scheduled for 2015 on Quartz Lake in order to reduce impacts/mortality to bull trout. Redd counts would serve as the primary monitoring tool for bull trout abundance in the interim. Trend gill netting would be resumed towards the end of the study period as an assessment measure** ~~sampling through periodic gill netting may be suspended during implementation of this alternative~~.

*p. 60, paragraph 3, Cumulative Impacts of Alternative C under Fisheries, Bull Trout, Westslope Cutthroat Trout, Impacts of Alternative C*: Glacier National Park would also likely continue to implement a periodic monitoring program on lakes on the west side of the park~~, potentially including Logging Lake~~.... The next gill net monitoring sampling for Logging Lake is scheduled to occur in 2015. However, additional gill net sampling combined with this alternative could result in additional mortality to bull trout.~~;~~ T**he park would therefore forego trend netting on Logging Lake until at least 2016. Risk to bull trout in Logging Lake from trend netting would be reduced if bull trout have successfully been moved upstream into Grace Lake and Creston National Fish Hatchery** ~~sampling through periodic gill netting may be suspended during implementation of this alternative~~.

*p. 62, paragraph 5, Conclusion under Fisheries, Bull Trout, Westslope Cutthroat Trout, Impacts of Alternative D (Preferred)*: Under the preferred alternative, there would be minor to moderate short ~~and long~~-term, site-specific to local, adverse impacts to the Quartz and Logging Lake bull trout populations from netting and translocation. There would also be minor short ~~and long~~-term adverse impacts to other native fish due to by-catch mortality.

*p. 71, paragraph 4, Impacts of Alternative C under Wildlife, Bald Eagles, and Common Loons*: As with Alternative B, wildlife could be disturbed by human activity**, especially** ~~at a time~~ **during May-June and September-October** when visitation is typically low~~,~~ and ~~from~~ motorboat noise **would occur**.

... *p. 72, paragraph 1*: There would be at least one round trip helicopter flight to deliver the boat, and possibly additional flights for boat and/or motor maintenance and bull trout translocation ~~(up to four flights per year, approximately, anticipated for the first few years, with fewer anticipated during the later stages of the project)~~. **Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase.** Helicopters would likely cause temporary disturbances to wildlife along the flight path. Impacts would be fairly localized, since activity under Alternative C would be limited primarily to Logging Lake**. Project activity at Grace Lake would be primarily non-**

**motorized, unless helicopter transport is necessary during bull trout translocation**~~, with some non-motorized activity at Grace Lake~~.

... p. 72, paragraph 2, Bald Eagles: ~~Project~~ **Motorized netting** activities would take place during the spring incubation and nestling periods and the fall migration period, and would have the potential to disturb nesting and foraging bald eagles.

... p. 73, paragraph 2, Conclusion: Disturbances from motorboat use, the extended presence of personnel **(especially** during typically low visitor use periods **in May-June and September-October)**, and round trip helicopter flights would have negligible to minor, short-term adverse impacts to wildlife, bald eagles and common loons, especially during springtime.

p. 73, paragraph 3, Impacts of Alternative D (Preferred) under Wildlife, Bald Eagles, and Common Loons: Human activity at Quartz **and**~~,~~ Logging **Lakes during netting** and **at** Grace Lake**s during translocation, especially** in the spring and fall~~,~~ when backcountry visitation is usually low, could displace wildlife, as could motorboat noise on Quartz and Logging Lakes during netting operations... Some wildlife species may be slightly more vulnerable to disturbance during springtime netting operations (May-June), but ~~work~~ **netting** in the fall (September-October) would occur during a less sensitive time of year, when nesting and natal periods would have concluded and most migrant bird species would have departed. Round trip helicopter flights to Quartz**,** ~~Lake and~~ Logging **and possibly Grace** Lake**s** ~~(up to four per year, approximately, anticipated to Logging for the first few years, with fewer anticipated during the later stages of the project; possibly be one flight anticipated each year or every few years to Quartz Lake)~~ would likely temporarily disturb wildlife. **Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or motor maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase. One flight to Quartz Lake would be anticipated each year or every few years for boat delivery and/or maintenance.**

... p. 74, paragraph 2, Bald Eagles: Implementation of **motorized netting operations under** Alternative D would take place during the spring incubation and nestling periods, when bald eagles are most sensitive, as well as the fall migration period.

p. 79, paragraph 1, Impacts of Alternative C under Grizzly Bears: The work would be of low intensity and intermittent, **with motorized gill netting activity** occurring only during spring and fall **and bull trout translocation potentially occurring any time the lakes are ice free, for a few days per year**. Motorboat noise, round trip helicopter flights ~~(up to four per year, approximately, anticipated for the first few years, with fewer anticipated during the later stages of the project)~~, and the extended presence of project personnel at a time when visitor use is typically low could displace individual bears from the project area. **Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or motor maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase. In accordance with the conservation measures outlined in the biological assessment (BA) for administrative flights in the park, flights for the project would not occur before 1 May or after 1 October.** The potential for bear encounters would increase with the bull trout conservation component of this alternative, which

would entail more human activity off the water as crews translocate juvenile bull trout from Logging Lake to Grace Lake.

p. 79, paragraph 2, Cumulative Impacts of Alternative C under Grizzly Bears: Alternative C combined with ... would increase the overall potential for disturbance or displacement of individual bears. This increase would be intermittent (only occurring during spring and fall **during gill netting, and for an estimated few days per year during translocation**) and of low intensity.

p. 79, paragraph 3, Conclusion, Impacts of Alternative C under Grizzly Bears: Alternative C would have the potential to displace individual grizzly bears**, especially** from the vicinity of Logging Lake **during motorized netting operations** in the spring and fall, and could increase the potential for bear-human encounters and conflict.

p. 80, paragraph 2, Impacts of Alternative D (Preferred) under Grizzly Bears: The proposed activities would be intermittent (**with motorized gill netting** occurring only during spring and fall **and bull trout translocation potentially occurring any time the lakes are ice free, for a few days per year**) and of low intensity. Because ~~they~~ **project activities** would occur primarily on the open waters of Quartz and Logging Lakes, they would have little effect on grizzly bears. Motorboat noise, round trip helicopter flights ~~(up to four per year, approximately, anticipated to Logging Lake for the first few years, with fewer anticipated during the later stages of the project; possibly one flight anticipated each year or every few years to Quartz Lake)~~, and the extended presence of project personnel**, especially** at a times when visitor use is typically low**,** could displace some individual bears from the project areas. **Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or motor maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase. One flight to Quartz Lake would be anticipated each year or every few years for boat delivery and/or maintenance. In accordance with the conservation measures outlined in the biological assessment (BA) for administrative flights in the park, flights for the project would not occur before 1 May or after 1 October.** The potential for bear encounters would increase with bull trout conservation efforts at Logging Lake, because there would be more human activity off the water as crews translocate juvenile bull trout from Logging Lake to Grace Lake.

... p. 80, paragraph 3, Cumulative Impacts of Alternative D: Alternative D combined with ... would increase the overall potential for disturbance or displacement of individual bears. This increase would be intermittent (only occurring during spring and fall **during motorized gill netting, and for an estimated few days per year during bull trout translocation**) and of low intensity.

... p. 80, paragraph 4, Conclusion: Alternative D would have the potential to displace individual grizzly bears**, especially** from the vicinities of Quartz and Logging Lakes **during motorized gill netting activity** in the spring and fall, and could increase the potential for bear-human encounters and conflict.

p. 83, paragraph 5, Impacts of Alternative B under Recommended Wilderness: Impacts would be long term, since the project would be underway for more than one year (likely ~~seven~~ **six** to ~~ten~~ **eight** years).

*p. 84, paragraph 2, Conclusion, Impacts of Alternative B under Recommended Wilderness*: The continued use and presence of a motor boat on the lake for the next ~~seven~~ **six** to ~~ten~~ **eight** years, motorized noise disturbances during netting, and possible roundtrip helicopter flights would have impacts to wilderness qualities (untrammeled, undeveloped, and opportunities for solitude) that are adverse, site-specific and local, short and long-term, and minor to moderate.

*p. 84 (paragraph 4) and p. 85 (paragraph 1), Impacts of Alternative C under Recommended Wilderness*: Opportunities for solitude would be adversely affected for visitors who visit Logging Lake when netting ~~or translocation~~ operations are underway**, and for visitors to Logging and/or Grace Lakes if helicopters are used during bull trout translocation**... The project would be underway for more than one year (~~seven~~ **six** to ~~ten~~ **eight** years), and adverse impacts would therefore be long-term. Compared with Alternative B, the higher number of helicopter flights **that may be** required for this alternative ~~(up to four per year, approximately, anticipated for the first few years, with fewer anticipated during the later stages of the project)~~ would cause a higher level of disturbance to recommended wilderness. **Helicopter flights may or may not be necessary during bull trout translocation; if flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase.** Noise along the flight paths would be transitory and adverse impacts would be temporary, but interferences with the wilderness character of the Logging drainage would **possibly** be more frequent.

*p. 85, paragraph 3, Conclusion, Impacts of Alternative C under Recommended Wilderness*: The presence and use of a motor boat on Logging Lake for the next ~~seven~~ **six** to ~~ten~~ **eight** years, motorized noise during netting, bull trout translocation activity, and roundtrip helicopter flights would have impacts to wilderness qualities (untrammeled, undeveloped, and opportunities for solitude) that are adverse, site-specific and local, short and long-term, and minor to moderate.

