

## **APPENDIX I**

### **Minimum Tools Analysis**

*Native Fish Restoration in Fossil Creek*  
Minimum Tools Analysis for Wilderness Alternative  
9/16/03, Modified 11/17/03

ALTERNATIVE A – Allow use of Motorized Equipment and Mechanical Transport.

Project Description: Construct a single reinforced concrete fish barrier in Fossil Creek at a location approximately 4.5 miles upstream of the confluence of the Verde River, and renovating the stream above the barrier with the piscicide antimycin A. The barrier would be created by placing steel reinforced concrete plugs into three 5' to 9' wide by 2' to 9' tall notches in river channel bedrock. A small concrete apron would be placed in the river channel below each filled slot. A gabion structure would be built on a side channel in a six foot space between two 20 foot diameter boulders. The gabion structure would be 4' x 6' x 3' in size.

Uses associated with Alternative A:

- Use of temporary road? No
- Use of motor vehicles? Yes
  - A. Materials, equipment, camping gear, and sanitation facilities would be flown in by helicopter and long-lined to the staging area near the project site. These items would be transported to the site in a day or less, and removed from the site in a day or less. The sanitation facilities would require servicing during construction, which would be done at the same time that crew transportation is done.
  - B. Concrete would be flown in and poured directly into temporary formwork at each of the three slots. The concrete would be poured in two phases – the first phase to fill two slots, and the second phase to fill the remaining slot. The estimated time for transporting and pouring the concrete would be two days.
  - C. People would be transported to the site by helicopter. This would involve flights at the beginning and end of each workweek.
  - D. A helicopter would be used to transport 55 gallon drums containing captured fish from Fossil Creek to Irving. This could be accomplished in 2 days.
  - E. Total days of flying would be 10 to 12.
- Use of motorized equipment? Yes. Use of generators, air compressors, jackleg drills, dewatering pumps, concrete vibrators, and power saws (including chainsaws). Any of these tools could be in use any day during construction.
- Use of motorboats? No
- Landing of airplanes? No
- Landing of helicopters? Yes.
- Use of mechanical transport? No
- Creating a structure or installation? Yes. The main structure would be concrete and would be colored and textured to blend with the surrounding rock. A gabion structure would be built on a side channel. This structure would be covered with natural rocks to make it more natural appearing. Rock collected for filling the gabions would be collected from within the main or side channel, or brought in

from outside the Wilderness. If the rocks are brought in, they must be similar in appearance to the natural rocks. This is a non-conforming use requiring Regional Forester approval.

- Other impacts to wilderness character?
  - A. A crew camp would be placed near the job site, with up to 10 people in residence. The crew would need to be informed of, and practice, minimum impact camping techniques including not digging around tents, not damaging trees, etc. A Forest Service project monitor would ensure this requirement is met. Campfires would be allowed only with wood brought from outside the Wilderness. Fires would be built on a surface that would eliminate impacts to the ground and ashes would be removed from the campsite and properly disposed of. Cultural sites would be flagged for avoidance. Sanitation facilities would be required.
  - B. Clearing of vegetation for a helicopter landing spot would be required.
  - C. Piscicides would be used for removal of non-native fish.

#### Environmental Effects associated with Alternative A:

##### Biophysical:

Brush would need to be cleared to create a helispot. There would be a short term trampling impact to soils and vegetation from on the ground activities at the camp, staging area, and at the job site. Some disturbance would occur to terrestrial wildlife that normally moves through the area from the occupancy of the camp, staging area and job site.

##### Social and Recreation:

The fish barrier would be a non-natural permanent human made structure within the Wilderness. With full flows returned to Fossil Creek, it would not be visible to the casual observer. Ten to twelve days of helicopter flights, and month long noise from motorized equipment at the job site, would be intrusive noise to people expecting to hear predominantly natural quiet within the Wilderness. The number of people impacted by the noise would be low since use in this part of the Wilderness is low. People recreating at Stehr Lake would likely hear the noise at the job site, leading some of them to investigate the noise at the project site. Helicopters would exceed the FAA cruising level of 2000 feet above ground level.

Construction of a permanent human made structure, use of piscicides, and use of motorized equipment in the Wilderness are non-conforming uses requiring Regional Forester approval.

##### Timing:

The motorized alternative would complete the project more quickly than Alternative B, thus having less impact on the Wilderness resource in terms of duration.

### Heritage Resources:

There is a potential impact to the archeological sites. This includes trampling and moving artifacts. However, the draft cultural resources survey (6/25/03) concludes that the project would have no adverse effects to cultural resources. Additionally, if all mitigation recommendations are followed, there should be No Effect to cultural resources (8/18/03 letter from P. Pillis to J. Czaplicki, BOR). Helicopter landings to drop off passengers would cause more damage to the sites than with long lining. An archeologist approved by the Forest Service would monitor the project.

