



# Appendix I

MOUNTAIN LAKES FISHERY  
 CURRENT AND PROPOSED  
 MITIGATION PRACTICES

## APPENDIX I: MOUNTAIN LAKES FISHERY CURRENT AND PROPOSED MITIGATION PRACTICES

Alternative A: No Action—Existing Management Framework of 91 Lakes (62 Lakes Have Fish)

Alternative B: Proposed Adaptive Management of 91 Lakes under a New Framework (42 Lakes May Have Fish) (Preferred Alternative)

Alternative C: Proposed Adaptive Management of 91 Lakes under a New Framework (11 National Recreation Area Lakes May Have Fish)

Alternative D: 91 Lakes Would Be Fishless (Environmentally Preferred Alternative)

Action	Alternative A	Alternative B	Alternative C	Alternative D	Responsible Agency
Lake Stocking	<p>To make sure stocked fish do not reproduce and affect downstream fish, sterile fish are stocked in many lakes. For lakes where monitoring shows that fish densities in a lake are having adverse effects on fish health, the density and cycle of fish stocking are adjusted to allow periods of low density.</p> <p>The Park Headquarters and Offices department would continue to issue brochures about park areas, in general, and about minimum impact practices. Information about fishing refers to the Washington State fishing regulations. Literature about the stocking program is available from the Washington Department of Fish and Wildlife. The National Park Service maintains the North Cascades Complex website that provides an abundance of information on the national park and national recreational areas: <a href="http://www.nps.gov/NOCA/">http://www.nps.gov/NOCA/</a>.</p> <p>Informational signs about fish stocking are posted in the park.</p>	<p>Same as under alternative A with the following additions:</p> <p>For lakes where removal of reproducing fish may not be feasible because of the complexity of the associated stream where reproduction occurs, it may be possible to reduce the access to the area in order to minimize impacts to vegetation.</p> <p>Additional signs could be posted in the riparian areas that are most heavily used to allow for recovery of vegetation.</p> <p>For lakes where monitoring shows that fish densities are having more adverse effects on other biota than would be acceptable, the density of stocked fish would be reduced, or the stocking of the lake could become cyclical to allow periods of very low density or no fish, which would allow populations of other affected organisms to rebound. If monitoring indicates that unacceptable adverse effects continue despite reduced densities, stocking would be discontinued to allow for a fishless condition in the lake. For more information about monitoring and adaptive management, see appendix F and, also, the “Adaptive Management” section in the “Alternatives” chapter of this document.</p> <ul style="list-style-type: none"> <li>• If possible, camp at least 200 feet from the nearest lake or stream.</li> <li>• Use camp stoves instead of building a fire. Where campfires are legal and safe, use an established fire ring and only small pieces of dead and downed wood.</li> </ul>	Same as alternative B.	N/A	

Action	Alternative A	Alternative B	Alternative C	Alternative D	Responsible Agency
Lake Stocking (continued)		<ul style="list-style-type: none"> <li>• Pack out the offal (carcass) from any fish kept, or dispose of it in a manner that will not attract wildlife or harm the aesthetics of the area.</li> <li>• Be mindful of damaging fragile vegetation, both along the shoreline and in campsites. Always camp in established campsites and walk on established trails to avoid trampling fragile vegetation and compacting soil.</li> <li>• Do not alter campsites or build structures such as tables or lean-tos.</li> </ul> <p>Stocking would have to occur after lakes thaw (which varies according to elevation and aspect) and before fall in order for fry to acclimatize to the lakes. Visitors would be informed of airplane stocking schedules. Rangers issuing backcountry permits would advise visitors of any impending aircraft stocking and suggest alternate destinations. Aircraft stocking would only be used if it were determined that fish would not survive a long-distance backpack trip.</p> <p>As part of a monitoring component of this plan, the park would gather more data about the effects of shoreline trampling and would establish a threshold and actions to implement, such as restoring soils.</p>			
Mechanical Fish Removal	N/A	<p><b>For gillnets:</b></p> <p>Where needed to reduce or avoid certain impacts, timing of the activity would be controlled to avoid conflicts with other specific species' activities or important use periods.</p> <p>No gillnets would be left unsupervised. Crews would free any wildlife observed in the nets. If necessary, nets would be cut to free an animal. If wildlife were injured during entrapment, they would be taken to an approved wildlife rehabilitation center for treatment.</p> <p>In order to mitigate trampling of shoreline vegetation, crews would be kept small and would walk in the lake, rather than along the shoreline when setting nets. In addition, crews would camp far enough from the lake to minimize impacts to the shoreline.</p>	Same as alternative B.	Same as alternative B.	