*p. 86, paragraph 2, Impacts of Alternative D (Preferred) under Recommended Wilderness*: Motorized boat use and a portable generator at both Quartz and Logging Lakes would extend intermittent disturbances to the untrammeled quality of recommended wilderness to two backcountry locations. Activities necessary to translocate bull trout in the Logging drainage would contribute to these impacts **if helicopters are used during bull trout translocation, possibly extending them to Grace Lake**. Impacts would be long-term, as the projects would be underway for more than one year (~~seven~~ **six** to ~~ten~~ **eight** years) ~~at both lakes~~. During the spring and fall, when netting operations are underway, backcountry visitors would experience diminished opportunities for solitude ~~in two locales~~, and motorboat use would adversely impact the scenic viewshed and undeveloped character at ~~two backcountry~~ **Quartz and Logging L**lakes. Compared with Alternatives B and C, this alternative would require the most helicopter flights. ~~(up to four per year, approximately, anticipated to Logging Lake for the first few years, with fewer anticipated during the later stages of the project; possibly one flight anticipated each year or every few years to Quartz Lake).~~ **Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase. Additionally, one flight to Quartz Lake would be anticipated each year or every few years for boat delivery and/or maintenance.** Helicopter noise would be transitory along the flight paths, but the higher **possible** number of flights would have more negative impacts to the North Fork District's wilderness character, and over a greater area.

*p. 87, insert at beginning of 2nd paragraph, Conclusion, Impacts of Alternative D (preferred) under Recommended Wilderness*: **Adverse impacts to recommended wilderness would not change the fundamental character and values that qualify the project areas for inclusion in the park's wilderness recommendation.**

*p. 88, paragraph 6, Impacts of Alternative B under Natural Soundscapes*: Motorboat and generator noise would occur intermittently, day or night, during two separate two-month long periods (May-June and September-October) each year for ~~seven~~ **six** to ~~ten~~ **eight** years.

*p. 90, paragraph 1, Impacts of Alternative C under Natural Soundscapes*: As with Alternative B, Alternative C would produce temporary, discontinuous noise disturbances due to the use of a motorboat, a portable generator, and ~~up to four~~ helicopter flights**. Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase.** ~~per year (approximately) anticipated in the first few years, with fewer flights anticipated during the project's later stages.~~ ... Motorboat and generator noise would occur intermittently, day or night, during two separate two-month long periods (May-June and September-October) each year for ~~seven~~ **six** to ~~ten~~ **eight** years. ... Noise from helicopter flights would affect a greater area **(possibly including Grace Lake, if helicopters are used during bull trout translocation)** and, compared with Alternative B, the higher **possible** number of helicopter flights would result in more noise disturbances.

... *p. 90, paragraph 2*: ~~The work~~ **Motorized gill netting operations** would occur at a time of year when human activity in the backcountry is usually low (or non-existent), and the presence of field crews would likely create additional, periodic, low level noise. ... Noise effects would be temporary, **with effects from gill netting** ceasing altogether at the end of each two-month work session and following project implementation. N**oise from helicopter flights would occur only for the duration of the flight.**

*p. 90 (paragraph 4) and p. 91 (paragraph 1), Conclusion, Impacts of Alternative C under Natural Soundscapes:* Helicopter noise would **possibly** increase under this alternative, but would be transitory and temporary.

*p. 91, paragraph 2, Impacts of Alternative D (Preferred) under Natural Soundscapes*: Impacts to natural soundscapes under Alternative D would generally be as described for Alternatives B and C, but would occur at ~~two locations~~ **Quartz Lake and in the Logging drainage**. ... The **possibly** greater number of helicopter flights under this alternative ~~(up to four per year, approximately, anticipated to Logging Lake for the first few years, with fewer anticipated during the later stages of the project; possibly one flight anticipated each year or every few years to Quartz Lake)~~ would increase the level of impacts on soundscapes. Helicopter noise would be transitory along the flight paths, but adverse effects would occur over a greater area. **Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase. One flight to Quartz Lake would be anticipated each year or every few years for boat delivery and/or maintenance.**... Motorboat and generator noise would occur intermittently, day or night, during two separate two-month long periods

(May-June and September-October) each year for ~~seven~~ **six** to ~~ten~~ **eight** years. ... Project noise **from motorized gill netting operations as well as helicopter flights** could temporarily displace animals, mask important sounds, and cause brief behavioral and physiological changes. ~~The~~ **Project** noise could also temporarily disrupt the natural, backcountry quietude for visitors at ~~both~~ Quartz, ~~and~~ Logging, **and possibly Grace** Lakes.

~~Work~~ **Motorized gill netting operations** would occur at a time of year when human activity at Quartz and Logging Lake is usually low (or non-existent), and the presence of field crews would likely create additional, periodic, low level noise. ... Noise effects **from motorized gill netting** would be temporary, ceasing altogether at both **Quartz and Logging L**~~l~~akes at the end of each two-month work session and following project implementation. N**oise from helicopter flights would occur only for the duration of the flight.** While adverse impacts to natural soundscapes would affect two, **possibly three** backcountry lakes under this alternative, they would not exceed a moderate level due to the intermittent, discontinuous audibility of the noise and because noise production would not occur over periods that are longer than two months at a given time. The impacts would also be primarily localized to Quartz and Logging Lakes, **with some possible helicopter activity at Grace Lake during bull trout translocation**.

*p. 92, paragraph 2, Conclusion, Impacts of Alternative D (Preferred) under Natural Soundscapes*: Noise from motorboats, portable generators, and helicopter flights would cause discontinuous, temporary intrusions to natural soundscapes at ~~both~~ Quartz, ~~and~~ Logging, **and possibly Grace** Lakes. ...Helicopter noise would **possibly** increase under this alternative, but it would be temporary and transitory along the flight paths.

*p. 95, paragraph 3, Impacts of Alternative C under Visitor Use and Experience*: A motorized boat and generator, helicopter flights, and the presence of a field crew for an extended period of time would temporarily disturb visitors seeking solitude and the quiet character of the backcountry at Logging Lake**, and possibly at Grace Lake if helicopters are used during bull trout translocation**. ~~Work~~ **Motorized gill netting operations** would be underway in May-June and September October. ... ~~The project~~ **Motorized gill netting operations** would not be underway at Logging Lake during July and August, when backcountry visitation is likely to be highest. **Bull trout translocation, however, could occur at this time. Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase.**

*p. 96, paragraph 2, Conclusion, Impacts of Alternative C under Visitor Use and Experience:* Adverse impacts to visitor use and experience would be most likely in June and September **(the portion of the gill netting period when visitors are most likely to be at Logging Lake)**; there would be no adverse impacts during July and August, when visitation to Logging Lake is likely to be high, **except for possible temporary noise disturbances if helicopter flights become necessary during bull trout translocation**.

*p. 96, paragraph 3, Impacts of Alternative D (Preferred) under Visitor Use and Experience:* Disturbances would also occur over a greater area, however, including those from motorboats and generators, helicopter flights, and the extended presence of field crews. Such activity would be temporarily disruptive for visitors seeking solitude and a primitive backcountry experience at ~~both~~ Logging and Quartz Lakes, **and possibly at Grace Lake if helicopters are used during bull trout translocation**. ~~The project~~ **Motorized gill netting operations** would be underway at

~~both~~ **Logging and Quartz L**lakes during May-June and September-October. During these time periods, impacts to visitor use and experience would likely be most evident in June and September, and less apparent in May and October, when fewer people are likely to visit the park's backcountry. ~~Work~~ **Motorized gill netting operations** would not be underway during July and August, when visitation to Quartz and Logging Lakes is likely to be highest. **Bull trout translocation at Logging and Grace Lakes could occur at this time, however. Helicopter flights may or may not be necessary during bull trout translocation. If flights are necessary during translocation, there could be up to four flights per year, approximately, including those for boat delivery and/or maintenance to Logging Lake and possibly for bull trout transport to Logging and/or Grace Lake, with fewer flights anticipated during the later stages of the translocation phase. One flight to Quartz Lake would be anticipated each year or every few years for boat delivery and/or maintenance.**

*p. 97, paragraph 2, Conclusion, Impacts of Alternative D (preferred) under Visitor Use and Experience*: Disturbances from motorboats, generators, helicopter flights and the presence of field crews would have temporary, adverse impacts on visitors seeking solitude and a primitive wilderness experience; two**, possibly three** backcountry ~~areas~~ **lakes (Logging, Quartz, and possibly Grace Lake)** would be impacted under this alternative. Adverse effects to visitor use and experience would likely be most apparent **during motorized gill netting** in June and September. There would be no adverse impacts during July and August, when people are most likely to visit backcountry areas such as Quartz**,** ~~and~~ Logging**, and Grace** Lakes**, except for possible temporary noise disturbances if helicopter flights are necessary during bull trout translocation**.

*Appendix A, p. 21, paragraph 1, MRDG Alternative 2*: Helicopters would be used for boat delivery and maintenance, and possibly for bull trout translocation to reduce the risk of losing the eggs or harming the young fish. **Helicopter flights would not be used to transport bull trout juveniles/eggs except as a last resort necessary for the success of the translocation**.

## RESPONSES TO COMMENTS

1. **Comment:** "The continuation of intensive efforts to reduce the lake trout populations in Quartz, and the expansion of these efforts at Logging, come with significant and negative long-term impacts on wilderness values."

   ***Response:*** *While we disagree that impacts to recommended wilderness will be significant, the EA acknowledges the negative long-term impacts to wilderness values on pp. 35 and 83-87.*

2. **Comment:** "Once established in these lakes, as is now the case, lake trout can not [*sic*] be eliminated. They can be reduced in numbers, but a significant reduction will be permanent only with continuing heavy-handed (motorized) projects."

   ***Response:*** *We agree that completely eliminating lake trout from lakes where they have become established may not be possible. But even if lake trout cannot be totally eliminated, data suggest that suppression techniques such as those described for the preferred alternative can depress their numbers sufficiently to enable native fish populations, including bull trout, to persist and play a functional role in the aquatic ecosystem for the long term. Bull trout numbers in Quartz Lake are now fairly healthy, while lake trout angler catch rates continue to decline (Downs et al. 2014). Lake trout*

*suppression in Lake Pend Oreille appears successful (Fredericks et al. 2014). Yellowstone cutthroat trout are also showing positive population growth signs in Yellowstone Lake as a result of increased lake trout suppression efforts (Syslo and Guy 2014). Effective lake trout suppression depends on the use of motorboats, and the early stages of suppression do tend to be intensive and require more time on the lake, especially in lakes where lake trout have been present for some time. However, once lake trout numbers are reduced, the level of suppression activity required to keep them in check is expected to decrease. Also, lake trout suppression technology continues to evolve and it is very likely that new technologies (e.g. finer meshed gill nets that catch juvenile lake trout more effectively, destroying lake trout eggs via electrofishing the spawning beds, spearfishing, and others) may eventually further reduce the necessary frequency and duration of suppression activity, including motorboat use. Nets with finer mesh have recently been in use on Quartz Lake, resulting in a higher juvenile catch rate, which has contributed to a somewhat decreased level of gill netting. Nevertheless, the park recognizes that, inevitably and unfortunately, successful lake trout suppression will likely be a long-term endeavor. The park has recognized the need to develop a comprehensive strategy to conserve native fisheries, and will therefore be preparing a fisheries management plan and environmental impact statement (EIS), anticipated within the next several years. See also Text Changes, p. 42 of the EA.*

3. **Comment:** "To suggest that human activity even approaches 'non-existent' in spring or fall is absurd."