### **ALTERNATIVE B – No use of motorized equipment or mechanical transport.**

**Project Description:** Construct a single reinforced concrete fish barrier in Fossil Creek at a location approximately 4.5 miles upstream of the confluence of the Verde River, and renovating the stream above the barrier with the piscicide antimycin A. The barrier would be created by placing steel reinforced concrete plugs into three 5' to 9' wide by 2' to 9' tall notches in river channel bedrock. A small concrete apron would be placed in the river channel below each filled slot. A gabion structure would be built on a side channel in a six foot space between two 20 foot diameter boulders. The gabion structure would be 4' x 6' x 3' in size.

### Uses associated with Alternative B:

- Use of temporary road or trail? Yes. Mules would haul in equipment, tools, materials, concrete, and aggregate. A trail would have to be constructed to accommodate the mule traffic. The trail would be at a location least likely to be used in the future, and would require rehabilitation after the project is completed. An alternative to the Stehr Lake access point would be Ike's Backbone Road (502C). The trail location would be flagged on the ground with the Forest Service to minimize impacts to Wilderness, archeological, soils, and native fish resources. If hay is used for mule feed, it must be weed free.
- Use of motor vehicles? No.
- Use of motorized equipment? No. Rock drilling would be accomplished by double jacking. This involves one person holding the drill in place on the rock and a second person driving the rock drill by hitting it with a sledgehammer sized implement. Concrete would be mixed and poured by hand. It may not be feasible to drill the holes by the double jack method. A manual pump would be used for dewatering the creek. Power saws would be replaced by handsaws. The remaining tools would be hand tools. Fish would be removed from and returned to Fossil Creek by foot, and transported in backpacks.
- Use of motorboats? No
- Landing of airplanes? No
- Landing of helicopters? No, except in the case of emergencies. Authority for approving emergency landings rests with Forest Supervisor on the Tonto National Forest, and the District Ranger on the Coconino NF.
- Use of mechanical transport? No
- Creating a structure or installation? Yes. The main structure would be concrete and would be colored and textured to blend with the surrounding rock. A gabion

structure would be built on a side channel. This structure would be covered with natural rocks to make it more natural appearing. Rock collected for filling the gabions would be collected from within the main or side channel, or brought in from outside the Wilderness. If the rocks are brought in, they must be similar in appearance to the natural rocks. This is a non-conforming use requiring Regional Forester approval.

- Other impacts to wilderness character?
  - A. A crew camp would be placed near the job site, with up to 10 people in residence. The crew would need to be informed of, and practice, minimum impact camping techniques including not digging around tents, not damaging trees, etc. A Forest Service project monitor would ensure this requirement is met. Campfires would be allowed only with wood brought from outside the Wilderness. Fires would be built on a surface that would eliminate impacts to the ground and ashes would be removed from the campsite and properly disposed of. Cultural sites would be flagged for avoidance. Sanitation facilities would be required.
  - B. Clearing of vegetation for a helicopter landing spot would be required.
  - C. Piscicides would be used for removal of non-native fish.

#### Environmental Effects associated with Alternative B:

##### Biophysical:

Presence of a trail would lead to increased visitation from the public at the job site. This is a concern because of increased Wilderness visitation and potential impacts to cultural resources. It would be more difficult to obliterate a constructed trail than to obliterate a trail created by use (Alternative C). Noxious weeds may be spread through seeds contained in mule droppings. The trail would result in increased soil erosion.

Because the project would be constructed through primitive means, the duration of the project would be longer. This would result in more soil compaction and increased trampling at the camp, staging area, and job site, in comparison with Alternative A or C. Disturbance to terrestrial wildlife would be greater than A or C because of the lengthened project duration.

Brush would need to be cleared to create a helispot at the staging area.

##### Social and Recreation:

The fish barrier would be a non-natural permanent human made structure within the Wilderness. With full flows returned to Fossil Creek, it would not be visible to the casual observer.

Noise generated by this alternative is not from motorized equipment.

The sense of impact to visitors from project implementation would be of longer duration.

Health and Safety:

The operation of a double jack drill is hazardous.

Timing:

Project implementation time would approximately triple.

Heritage Resources:

There is a potential impact to the archeological sites. This includes trampling and moving artifacts. However, the draft cultural resources survey (6/25/03) concludes that the project would have no adverse effects to cultural resources. Additionally, if all mitigation recommendations are followed, there should be No Effect to cultural resources (8/18/03 letter from P. Pilles to J. Czaplicki, BOR). Impacts under this alternative would be greater than with Alternatives A or C because of the lengthened duration of the project. An archeologist approved by the Forest Service would monitor the project.

**ALTERNATIVE C – Wilderness Preferred Alternative**

**Project Description:** Construct a single reinforced concrete fish barrier in Fossil Creek at a location approximately 4.5 miles upstream of the confluence of the Verde River, and renovating the stream above the barrier with the piscicide antimycin A. The barrier would be created by placing steel reinforced concrete plugs into three 5' to 9' wide by 2' to 9' tall notches in river channel bedrock. A small concrete apron would be placed in the river channel below each filled slot. A gabion structure would be built on a side channel in a six foot space between two 20 foot diameter boulders. The gabion structure would be 4' x 6' x 3' in size.