Action	Alternative A	Alternative B	Alternative C	Alternative D	Responsible Agency
<p>Mechanical Fish Removal (continued)</p>		<p>The park would post information about gillnetting schedules and locations on bulletin boards, the website for the North Cascades Complex, and visitor centers. Because most of the lakes in the study area cannot be reached and fished in one day, rangers who issue backcountry permits (which are required for overnight camping) would inform hikers and anglers of any gillnetting activity scheduled at their destination, and could recommend alternative lakes to visit. In addition, the park could take a less intensive, more long-term approach to netting in high-use areas in order to help ensure a positive visitor experience for anglers.</p> <p>To reduce impacts on vegetation, rafts or float tubes would be preferred over boats for setting and checking nets. In addition, crews would camp far enough from the lake to minimize impacts to the shoreline.</p> <p><b>For electrofishing:</b> Where needed to reduce or avoid certain impacts, timing of the activity would be controlled to avoid conflicts with other specific species' activities or important use periods.</p>	<p>Same as alternative B</p>	<p>Same as alternative B</p>	
		<p>Crews would wear neoprene waders and would walk in the water rather than along the shoreline to reduce shoreline trampling. This method would require a one-time application; repeat visits would not be necessary, which would minimize the amount of trampling.</p> <p>In addition to fish, any other organism in the water where the current is applied would be shocked or possibly killed. However, the larger the organism, the greater the shock, making fish the most susceptible. Because the waters in the North Cascades Complex have a low ionic content, they do not carry a charge very well, reducing potential effects to nonfish wildlife.</p> <p>Visitors receiving backcountry permits for overnight camping would also be informed of any treatment scheduled at their destination.</p> <p>To reduce impacts on vegetation, rafts or float tubes would be preferred over boats for setting and checking nets. In addition, crews would camp far enough from the lake to minimize impacts to the shoreline.</p>			



Action	Alternative A	Alternative B	Alternative C	Alternative D	Responsible Agency
<p>Chemical Fish Removal (continued)</p>	<p>N/A</p>	<p>Piscicides being dripped into streams flowing out of a lake could carry that toxicant to downstream waters. Because antimycin is very sensitive to oxidation, exposing it to oxygen rapidly breaks it down (Rosenlund 1992). Potassium permanganate, an oxidizer, would be placed at outlet streams to remove residual antimycin and prevent it from traveling downstream. In addition, agitation and loss of elevation would result in loss of toxicity due to oxidation (Rosenlund 1992). Many streams leaving high mountain lakes in the study area quickly become waterfalls, and the oxidation that occurs as the water drops and becomes agitated also helps to further break down the chemical (NPS, R. Zipp, pers. comm. with P. Steinholtz, 2003).</p> <p>Antimycin dose rates would be double verified and monitored to prevent inadvertent overdoses, and neutralization (potassium permanganate) would be on hand as a contingency measure.</p> <p>Antimycin can affect other aquatic organisms besides fish. However, as mentioned above, the concentration of antimycin necessary to remove fish has little or no effect on other aquatic animals. Some mortality to other species may occur, but numbers are likely to be minimal (NPS, R. Zipp, pers. comm. with P. Steinholtz, 2003).</p> <p>Crews treating lakes with antimycin would be required to wear eye protection and gloves. No one wearing contact lenses would be allowed to participate in antimycin treatment because fumes can penetrate soft contact lenses. A safety and organizational briefing would be conducted for personnel involved in the project, which would include the goal of the project, safety, operation of treatment equipment, and delegation of duties.</p> <p>Everyone working with antimycin would be given a copy of the product label.</p> <p>As described under the mechanical methods, crews delivering treatment from the shoreline could trample vegetation (chemical treatment would require shoreline applications) (Rosenlund 1992). All of the mitigation methods described under gillnetting would also be adhered to (for example, crews would walk in the lake water rather than along the shoreline and camp away from the lake).</p>	<p>Same as alternative B.</p>	<p>Same as alternative B.</p>	

Action	Alternative A	Alternative B	Alternative C	Alternative D	Responsible Agency
Chemical Fish Removal (continued)		<p>Also, as described under gillnetting, anglers would experience diminished visitor experience during chemical application. Educational materials about treatment dates and locations would be posted at bulletin boards, on the website for the North Cascades Complex, and at visitor centers. Park rangers would alert visitors to such activities when backcountry permits are issued. If necessary, lakes would be closed to fishing immediately after treatment until it is determined that the chemical has dissipated to ensure treated fish are not caught and consumed.</p> <p>Visitors would be given educational materials explaining the closures and describing how to recognize fish treated with antimycin (the fish become discolored and lethargic). In addition, antimycin breaks down very quickly in a fish's body, reducing the likelihood of contamination if fish are caught and consumed (NPS, R. Zipp, pers. comm. with P. Steinholtz, 2003; Rosenlund 1992).</p> <p>NPS staff would use boats to release chemical piscicides (to the extent they are able to avoid trampling vegetation) and for logistical reasons.</p> <p>Staff would avoid walking on vegetation around the lake, and in particular, on meadow or riparian vegetation where state listed plant species are more likely to occur.</p>			
Natural Fish Removal	N/A	<p>Increased trampling of shoreline vegetation could occur as a result of incentives that encourage anglers to increase the amount of fishing to help reduce fish populations. The NPS would provide additional educational information about shoreline sensitivity by posting information on bulletin boards, the website for the North Cascades Complex, and at visitor centers. Rangers who issue backcountry permits would also provide such educational material to anglers who are camping.</p>	Same as alternative B.	Same as alternative B.	