   ***Response:*** *This comment is out of context; human activity is characterized as "low (or non-existent)" in the Natural Soundscapes analysis to show that the area is typically very quiet due to low levels of human activity (during the early spring and late fall, these backcountry areas may indeed go without visitation for days at a time), and that the project would add new noise that is not typically present.*

4. **Comment:** "To imply that wilderness values exist, but only humans can be affected by negative impacts is an NPS revision of wilderness principles."

   ***Response:*** *The EA evaluates impacts to several defining attributes of wilderness character as described by the Wilderness Act [Section 2(c)], including "untrammeled"; "undeveloped…"; "protected and managed so as to preserve its natural conditions"; "… outstanding opportunities for solitude or a primitive an unconfined type of recreation"; and "may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value". These attributes speak not only to the human experience of wilderness, but also to the inherent state of the wilderness resource.*

5. **Comment:** "The contention that anthropogenic noise is significant only if it is continuous is another NPS revision of wilderness values and is designed to 'water down' the significance of human noise."

   ***Response:*** *The EA does not state that noise is significant only if it is continuous. Impacts to natural soundscapes are described on pp. 91-92 of the EA. The statement in the analysis that noise would be discontinuous is an accurate characterization; i.e. noise will not be continuous.*

6. **Comment:** "The objective of benefitting 'anglers' is the resurrection of a long-abandoned NPS policy."

***Response:*** *Benefitting anglers is not stated as a project objective in the EA. Rather, the EA explains and acknowledges the benefit to anglers as a result of the project.*

7. **Comment:** "Quartz and Logging will never again be 'ecologically intact."

   ***Response:*** *We acknowledge that the aquatic systems at Quartz and Logging Lakes are and will likely always be at some risk due not only to non-native invasive species, but also because of large-scale threats such as climate change and air pollution. Glacier National Park is nevertheless renowned for the fundamental integrity of its ecological systems. The quality and integrity of the park's ecological systems is one of the reasons why the park has been designated as a World Heritage Site. Based on data from lake trout suppression at Quartz Lake since 2009 as well as data from similar lake trout suppression efforts elsewhere in the region, the NPS has determined that this project could do much to restore and preserve the functional role of native fish populations and therefore the overall ecological integrity of the Quartz and Logging Lakes aquatic systems. The NPS mission and NPS policies require the protection of park resources.*

8. **Comment:** "Helicopter flights will impact far more than the two lake areas and species other than just humans."

   ***Response:*** *The EA acknowledged and discussed this on pp. pp. 32-36, 68-75, 78-81, 83-87, and 88-92.*

9. **Comment:** The EA attempts to downplay negative impacts and rate them as minor, low, moderate short-term, etc... The EA skews conclusions to favor and support intensive fishery management. These projects create far too much noise, water pollution, and air pollution. Disturbances created by logistical support (especially helicopter flights and helipad creation), and work crews (at the patrol cabins and on the lakes) destroy wilderness values. The EA analyses of negative impacts lack recognition of obvious tradeoffs. On balance, the Quart/Logging projects violate NPS objectives to a greater degree than they further them. As currently planned, these projects are a mistake. A full EIS should be prepared to more accurately evaluate the tradeoffs in the Alternatives."

   ***Response:*** *We disagree that the EA downplays negative impacts. The conclusions in the EA were reached through rigorous, thorough analyses in accordance with NEPA and NPS policy, with careful consideration of impacts to park resources. Analyses included consultation with subject matter experts within the NPS and other federal as well as state agencies. The project will result in adverse impacts to certain attributes of recommended wilderness for the duration of the project, as fully acknowledged in the analysis of impacts to recommended wilderness (pp. 83-87). As defined on pp. 44 and 82, moderate impacts to recommended wilderness will be "... readily apparent and/or would appreciably affect the defining attributes of wilderness..." But we disagree that intermittent motorized disturbances at two of the park's backcountry lakes will "destroy" wilderness values.*

   *The preferred alternative does not include the construction of a helipad. Please see the text changes to the EA on pp. 18 and 21 clarifying that equipment and materials transported to the project areas via helicopter will be delivered as long line sling loads.*

   *We disagree that the EA lacks recognition of trade-offs. The EA was unquestionably a process of evaluating the trade-offs of impacting certain resources and wilderness values for the benefit of other resources and wilderness values. The park is well aware that selection of the preferred alternative will negatively affect important wilderness values (such as untrammeled, undeveloped, and opportunities for solitude) at Quartz*

*and Logging Lakes (and possibly Grace Lake as well). The negative impacts to recommended wilderness and other resources will not, however, be unacceptable or result in the near total loss of that value or resource. They are the inevitable consequence of preserving the lakes' native aquatic ecosystems from the severely detrimental, unacceptable effects of non-native invasive lake trout (including the almost certain, eventual functional extinction of two bull trout populations, which will substantially hinder bull trout conservation on a regional scale, and severely compromised native fish species, including westslope cutthroat trout). Given the importance of intact aquatic systems to the health of native fish populations, the long-term integrity of terrestrial food webs, and the long-term preservation of recommended wilderness, failure to implement promising techniques to conserve native fish populations would be a greater violation of NPS policies. Additionally, Section 7(a)(1) of the Endangered Species Act states that all federal agencies shall utilize their authorities in furtherance of the purposes of the Endangered Species Act by carrying out programs for the conservation of threatened and endangered species. The NPS therefore has an affirmative duty to develop and implement programs for the conservation of listed species, including bull trout. The importance of protecting aquatic ecosystems in the park becomes even more urgent when considering the consequences of climate change. The park's high elevation watersheds will provide important refugia for bull trout and other native fish faced with the stressors of climate change. Ensuring the availability of habitat that is free of lake trout will be essential in maintaining this safeguard.*

*The impacts from this project were determined not to be major and/or significant and therefore an EIS is not required. The park plans to prepare a comprehensive fisheries management plan and EIS in the very near future to evaluate long-term fish management of these and other waters throughout the park (please see also the response to Comment 2).*

10. **Comment:** "From the Impact Topics Dismissed from Further Analysis, I agree the Canada lynx would not likely be impacted by the project and should be dismissed from further analysis (p8), but the project will occur during the lynx denning period, contrary to assertions in the EA."

    ***Response:*** *Thank you for the correction; please see Text Changes for a correction to the text on p. 8 of the EA.*

11. **Comment:** "I'm surprised the LeConte's Sparrow is listed as occurring in the Logging Lake area; I think there are records from Sullivan Meadow in the Logging subdrainage but not near the lake."

    ***Response:*** *The Le Conte's sparrow was included in a species occurrence data report from the Montana Natural Heritage Program. The observation location is "buffered by a minimum distance of 100 meters in order to encompass the estimated breeding territory size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance up to 10,000 meters". Park records contain a record of the species at Lone Pine Prairie, which is approximately 5.5 miles from Logging Lake.*

12. **Comment:** "I believe there are more trapping records of northern bog lemmings on the west side of the park than from Wright 1950... I agree that bog lemmings will not likely be impacted by the project, but they may be more widespread than indicated."

***Response:*** *Thank you for pointing this out. A text change has been made to p. 10 of the EA, under state-listed species of concern dismissed from further analysis, to include bog lemming trapping records.*

13. **Comment:** "In the Affected Environment section, treatment of the Bald Eagle (p 64) could have considered the full documented history of nesting activity at Quartz and Logging, instead of only the more recent period since 2005-6. That would have provided a broader perspective on the conditions at those lakes."

    ***Response:*** *We believe the time period in the EA is sufficient to evaluate how bald eagles are using the lakes. Nesting activity at park lakes changes over time, with some territories being vacated while others are newly established. Recent nesting data is therefore likely to be more informative about how bald eagles are currently using the lakes.*

14. **Comment:** "I didn't notice any mention of the noise or visual impacts at Grace Lake, from helicopter transport of bull trout."

    ***Response:*** *General references in the EA to the "Logging drainage", "wilderness character", and "recommended wilderness" were intended to include Grace Lake. Text changes have been made to pp. 14, 21, 23, 72, 73, 79, 80, 84-85, 86, 90, 91, 92, 95, 96, and 97 to include Grace Lake more specifically (please see Text Changes).*

15. **Comment:** "Nor is there any mention of the intrinsic value of wildlife, their value regardless of whether people see animals or catch fish."

    ***Response:*** *This assertion is incorrect. The value of seeing animals and catching fish was included in the EA under Visitor Use and Experience and Recommended Wilderness. But the analyses of impacts to wildlife, threatened and endangered species, species of concern, and special status species evaluated the effects to wildlife and their habitat without factoring in wildlife viewing and angling.*

16. **Comment:** "The treatment of wildlife was superficial in that only a few 'species of concern' were analyzed. How will other wildlife respond to these actions. Will they gradually alter their behavior in response, with cougars, bears, elk, moose and other species making less use of lakeshore areas? How will river otters and beaver respond? I know how they respond to a canoe appearing on Logging Lake on rare occasions. Will their behavior change when a motor boat is on the lake for weeks at a time?"