Uses associated with Alternative C:

- Use of temporary road or trail? Yes. The trail would be flagged on the ground with the Forest Service to minimize impacts to the Wilderness, archeological, soils, and native fish resources. The trail would not be constructed, but would be created by use. The trail would be at a location least likely to be used in the future, and would require rehabilitation after the project is completed. An alternative to the Stehr Lake access point would be Ike's Backbone Road (502C).
- Use of motor vehicles? Yes.
  - A. Materials, equipment, camping gear, and sanitation facilities would be flown in by helicopter and long-lined to the staging area near the project site. These items would be transported to the site in a day or less, and removed from the site in a day or less. The sanitation facilities would require servicing during construction, which would be done weekly.
  - B. Concrete would be flown in and poured directly into temporary formwork at each of the three slots. The concrete would be poured in two phases – the first phase to fill two slots, and the second phase to fill the remaining slot. The estimated time for transporting and pouring the concrete would be two days.
  - C. A helicopter would be used to transport 55 gallon drums containing captured fish from Fossil Creek to Irving. This could be accomplished in 2 days.
  - D. Total days of flying would be 7 to 9.

- E. Use of helicopters would be allowed on weekdays only.
- Use of motorized equipment? Yes. The following equipment would be allowed: generator, compressor, drill, and concrete vibrator (if absolutely necessary). The generator, compressor, and drill would only be used for drilling the holes in the rock. No other power tools would be allowed. Use of motorized equipment would only be allowed on weekdays.
- Use of motorboats? No
- Landing of airplanes? No
- Landing of helicopters? Yes. Contact with the ground through long-line delivery is considered a landing. Landing of the aircraft itself would only occur in emergency situations.
- Use of mechanical transport? No
- Creating a structure or installation? Yes. The main structure would be concrete and would be colored and textured to blend with the surrounding rock. A gabion structure would be built on a side channel. This structure would be covered with natural rocks to make it more natural appearing. Rock collected for filling the gabions would be collected from within the main or side channel, or brought in from outside the Wilderness. If the rocks are brought in, they must be similar in appearance to the natural rocks.
- Other impacts to wilderness character?
  - A. A crew camp would be placed near the job site, with up to 10 people in residence. The crew would need to be informed of, and practice, minimum impact camping techniques including not digging around tents, not damaging trees, etc. A Forest Service project monitor would ensure this requirement is met. Campfires would be allowed only with wood brought from outside the Wilderness. Fires would be built on a surface that would eliminate impacts to the ground and ashes would be removed from the campsite and properly disposed of. Cultural sites would be flagged for avoidance. Sanitation facilities would be required. Use of the camp and job site would be limited to Monday through Friday.
  - B. Clearing of vegetation for a helicopter landing spot would be required.
  - C. Piscicides would be used for removal of non-native fish.

#### Environmental Effects associated with Alternative C:

##### Biophysical:

Presence of a trail could lead to increased visitation from the public at the job site. Access from the 502C road would make the temporary trail less noticeable to the public; alternately, a trail originating from Stehr Lake could be disguised to some degree to make it less obvious as a take off point to the public. This is a concern because of increased Wilderness visitation and potential impacts to cultural resources. It would be less difficult to obliterate a user made trail than to obliterate a constructed trail (Alternative B). Use of the trail during the month-long construction phase could result in increased soil erosion.

There would be a short term trampling impact to soils and vegetation from on the ground activities at the camp, staging area, and at the job site. Some disturbance would occur to terrestrial wildlife that normally moves through the area from the occupancy of the camp, staging area and job site.

Brush would need to be cleared to create a helispot at the staging area.

Social and Recreation:

The fish barrier would be a nonnatural permanent human made structure within the Wilderness. This is a non-conforming use requiring Regional Forester approval. With full flows returned to Fossil Creek, it would not be visible to the casual observer. Seven to nine days of helicopter flights, and approximately 5 days from motorized equipment, would be intrusive noise to people expecting to hear predominantly natural quiet within the Wilderness. Weekday use only would minimize some of that impact. The number of people impacted by the noise would be low since use in this part of the Wilderness is low. People recreating at Stehr Lake would likely hear the noise at the job site, leading some of them to investigate the noise at the project site.

Use of piscicides in the Wilderness is a non-conforming use requiring Regional Forester approval.

Helicopters would exceed the FAA cruising level of 2000 feet above ground level.

Timing:

This alternative would complete the project more quickly than Alternative B, but would take slightly more time than Alternative A.

Heritage Resources: There is a potential impact to the archeological sites. This includes trampling and moving artifacts. However, the draft cultural resources survey (6/25/03) concludes that the project would have no adverse effects to cultural resources. Additionally, if all mitigation recommendations are followed, there should be No Effect to cultural resources (8/18/03 letter from P. Pilles to J. Czaplicki, BOR). An archeologist approved by the Forest Service would monitor the project.