    ***Response:*** *The affected environment for Wildlife, Bald Eagles, and Common Loons (p. 63) includes wildlife in general and lists several species that are not listed as species of concern. Impacts to wildlife in general (i.e. non-species of concern) are included in the discussion on pp. 67-75.*

17. **Comment:** "It's not clear that lake trout suppression at Quartz Lake has resulted in an increase in bull trout. The outcome of planned suppression efforts and other conservation efforts at Logging and Grace Lake is also uncertain. The restoration of native species is consistent with the NPS mission, but if the decline and extirpation of the bull trout in these drainages is inevitable, due to climate change and compounding affects, will the project be worth the impacts to other NPS values? Elimination of the lake trout is likely impossible. If the plan ultimately achieves some level of equilibrium, with both lake trout and bull trout persisting, it will probably require a continuous effort and permanent presence of the motor boat and netting crews on the lakes. Will even this

'successful' outcome be worth the tradeoff in loss of wildlife security and wilderness character?"

***Response:*** *While the future effects of climate change are difficult to predict, the decline and functional extinction of bull trout is not necessarily an inevitable consequence, especially if bull trout and other native fish continue to have access to habitat refugia that are secure from non-native invasive species.*

*Quartz Lake currently hosts the most viable bull trout population remaining among the larger lakes in the park, and appears to be a relatively healthy aquatic system (see EA pp. 4 and 52. At Quartz Lake, the objective is to maintain the lake as a stronghold for bull trout (additional text stating this has been added to p. 4 of the EA; see Text Changes). Therefore, success at Quartz Lake is not necessarily measured as an increase in bull trout numbers, but rather as a reduction in the lake trout population and the stability of the bull trout population. We believe that the park began suppression efforts at Quartz Lake before lake trout became well enough established to cause a decline in the lake's bull trout population. Redd counts indicate that the bull trout population at Quartz Lake remains healthy. This in addition to evidence that a high proportion of lake trout are being removed suggests that suppression techniques on Quartz Lake are meeting the desired objective, which is to keep lake trout at a sufficiently low abundance so they don't adversely impact bull trout and other native fish.*

*Lake trout are well established at Logging Lake, and the Logging Lake bull trout population is therefore far more compromised. Lake trout suppression and bull trout conservation actions in the preferred alternative are experimental in nature, and therefore the outcome is indeed uncertain. Because suppression at Quartz Lake is successfully removing lake trout and because hatchery-reared bull trout can be used to reestablish a population in lakes with suitable habitat, and since Logging Lake once supported one of the most robust bull trout populations in the park, there is reason to believe the effort will be successful over time.*

*Regarding elimination of lake trout and a "continuous" suppression effort, please see the response to Comment 2.*

*We believe the trade-off is worthwhile in order to protect bull trout and other native fish; see also the response to Comment 9.*

**18. Comment:** "Is this plan consistent with wilderness goals and objectives in NPS Management Policies and GNPs wilderness management plan?"

***Response:*** *The plan is consistent with the 2006 NPS Management Policies. Section 6 of the NPS Policies provides guidance on wilderness management and states: "Management should seek to sustain the natural distribution, numbers, population composition, and interaction of indigenous species. Management intervention should only be undertaken to the extent necessary to correct past mistakes, the impacts of human use, and influences originating outside of wilderness boundaries.*

*Management actions, including the restoration of extirpated native species, the alteration of natural fire regimes, the control of invasive alien species, the management of endangered species, and the protection of air and water quality, should be attempted only when the knowledge and tools exist to accomplish clearly articulated goals" (Section 6.3.7).*

*The park's recommended wilderness management plan does not address (nor prohibit) the restoration of native species; the plan requires a Minimum Requirements Analysis for*

*motorized equipment and mechanized transport within recommended wilderness (in accordance with the Wilderness Act, Director's Order 41, and NPS Management Policies), which was attached to the EA as Appendix A.*

19. **Comment:** "If this plan is implemented, no one will ever have the experiences [at Quartz and Logging Lakes] that I have enjoyed. Something will have been lost, probably forever. How do you measure that loss? Does it have any value to NPS or GNP administrators?"

    ***Response:*** *We recognize that some visitor experiences at Quartz and Logging Lakes will be diminished when project activities are underway, and that this may constitute a loss for some backcountry visitors. We recognize the value of the loss but have determined that a greater, unacceptable loss would occur through the demise of two bull trout populations. Please see also the response to Comment 9.*

20. **Comment:** "... the impacts to the wilderness character have not been fully considered. These concerns deserve a more thoughtful evaluation."

    ***Response:*** *We disagree. Please see responses to Comments 4 and 9.*

21. **Comment:** "The wilderness analysis is deeply flawed. It assumes that an action benefiting a native species even when the action involves the use of motorized equipment and overt trammeling of an admittedly altered lake system is on its face more important than preserving the area's wildness. While lake trout are unnatural in this area, their existence in the lake systems is not an overt trammeling of the wilderness as the proposed lake trout removal would be. Their introduction (more on this issue later) was apparently an inadvertent consequence of lake trout planting in Flathead Lake several decades ago. It takes a deliberately conscious act to confine, tether or trammel something. In sum, the project violates the basic premise of wilderness as a self-willed landscape."

    ***Response:*** *We disagree. Wilderness is not exclusively characterized by the Wilderness Act as a "self-willed landscape". The defining attributes of wilderness as described in Section 2(c) of the Wilderness Act include not only "untrammeled", but also "protected and managed so as to preserve its natural conditions and which... may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value." The NPS recognizes that the project will adversely affect the untrammeled quality of recommended wilderness. These impacts will, however, not be unacceptable. The NPS has determined that the risk to the park's native aquatic systems and the ecological condition of recommended wilderness from non-native invasive lake trout is unacceptable, and that the adverse effects to recommended wilderness from non-native invasive lake trout would be greater in degree and intensity than those that will occur from the project.*

22. **Comment:** "The Wilderness Act does not allow this of [*sic*] activity, regardless of how well intended it may be."

    ***Response:*** *We disagree. The Wilderness Act prohibits certain uses "except as necessary to meet minimum requirements for the administration of the area for the purposes of this Act" [Section 4(c).] In accordance with the minimum requirements concept, Director's Order 41, and Section 6.3.5 of the NPS Management Policies, the NPS completed a Minimum Requirement Analysis, which was attached to the EA as Appendix A. Section 6.3.4.3 of the NPS Management Policies also guided our analysis*

*and decision process. Through the Minimum Requirement Analysis, the park determined that the project is necessary to preserve the natural quality of wilderness character and unique ecological, scientific, and educational values. Additionally, the analysis determined that the project is necessary to meet requirements of other federal laws, specifically the Endangered Species Act and the NPS Organic Act. Furthermore, the Wilderness Act does not "modify the statutory authority under which units of the national park system are created", nor "lower the standards evolved for the use and preservation" of a park [Section 4(a)(3)]. The NPS has the statutory authority and responsibility to conserve species listed under the Endangered Species Act [Section 7(a)(1)], Executive Order 13112 (Invasive Species) requires federal agencies to control invasive species populations and "provide for restoration of native species and habitat conditions", and the NPS Organic Act and Glacier National Park's enabling legislation require the preservation of native species in an unimpaired condition for future generations.*

23. **Comment:** "The agencies do not have the authority to purposely trammel wilderness by this kind of activity, in perpetuity. The EA admits this would be a required action for the long-term."

    ***Response:*** *The EA does not state that the project will continue in "perpetuity"; the preferred alternative (p. 23) states that the project would continue for seven to ten years. However, the park recognizes that, unfortunately, successful lake trout suppression would likely be a long-term endeavor. The EA therefore further states that any future lake trout suppression and bull trout conservation deemed necessary beyond the seven to ten year time would require additional environmental analysis and review. For this reason and to address the need for a comprehensive strategy to conserve native fisheries, the park will be preparing a fisheries management plan and EIS, anticipated within the next several years. Because the EIS is anticipated before the conclusion of the seven to ten year time frame originally proposed in this EA, we have reduced the time frame for the preferred alternative to six to eight years. Please see Text Changes, pp. 17, 22, 23, 26, 83, 84, 85, 86, 88, 90, and 91.*

    *The NPS has the authority to undertake the project. Section 4(a) of the Wilderness Act states the following: "The purposes of this Act are hereby declared to be within and supplemental to the purposes for which national forests and units of the national park and wildlife refuge systems are established and administered". In specific reference to wilderness within the national park system, Section 4 (a) (3) of the Act holds that a wilderness designation of lands within a national park "shall in no manner lower the standards evolved for the use and preservation of such park". (See also response to Comment 22).*

    *The park has a statutory obligation to restore and protect threatened bull trout populations under the Endangered Species Act [Section 7(a)(1)], and the NPS Organic Act of 1916, which directs the agency to "conserve the scenery and the natural and historic objects and the wild life therein" and to "leave them unimpaired" for future generations. Additionally, Executive Order 13112 (Invasive Species) orders federal agencies to control invasive species populations and "provide for restoration of native species and habitat conditions". Through its enabling legislation, Glacier National Park was established in part to "provide for the preservation of the park in a state of nature so far as is consistent with the purposes of this act, and for the care and protection of the fish and game within the boundaries thereof". The laws give the NPS the management discretion to allow impacts to park resources and values when necessary and*

*appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values.*

*NPS Management Policies guide and regulate how the NPS carries out its authority and obligations under the laws. Section 4.1 of the Policies states that: "Biological or physical processes altered in the past by human activities may need to be actively managed to restore them to a natural condition or to maintain the closest approximation of the natural condition when a truly natural system is no longer attainable."*

*Section 4.1.5 states: "The Service will use the best available technology, within available resources, to restore the biological and physical components of these [natural] systems, accelerating both their recovery and the recovery of landscape and biological community structure and function. Efforts may include, for example*

- *removal of exotic species..."*

*Section 4.4.1.1 states: "To meet its commitments for maintaining native species in parks, the Service will cooperate with states, tribal governments, the U. S. Fish and Wildlife Service, NOAA Fisheries, and other countries, as appropriate, to*

- *... prevent the introduction of exotic species into units of the national park system, and remove, when possible, or otherwise contain individuals or populations of these species that have already become established in parks."*

*Section 4.4.2 states: "The Service may intervene to manage populations or individuals of native species only when such intervention will not cause unacceptable impacts to the populations of the species or to other components and processes of the ecosystems that support them... Management is necessary because a population occurs in an unnaturally high or low concentration as a result of human influences ... to protect rare, threatened, or endangered species; ..."*

*Section 4.4.2.2 states: "The Service will strive to restore extirpated native plant and animal species to parks whenever all of the following criteria are met:*

- *Adequate habitat to support the species either exists or can reasonably be restored in the park and if necessary also on adjacent public lands and waters; once a natural population level is achieved, the population can be self-perpetuating...*
- *...The species disappeared or was substantially diminished as a direct or indirect result of human-induced change to the species population or to the ecosystem.*
- *Potential impacts upon park management and use have been carefully considered."*

*In particular, Section 4.4.2.3 of the Policies states: "The Service will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. The Service will fully meet its obligations under the NPS Organic Act and the Endangered Species Act to both proactively conserve listed species and prevent detrimental effects on these species. To meet these obligations, the Service will*

- *... undertake active management programs to inventory, monitor, restore, and maintain listed species' habitats; control detrimental nonnative species; manage detrimental visitor access; and reestablish extirpated populations as necessary to maintain the species and the habitats upon which they depend; ..."*

*Section 4.4.4 states: "Exotic species will not be allowed to displace native species if displacement can be prevented," and Section 4.4.4.2 states: "All exotic plant and animal*

*species that are not maintained to meet an identified park purpose will be managed—up to and including eradication—if (1) control is prudent and feasible, and (2) the exotic species*

- *interferes with natural processes and the perpetuation of natural features, native species or natural habitats, or*
- *disrupts the genetic integrity of native species,...*

*High priority will be given to managing exotic species that have, or potentially could have, a substantial impact on park resources, and that can reasonably be expected to be successfully controlled. ..."*

*Additionally, Section 6 of the NPS Policies provides guidance on wilderness management and states: "Management should seek to sustain the natural distribution, numbers, population composition, and interaction of indigenous species. Management intervention should only be undertaken to the extent necessary to correct past mistakes, the impacts of human use, and influences originating outside of wilderness boundaries.*

*Management actions, including the restoration of extirpated native species, the alteration of natural fire regimes, the control of invasive alien species, the management of endangered species, and the protection of air and water quality, should be attempted only when the knowledge and tools exist to accomplish clearly articulated goals" (Section 6.3.7).*

**24. Comment:** "The argument that this will benefit wilderness is flawed. The EA suggests that overt trammeling will be minimal because the motorized use would only take place up to sixteen weeks every year for the next seven to ten years. It then suggests that this activity will likely be necessary on into the future. In other words, this project is basically a commitment to engage in the use of motorized equipment and overt trammeling of an ecosystem in perpetuity... The question [that] needs to be addressed is where in the Wilderness Act is this kind of perpetual trammeling valued above the untrammeled nature or process of wilderness?"

***Response:*** *The EA acknowledges both beneficial and negative impacts to recommended wilderness. The benefits to the natural conditions and the unique ecological, scientific, and educational value of recommended wilderness will outweigh the negative impacts to other wilderness defining attributes, including the untrammeled quality. See also response to Comment 21.*

*See response to Comment 23 regarding future activity and the project time frame, which has been changed from seven-ten years to six-eight years.*

**25. Comment:** "This project is not minor. Any motorized intrusion in wilderness seriously damages the wilderness. In this case it is constant motorized intrusion of motorboats on lakes for 16 weeks. It would also entail the use of helicopters to transport the boats to and from two lakes. It is very heavy-handed and completely at odds with wilderness."

***Response:*** *The EA does not state that the project or impacts to recommended wilderness will be "minor". The EA states that impacts to recommended wilderness from the preferred alternative will be moderate (pp. 35 and 86-87). Impacts to wilderness were analyzed on pp. 83 to 87, including noise from helicopters and the use of one motorboat on each lake (see also response to Comment 9). The time frame of the project has been reduced (see response to Comment 23).*

26. **Comment:** "One example of how misguided the EA analysis is regards angling. It suggests bull trout are needed to provide wilderness angling opportunities. Angling is not a wilderness dependent activity. It is allowed in wilderness, often including wildernesses that are also within the national park system, but it is not wilderness dependent."

    ***Response:*** *We agree that angling is not wilderness dependent. Angling is not among the project objectives listed in the EA (see Purpose and Need, p. 5). The EA acknowledges the benefit to anglers as a result of the project (see also the response to Comment 6.*

27. **Comment:** "The EA further notes, 'Lake trout suppression and the preservation of native fisheries at Quartz and Logging Lakes would benefit anglers as well as non-angling visitors seeking opportunities to visit and/or view wildlife in two ecologically intact backcountry areas.' However, the EA itself, by suggesting that this heavy-handed program will likely be needed in perpetuity, is clearly stating this area is not ecologically intact and won't likely ever be again. Besides, what evidence does the Park Service have that the nonangler would be able to tell the ecological difference between Logging and Quartz Lakes dominated by lake trout versus Logging and Quartz Lakes dominated by bull trout?"

    ***Response:*** *Regarding whether the project areas are ecologically intact, please see the response to Comment 7. A decrease in the occurrence of fish-dependent predators such as bald eagles, common loons, osprey, kingfishers, river otters, and other species at lakes dominated by lake trout would be one very obvious ecological consequence of allowing Quartz and Logging Lakes to be dominated by lake trout. Lake trout inhabit deeper water where they are less accessible to fish-dependent predators; native fish species inhabit shallower water, where they are more accessible. This is discussed in the EA on pp. 63-75. Many of Glacier National Park's visitors are very familiar with certain areas of the park, including the species composition and ecological character of those areas. The park's ecological integrity is much of what makes the visitor experience at Glacier National Park unique, extraordinary, and memorable.*

28. **Comment:** "The EA downplays the problems of both manipulating the wilderness, in perpetuity, and of using motorized equipment, including helicopters, in perpetuity. While lake trout may be undesirable in Glacier National Park, their presence is not prohibited by the Wilderness Act. The same can't be said for the use of motorized boats, motorized netting, and helicopters."

    ***Response:*** *See responses to Comments 9, 22, and 23.*

29. **Comment:** "When did they [lake trout] begin to migrate into the park? Were lake trout ever introduced into Glacier National Park? What role did the Park Service have in putting lake trout in the Park, if any?"

    ***Response:*** *The EA describes the entry of lake trout into park waters on p. 2. Anglers began reporting catching lake trout in the late 1950's; lake trout were first documented in NPS gill netting catches in McDonald and Kintla Lakes in 1969. The NPS has no records of stocking lake trout in the park.*

30. **Comment:** The EA ... "fails to consider the cumulative impacts of the program on wilderness character in perpetuity..."

    ***Response:*** *The EA does not propose the project in perpetuity. A cumulative impacts analysis was conducted for this EA (see Affected Environment and Environmental*

*Consequences); long-term cumulative impacts to recommended wilderness and other resources will also be evaluated in the upcoming fisheries management plan and environmental impact statement (see also responses to Comments 2 and 23).*

31. **Comment:** "The Park Service's approach is completely inconsistent with regards to nonnative introductions in this project. There is no similar concern that the nonnative Yellowstone cutthroat trout planted decades ago into Grace lake [*sic*] are negatively impacting the invertebrates and amphibians that previously occurred in the area (assuming the lake was fishless, the EA is unclear on this point)."

    ***Response:*** *While Yellowstone cutthroat trout are not native to the park and can hybridize with westslope cutthroat trout, they are not known to have severe adverse impacts to native fish populations. Amphibians and invertebrates at Grace Lake, including likely effects from the 1925 introduction of Yellowstone cutthroat trout, are discussed in the EA on pp. 59-60. Non-native Yellowstone cutthroat trout and native bull trout have co-existed for decades in the Trout and Arrow Lake systems (p. 59 of the EA). The NPS is undertaking lake trout suppression efforts at Quartz and Logging Lakes because lake trout are known to have severe negative effects to native fish, including bull trout (a threatened species under the Endangered Species Act), at the population level. The EA describes the serious threats lake trout pose to bull trout populations and other native fish on pp. 1-3, pp. 37-38, and pp. 46-54.*

32. **Comment:** "Furthermore, the EA proposes to place nonnative bull trout (bull trout were not found previously in Grace Lake) into Grace Lake... The EA fails to look at the impacts on the system from introducing bull trout into a system that does not have bull trout. What are those impacts? Further, do the Park Service regulations even allow this kind of action?"

    ***Response:*** *The EA addresses the impacts of translocating bull trout on pp. 58-61. The Endangered Species Act and NPS Organic Act compel the NPS to conserve threatened species, such as bull trout. Section 4.1.5 of the NPS Management Policies speaks to the restoration of natural systems and states that efforts may include the "restoration of native plants and animals". Section 4.4.2.2 includes captive breeding to "increase the number of offspring for release to the wild or to manage the population's gene pool." Please see also the response to Comment 23.*

33. **Comment:** "The EA and MRDG look at different alternatives. The MRDG fully considers a mainly non-motorized option, but the EA doesn't. Why is there this inconsistency?"

    ***Response:*** *The EA considered but dismissed a non-motorized alternative because the work would not be possible with non-motorized equipment, the level of mortality to non-target fish species (including the ESA listed bull trout) would increase, and there would be a high risk to crew safety (see p. 25 of the EA).*

34. **Comment:** "The EA suggests that putting camouflage over the boats and leaving them near other structures throughout the life of the project is somehow compatible with wilderness. Furthermore, it is puzzling that there is a boathouse on Logging Lake, yet no mention is made of using it."

    ***Response:*** *Storing the boats near the existing structures is the least intrusive option. The boats will be covered with camouflage or some other type of covering during prolonged non-use periods in order to reduce the potential for them to be a visual intrusion. The boathouse on Logging Lake is too small to house the motorboat.*

35. **Comment:** "This project in conjunction with other helicopter use in Glacier calls into question existing administration of the area and the agency's apparent lack of commitment to administering wilderness. The fact the helicopter landings (50 flights per year authorized in recommended wilderness), innumerable structures (cabins and boathouses) strongly suggest that the administration of the area is nothing akin to what is appropriate in wilderness."

    ***Response:*** *As stated in the EA (p. 42), the park closely manages the use of administrative flights and has determined that approximately 50 flights per year will not measurably affect park resources. Not all administrative flights land in recommended wilderness. The park also does not always implement 50 flights per year (i.e. 50 is the cap but not the target, and 50 flights are not always utilized). The structures referred to were present prior to the area being recommended as wilderness.*

36. **Comment:** "Given the NPS's apparent strong desire to manipulate and trammel the recommended wilderness, likely on into perpetuity, the EA should have addressed the impact on the NPS' wilderness recommendation for Glacier. Clearly this project sets the administration of the area on a path in conflict with long-term administration of the area as Wilderness. The EA should have informed the public of the long-term consequences of the proposed action."

    ***Response:*** *The project will not change the fundamental character and values that qualify the project areas for inclusion in the park's wilderness recommendation. Additionally, Section 6.2.1.2 of the 2006 NPS Management Policies state: "An area will not be excluded from a determination of wilderness eligibility solely because established or proposed management practices require the use of tools, equipment, or structures if those practices are necessary to meet minimum requirements for the administration of the area as wilderness," and "Overflights do not make an area ineligible for wilderness designation." Text stating that the project will not affect Glacier National Park's wilderness recommendation has been added to the conclusion of the impacts analysis for recommended wilderness; see Text Changes, p. 87.*

37. **Comment:** "The EA downplays impacts to wilderness character and solitude, suggesting that the motorboats would be used at times when visitor use is light to non-existent. That reasoning is seriously flawed. Solitude would be as greatly, if not more greatly affected, in areas when the use is light. Those who visit an area in the off-season do so to avoid crowds and find solitude. The idea behind prohibiting motorized use is that it, on the face of it, is incompatible with wilderness, wilderness character, and solitude. The violation of wilderness by the use of motorized equipment occurs whether there are no visitors or many visitors to the area. The analysis seems to miss this point entirely."

    ***Response:*** *We disagree. The EA acknowledges that visitors to Quartz and Logging Lakes during spring and fall will be adversely impacted (see sections on recommended wilderness, pp. 81-87; natural soundscapes, pp. 87-92; and visitor use and experience, pp. 92-97). See also responses to Comments 3 and 9.*

38. **Comment:** "In any case, the EA fails to justify the statement that May-June and September-October are times when these areas have little or no use. What data suggest September is not a popular time for Glacier backcountry visits?"

    ***Response:*** *See pp. 92-93 of the EA.*

39. **Comment:** "The EA also fails to look at a comprehensive program of bull trout recovery in Glacier National Park. Without knowing where else bull trout populations are found in Glacier National Park lakes, it is impossible to tell whether this program makes any sense at all, let alone whether it meets any test of section 4(c) of the Wilderness Act. Also, given the extensive nature and use of motorized equipment, this project would have a significant impact on the wilderness. Clearly, an EA is inadequate and an EIS is needed, preferably a comprehensive EIS that looks at the entire program."

    ***Response:*** *We disagree. See responses to Comments 2, 9, and 23. Additionally, for a discussion of the status of bull trout in the park, see the EA under Purpose and Need (pp. 1-5) and the Affected Environment section for fisheries (pp. 47-48).*

40. **Comment:** "This project has a significant negative impact on the recommended wilderness. It overtly trammels wilderness, likely into perpetuity. The actions have a greater impact on wilderness than does the unfortunate and ongoing replacement of one species of Salvalinus by another."

    ***Response:*** *We disagree. See responses to Comments 1, 9, 21, and 24. See response to Comment 23 regarding the project timeframe.*

41. **Comment:** "I have photographed common loons feeding at the very spot the dock would be placed in the lake to house the boat and its rather massive motor..."

    ***Response:*** *The preferred alternative does not include construction or placement of a dock at either Logging or Quartz Lake.*

42. **Comment:** "While the preservation of an endangered fish like bull trout is a noble and worthy endeavor, simply netting the competitive lake trout, even over the course of seven to 10 years, has no hope of long-term success. Once the netting is stopped, the lake trout are sure to come back."

    ***Response:*** *Please see responses to Comments 2 and 17.*

43. **Comment:** "The Park Service might better employ a piscicide treatment of the entire lake and subsequent restocking, in conjunction with a fish barrier constructed in lower Logging Creek if it wants a long-term solution. Granted, such a treatment will have a deleterious effect to the entire fish population and would also likely have short-term impacts to both bald eagles and common loons, but it will not have the same long-term effects that continuous netting will on wilderness values and the bird population."

    ***Response:*** *The probability of a successful piscicide treatment at Logging Lake would be highly uncertain given the current state of the science and knowledge of such treatments. Logging Lake is a much bigger, deeper lake than the lakes where piscicides have so far been tried. Not only would the results be highly uncertain, treating Logging Lake with a piscicide would require the destruction of the entire native fish community, and would also be extremely costly (estimated at over two million dollars). See also Text Changes, p. 26, Alternatives Considered by Eliminated from Detailed Study.*

    *The park will consider a barrier downstream of Logging Lake if lake trout suppression and bull trout conservation measures appear promising (as stated on pp. 21-22 of the EA). A barrier is not part of the preferred alternative, however, and would require additional environmental analysis and review. Please refer to the EA for analyses of impacts to bald eagles and common loons (pp. 63-75) and recommended wilderness (pp. 81-87) from no action (Alternative A) and the action alternatives (Alternatives B- D).*

44. **Comment:** "There is no way a 90 hp motorboat cruising up and down Logging and Quartz lakes has a 'negligible' impact on wilderness as this analysis maintains."

    ***Response:*** *The EA does not state that impacts to recommended wilderness or wilderness character will be negligible. Adverse impacts to recommended wilderness will be at a moderate level (please see EA, pp. 35 and 83-87).*

45. **Comment:** "The Summary of the EA implies that a decision to proceed has already been made, and that 'no major effects are anticipated as a result of this project', and that 'the majority of comments received were in support of the proposed project'."

    ***Response:*** *The summary states that "no major effects are anticipated" because no major impacts were identified during the analysis. The reference to comments in the summary pertains to scoping comments, the majority of which were supportive.*

46. **Comment:** "Instead major efforts should be made to ensure that lake trout cannot enter the Camas and Akokala Creek drainages."

    ***Response:*** *The park is currently proposing a fish passage barrier on Akokala Creek; the EA was on public review from June 6 to July 7, 2014. There is a natural waterfall upstream of Rogers Lake protecting the lakes in the upper portion of the Camas drainage (Trout and Arrow) from invasion. Rogers Lake already has lake trout, but likely only provides marginal habitat for both lake and bull trout due to its relatively warm water temperatures.*

47. **Comment:** "I am concerned that even if successful and bull trout are recovered, you will probably make them catch-and-release only, as you have recently done for cutthroat... I am still appalled, as are others, that a few years ago you radically changed the regulations to make the cutthroat fishery catch-and-release only, parkwide. You did this apparently arbitrarily, without warning and without inviting public comment."

    ***Response:*** *Bull trout fishing in park waters is currently prohibited by the Endangered Species Act and park fishing regulations; this would not change as a result of this project. The public was given the opportunity from December 1-30, 2009 to review and comment on the referenced changes to cutthroat trout harvest regulations.*

48. **Comment:** "Lake trout and bull trout have coexisted in Flathead for over 100 years, let nature take its course. The bull trout will take a hit but survival of the fittest will produce a bull trout that can compete with the lakers *[sic]*."

    ***Response:*** *As stated in the EA, data show that in systems inhabited by both bull trout and lake trout, lake trout become the dominant species and bull trout become functionally extinct.*

49. **Comment:** "Why don't you open the box a bit and let all of us help you?... First of all, open fishing up to all year and all methods that can identify the fish before it is killed. That means no nets (which kill bulls). That means allowing crossbows and spear fishing. It is fairly easy to identify bulls from lakers *[sic]* for us experienced fisherpeople *[sic]*. IF you would provide some simple CDs for the inexperienced, that would help. Also, put no limits on the number caught. Also, of course make it free, why should the public pay anything to get rid of an invasive species? Maybe let us in the park free a couple times a year if we catch some. Or pay us per fish for the fish we catch at a comparable rate to what your methods cost per fish. We could simply give you the heads or tails. How about providing a fishing pole (with deposit) so tourists can fish? I think if you allowed spear

guns, the bigger spawners would take a huge hit. If your response is that there may be some bulls killed, that is true, but some bulls are getting killed now and if there would be a fine associated with that, you would mostly get experienced motivated divers spearfishing."

***Response:*** *Please see Text Changes, p. 26 (Alternatives Considered but Eliminated from Detailed Study) and pp. 17, 19, and 23 (Alternatives Carried Forward).*

50. **Comment:** "Biologist, Leon Carl, has done aquatic research in Ontario lakes with results suggesting that, if coregonines [fish species belonging to a genus of freshwater whitefish] were introduced in adequate numbers into lakes with lake trout, the effect would be a gradual reduction in lake trout recruitment... When coregonines (i.e. whitefish and cisco species) are stocked, I suggest that it be done just after lake trout spawning is over. Locations used for coregonine stocking would be those lake trout spawning areas previously found... If one considers Bear Lake in Utah/Idaho, the existence of four different coregonine species predated the stocking of lake trout in the 1930's by many years. In this situation, the lake trout population did not increase greatly in number nor did cutthroat trout become endangered. Is it possible, that a similar result could happen to bull trout in Quartz Lake, if large numbers of coregonines were introduced?... Concurrent with lake trout removal by using gill nets, I would suggest that you introduce coregonines so that when the number of bull and/or cutthroat going upstream to spawn starts to increase sufficiently, the gill netting can be terminated."

    ***Response:*** *An alternative to introduce non-native fish species is dismissed on p. 26 of the EA, under Alternatives Considered but Eliminated from Detailed Study. Additionally, both the Quartz and Logging aquatic systems are already inhabited by native lake trout egg predators, including mountain whitefish and two species of suckers, yet lake trout continue to expand.*

51. **Comment:** "... this program will require adaptive strategies during the implementation. One such idea we propose is to consider the use of shallow trap nets (in addition to gill nets) in the lake trout removal effort and for nonlethal capture of nontarget bull trout for possible translocation."

    ***Response:*** *Trap nets are included in the EA under Alternatives B and C (and therefore also Alternative D, which is B and C combined). See EA pp. 17, 19, and 23.*

52. **Comment:** "We would also urge you to consider adding a series of floating gillnets or other quantitative measures to the monitoring strategy, so that population levels of species that primarily utilize the epilimnion (e.g. westslope cutthroat trout) can be accurately assessed both pre- and post-implementation, in order to better understand both the impacts of the current lake trout population and possible benefits of suppression."

    ***Response:*** *We have concerns over deploying floating gill nets due to the high mortality of native westslope cutthroat trout that would be anticipated. Floating gill nets would also have a higher likelihood of incidentally catching other species such as diving birds and aquatic mammals such as otters.*

53. **Comment:** "We feel that a similar [to Quartz Cr. barrier] barrier will need to be below Logging Lake as resources become available to halt the movement of additional invasive lake trout into the upper drainage. The Park Service should begin the process of needed

planning and environmental review for the construction of such a barrier as soon as possible."

***Response:*** *Please see response to Comment 43.*

54. **Comment:** "Serious consideration should be given to placement of other fish barriers below Park lakes not currently compromised by lake trout, such as Akokala Lake."

    ***Response:*** *Please see response to Comment 46. We anticipate including other fish passage barriers in the analysis for the upcoming fish management plan/EIS for the park.*

55. **Comment:** "Any fish barriers used in the Park should be closely monitored and properly maintained to insure their effectiveness and future stability. The barrier on Quartz Creek was damaged and became ineffective largely due to high spring flows. Barriers likely cannot be designed to withstand extreme flow events, but should be closely monitored during high flows and repaired or replaced quickly as needed."

    ***Response:*** *We completed repairs to the Quartz barrier in 2013 and will continue to annually monitor any barriers we construct.*

56. **Comment:** "We understand that the lake trout netted will be sunk into the lake. The environmental assessment needs to consider the impact of sinking fish in the lake and how that might affect oxygen levels and water quality. Jack Stanford from the Yellow Bay Research Station recommended that the NPS establish an oxygen profile for both lakes which will help to establish an estimate of how many fish can be sunk before oxygen levels start to change. Basically baseline data on oxygen levels is needed to provide for adaptive management on the lakes."

    ***Response:*** *The effects of sinking dead fish in the lakes have been added to the discussion of Water Resources under Impact Topics Dismissed from Further Analysis. See Text Changes, p. 12.*

57. **Comment:** "Bycatch of native fish is an extremely important issue in this type of suppression effort both for actual and perceived effects on the native fish populations. Every effort should be made to insure that negative impacts of bycatch are kept to an absolute minimum. Close coordination with representatives of the U.S. Fish and Wildlife Service must be maintained throughout the project and their advice and consent should be closely followed. Researchers should closely follow work being done on other projects such as Swan Lake and Lake Pend Oreille in order to take advantage of lessons learned through similar netting efforts."

    ***Response:*** *See Mitigation Measures on p. 23 of the EA for steps that will be taken to reduce bycatch, including using information from other projects. The impacts analyses for fisheries from Alternatives B, C, and D, pp. 54-62, include a discussion of anticipated impacts from bycatch. We will remain in close contact with the USFWS regarding bull trout bycatch. The park's current ESA Section 10 recovery permit for bull trout requires ongoing coordination and consultation. The park's biological staff already does and will continue to communicate regularly with managers implementing both the Swan Lake and the Lake Pend Oreille lake trout suppression efforts in order to improve the success of similar efforts in the park.*

58. **Comment:** "Page 23, referring to mitigation measures under Alternative D, states 'Nets would be checked at least once every 24 hours to minimize mortality to non-target fish

species.' While the rest of the document refers to the intention to keep net sets short (six hours or less) and to the poor response to netting by native bull trout and poor survival in gill nets, maybe this bullet should be changed to refer to an absolute maximum of something like 12 hours? Or, dropped?"

***Response:*** *The text for this mitigation measure has been modified to reflect short duration gill net sets, typically less than 6 hours. Trap net sets would be checked at least every 24 hours; as a live trapping method, trap nets generally do not result in mortality to the captured fish. See Text Changes, p. 23.*

59. **Comment:** "Lake trout suppression at Logging Lake and Quartz Lake is stated to require a [*sic*] 'a seven to ten year time frame to determine if suppression, translocation, and hatchery rearing efforts are succeeding.' We feel that, considering results from Swan Lake and Lake Pend Oreille, seven years is much too short a time frame to expect to see any definitive results. We feel that the ten year time frame would be an absolute minimum to expect to see results of the netting and translocation efforts."

    ***Response:*** *We agree with your points in regard to the timeline needed to determine the efficacy of the project. However, we have reduced the timeline in the EA to six-eight years due to concerns over impacts to recommended wilderness and other resources (see Text Changes, pp. 17, 22, 23, 26, 83, 84, 85, 86, 88, 90, and 91). The park will address longer term lake trout suppression in a forthcoming park-wide fish management plan and EIS, anticipated within the next several years (see also response to Comment 2).*

60. **Comment:** "The Park should also suspend the periodic gill net sampling scheduled to occur in 2015 on Quartz and Logging Lakes, to reduce the impact on bull trout and westslope cutthroat trout, and minimize the possibility of by-catch."

    ***Response:*** *The park will postpone gill netting scheduled for 2015 on Quartz Lake in order to reduce impacts/mortality to bull trout. Redd counts will serve as the primary monitoring tool for bull trout abundance in the interim. Trend gill netting is the only standardized monitoring tool currently available to assess long term native fish trends in these waters and will be resumed towards the end of the study period as an assessment measure. Similarly, the park will forego trend netting on Logging Lake until at least 2016. Risk to bull trout in Logging Lake from trend netting will be reduced if bull trout have successfully been moved upstream into Grace Lake and Creston National Fish Hatchery. See text changes to pp. 19, 22, 56-57, and 60 for clarification.*

61. **Comment:** "The Park should also include by-catch triggers (specific numbers of bull and westslope cutthroat trout) that would cause a halt to gill netting, as well as a re-evaluation of the method of removal and suppression of lake trout. Those triggers should be unique, separate and specific to each lake and monitoring of by-catch numbers should be constant."

    ***Response:*** *Bycatch of westslope cutthroat trout has not been an issue in Quartz Lake due to the depth of the net sets (see also EA under Fisheries, Bull Trout, and Westslope Cutthroat Trout, Impacts of Alternative B). Previous trend netting in Quartz and Logging Lakes indicates westslope cutthroat trout are rarely captured in sampling nets set deeper than 10 feet. Lake trout removal net sets are typically greater than 60 feet. For example, only 37 westslope cutthroat trout were captured as gill net bycatch in Quart Lake in 2013. Of these, only 10 were mortalities. We anticipate a similar situation on Logging Lake. We currently have bull trout bycatch mortality "triggers" in place on Quartz Lake*

*that require additional consultation with the USFWS and will develop similar "triggers" for Logging Lake.*

62. **Comment:** "While we are supportive of the effort to reduce lake trout, the park needs to be more specific about the actual duration of this project and the use of motorized equipment in the recommended wilderness. A constant presence of motorized equipment within the recommended wilderness could have the effect of rendering those areas unsuitable for wilderness designation over the long term."

    ***Response:*** *Please see responses to Comments 23 and 36, and Text Changes, pp. 17, 22, 23, 26, 83, 84, 85, 86, 88, 90, and 91, and 87. There will not be a "constant" presence of motorized equipment at the lakes; motorized gill netting will be underway during May-June and September-October.*

63. **Comment:** "One of the steps the Park needs to take to limit the long term use of motorized equipment within recommended wilderness is to have a system-wide plan for dealing with lake trout management, not only reducing current populations but making sure to keep new fish out of the lakes. A systems approach might include: more/better fish barriers; supporting the netting efforts on Flathead Lake and within the North Fork drainage; and using best available science to remove lake trout and enhance native fisheries."

    ***Response:*** *Completion of a comprehensive fisheries management plan/EIS is anticipated within the next several years. See also response to Comment 2.*

64. **Comment:** "The park needs to minimize decibel levels throughout the duration of the project. This includes: purchasing a boat motor that is designed to be quiet; using the best available helicopters with quieter engines; purchasing a generator that is quiet running; minimizing the duration of motor use."

    ***Response:*** *The boat motor will be selected, in part, to minimize noise (see EA under Mitigation Measures, p. 24). A text change has been made stating that the generator will also be selected in part to minimize noise; this mitigation measure has also been added under Natural Sounds (see Text Changes, p. 24). The helicopter must be selected on the basis of the weight of the load and the helicopter's hauling capacity. Motorized use will only be underway during the implementation of project activities.*

65. **Comment:** "The Park should include potential helicopter flights to Grace Lake, for bull trout transport, as part of the EA."

    ***Response:*** *The EA includes the potential for transporting bull trout via helicopter, under Alternative C, p. 21. However, text changes have been made to pp. 21 and 23 to clarify that helicopter flights for bull trout translocation will only occur as a last resort. A number of text changes have also been made to include Grace Lake more specifically (see response to Comment 14).*

66. **Comment:** "The Park should be taking a more seasonal approach to lake trout removal and focusing netting during lake trout spawning in the fall when they will be at their highest densities. Included in this is using the best available science and techniques from other lakes (Swan and Pend Oreille), such as potentially vacuuming eggs from spawning grounds."

    ***Response:*** *See pp. 18 and 19 of the EA under Alternatives B and C for the seasonal timeframe for the project. Juveniles will generally be targeted in spring when data on*

*Quartz Lake suggests they are highly vulnerable to capture. Adults will be targeted in the fall when they congregate on spawning grounds. We are continually sharing information with other fish managers implementing similar projects and use this information to improve our effectiveness. Pages 17 and 19 of the EA include the continued refinement of techniques to improve efficiency; see also p. 5 under Background. Additionally, text changes to pp. 17, 19, and 23 include new and emerging technologies that may be used as they become available.*

67. **Comment:** "As part of wildlife mitigation, the Park requires a daily check of the boat motor to make sure it is working properly. The Park should also require a daily check of the generator as well, so as to minimize the potential for any malfunctions, spills or inefficiencies."

    ***Response:*** *Thank you for the suggestion; daily inspections of the generator before use has been added to the Mitigation Measures. Please see Text Changes, p. 24.*

68. **Comment:** "The Park should also expand the species studied in their effected [*sic*] wildlife to include species which may be more active in the spring and fall around the affected lakes."

    ***Response:*** *The impacts analysis for wildlife (pp. 63-75) addresses effects to wildlife that are active during spring and fall.*

69. **Comment:** "Finally, under mitigation of visitor experience the Park proposes putting up signs and handing out literature at the backcountry permit office. The Park should consider going farther and including interpretive information at the lake or potentially stationing a ranger/volunteer at the lakes to help answer visitor's questions."

    ***Response:*** *Thank you for the suggestion. Stationing a ranger or volunteer at the lakes full time would likely be logistically and economically infeasible, and perhaps more than is necessary given the low visitation at the lakes in the spring and fall. While they will not always be available to talk with visitors, the fisheries crews that will be stationed at the lakes are fully informed about the project and will be able to answer visitor questions.*

70. **Comment:** "Sinking of dead fish in the lakes. While listed under mitigation for wildlife, we believe this issue needs more attention than it has been given. Both Logging and Quartz lakes are oligotrophic (very clean and clear, offering little to sustain life) and likely have O2 saturation throughout the water column. The addition of dead fish could cause an increase in 'decomposition bacteria,' which consume oxygen and may result in an 'O2 sag' at the lake bottom. This could have an effect far beyond oxygen levels and lake trout and could result in fundamental changes to water quality. The Park needs to establish year round (with emphasis on winter months) O2 profiles and baseline data about O2 levels in both lakes; this, combined with analysis of water quantity, would also help establish a modeling estimate of how many fish can be sunk before affecting O2 levels. The Park should then be monitoring O2 levels in both lakes on a year-round basis and be prepared to find other ways of disposing of fish if either lake shows signs of O2 sag."

    ***Response:*** *Please see response to Comment 57 and Text Changes, p. 12.*

71. **Comment:** "The Park needs to create a systemic plan for managing for lake trout. This means not just targeting current populations but also the prevention of new non-native fish from entering the system. This plan would need to include: current activities of

netting fish; establishing fish barriers at vulnerable streams; using egg vacuums; and the incorporation of 'Judas fish' to help locate spawning areas. The Park should be using the very best biology and technology for protecting its wilderness lakes, learning from (and coordinating with) other removal projects (Swan, Pend Oreille and Flathead Lakes) to increase tools available to the Park. This plan should be adaptive to changing conditions, and must contain triggers and monitoring systems that will result in the greatest number of lake trout removed, greatest number of bull trout protected, and greatest chance of preventing future non-natives from entering the system."

***Response:*** *An upcoming fisheries management plan/EIS will include a systematic plan for managing lake trout for the long term. Please see responses to Comments 2, 58, and 67.*

72. **Comment:** "It is well established that bull trout decline as lake trout invade and take over, but is there data to show how long it takes for bull trout to increase after lake trout suppression and over what time period? The EA describes the ongoing lake trout removal on Quartz Lake as being successful in removing a high proportion of tagged adults and also indicates that lake trout removal in other areas of Montana and Idaho have demonstrated high rates of lake trout removal. However, the EA does not provide data on whether bull trout populations have shown a positive response to these levels of lake trout removal. How do we know if the proposed lake trout removals will result in increased bull trout populations or is some still higher rate of adult and juvenile lake trout removal required before bull trout show increases? Do data exist for changes in bull trout redds or other measures of populations after lake trout suppression efforts began?"

    ***Response:*** *See response to Comment 17.*

73. **Comment:** "The EA states that lake trout have invaded 9 of 12 accessible lakes. What is the Park doing to prevent lake trout gaining access to the 3 non-invaded lakes given that lake trout removal is so difficult or impossible?."

    ***Response:*** *A fish passage barrier is proposed downstream of Akokala Lake; see responses to Comments 46 and 55. The park's upcoming fisheries management plan/EIS will consider what measures may be taken to prevent lake trout from entering other lakes that have not yet been invaded by lake trout, including Cerulean and Lincoln Lakes.*

74. **Comment:** "It was good to see as Mitigation that signs would be posted informing visitors of the activity on the lakes and the suppression efforts. We recommend that the posted information be kept current and specific spelling out when and where the activities will be occurring so visitors can modify their visit if they wish to avoid the motorized activities. We also recommend that such information be available on the Park's website."

    ***Response:*** *Posted information regarding the project will be kept current. Thank you for the suggestion to post the information on the park's website.*

75. **Comment:** "It was good to see mitigation for common loons and bald eagles spelled out in some detail and references to the Montana Common Loon Conservation Plan and the Bald Eagle Management Guidelines. However, use of terms like 'avoided to the greatest extent possible', 'as least disturbing as possible' and 'avoid whenever possible' implies that the lake trout removal activities will override the established management plans for

loons and eagles and could result in greater impacts to these species than described in the EA."

***Response:*** *With the mitigation in place as currently stated, impacts to bald eagles and common loons are not expected to exceed a minor level. Additionally, maintaining a stable native fish complex to support fish-dependent predators such as common loons and bald eagles is one of the project objectives (p. 5 of the EA, under Purpose and Need).*

76. **Comment:** "We suggest re-evaluating all activities conducted under this EA quite often, perhaps every other year, to determine their effectiveness and what should be changed not only from the fish conservation standpoint but also for wilderness values. These re-evaluations should be available and disseminated to interested individuals, organizations, and agencies."

***Response:*** *Project activities will be regularly re-assessed for improvements in efficiency and reductions in impacts to other resource values. Results and evaluations will be made available to interested parties and stakeholders.*

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# Appendix: Non-Impairment Finding

National Park Service's *Management Policies, 2006* require analysis of potential effects to determine whether or not actions will impair park resources. The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values.

However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within park, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may, but does not necessarily, constitute an impairment. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to pursue or restore the integrity of park resources or values and it cannot be further mitigated.

The park resources and values that are subject to the no-impairment standard include:

- the park's scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;
- appropriate opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing them;
- the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and
- any additional attributes encompassed by the specific values and purposes for which the park was established.

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. The NPS's threshold for considering whether there could be an impairment is based on whether an action will have significant effects.

Impairment findings are not necessary for visitor use and experience, socioeconomics, public health and safety, environmental justice, land use, and park operations, because impairment findings relates back to park resources and values, and these impact areas are not generally considered park resources or values according to the Organic Act, and cannot be impaired in the same way that an action can impair park resources and values. After dismissing the above topics, topics remaining to be evaluated for impairment include fisheries, wildlife, threatened and endangered species (grizzly bears), recommended wilderness, and natural soundscapes.

Fundamental resources and values for Glacier National Park are discussed in the 1999 *General Management Plan.* All but one of the impact topics (visitor use and experience) carried forward in this EA are necessary to fulfill specific purposes identified in the establishing legislation of the park; are key to the natural or cultural integrity of the park; and/or are identified in the park's general management plan or other relevant NPS planning document.

- **Fisheries** – lake trout removal and bull trout conservation will result in some incidental netting mortality and the removal of juvenile bull trout/eggs from Logging Lake, and will have minor to moderate adverse impacts to bull trout and minor adverse impacts to westslope cutthroat trout and other native fish. But the moderate, long-term beneficial impacts to native fish, including bull trout and westslope cutthroat trout, from decreased competition and predation by lake trout will outweigh the adverse impacts. Although fisheries are a fundamental resource at the park, the preferred alternative will only result in minor to moderate, site-specific to local, short-term adverse impacts to fisheries, including bull trout and westslope cutthroat trout; therefore, there will be no impairment to fisheries.
- **Wildlife** – disturbances from motorboat use, helicopter flights, and the presence of project personnel at a time when other human activity is typically low will have negligible to minor adverse impacts to wildlife, including bald eagles and common loons. The preservation of two intact native fisheries and shallow water-dwelling fish that are more accessible to fish-dependent predators will also have beneficial impacts that are negligible to minor for wildlife and common loons and minor for bald eagles. Although wildlife are a fundamental resource at the park; the preferred alternative will only result in negligible to minor, site-specific to local and possibly regional, short-term adverse impacts to wildlife; therefore, there will be no impairment to wildlife.
- **Threatened and Endangered Species (Grizzly Bear)** – disturbances from human activity, including motorboat use and helicopter flights, will have negligible to minor adverse impacts to grizzly bears. Although grizzly bears are a fundamental resource at the park, the preferred alternative will only result in negligible to minor, site-specific to local, and short and long-term adverse impacts to grizzly bears; therefore, there will be no impairment to grizzly bears. The Section 7 determination for effects to grizzly bears is "may affect, not likely to adversely affect".
- **Recommended Wilderness** – lake trout suppression and bull trout conservation, including the use of motorboats, motorized equipment, and helicopters, will have moderate adverse impacts to the untrammeled and undeveloped qualities of recommended wilderness, and to opportunities for solitude. The preservation of native fish populations, however, will also benefit the natural condition and unique ecological, scientific, and educational value of the park's recommended wilderness; beneficial impacts to recommended wilderness will be moderate and long-term. Although recommended wilderness is a fundamental resource at

the park, the preferred alternative will only result in moderate, site-specific and local, short and long-term adverse impacts to recommended wilderness; therefore, there will be no impairment to recommended wilderness.

- **Natural Soundscapes** – intermittent, temporary noise from motorboats, portable generators, and helicopter flights will have moderate adverse impacts to natural soundscapes. Although natural soundscapes are a fundamental resource at the park, the preferred alternative will only result in moderate, site-specific and local, short-term adverse impacts to natural soundscapes; therefore, there will be no impairment to natural soundscapes.

In conclusion, as guided by this analysis, good science and scholarship, advice from subject matter experts and others who have relevant knowledge and experience, and the results of public involvement activities, it is the Superintendent's professional judgment that there will be no impairment of park resources and values from implementation of the preferred alternative.