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Introduction

The Mill Creek Irrigation District (MCID) has requested use of mechanized transport (helicopter) for work on Mill Lake Dam in 2005. The proponent's goal is to "rehabilitate the 98 year old high hazard dam for compliance with dam safety requirements, for retaining full storage water rights and to insure efficient releases".

The MCID's proposed work includes:

- Remove the temporary flexible liner in the existing outlet pipe.
- Slip-line existing 24-inch corrugated metal pipe with a 21 ½ inch O.D. (outside diameter) high density polyethylene pipe (HDPE).
- Grout annular space between new insert pipe and the existing 24-inch Corrugated Metal Pipe. Grout voids around the old gate chamber located in the mid-section of the dam.
- Install a new outlet gate and hydraulic value operator. The existing 24-inch square slide gate will be removed.
- Construct a new outlet structure.

The MCID is requesting the use of helicopters to transport heavy equipment, people, supplies and materials. They propose to use various types of specialized equipment including a grout pump, holding tank,.and agitator.

Forest Service Manual WO Amendment 2300-90-1, 2326.1 – Conditions Under Which Use May Be Approved. Allow the use of motorized equipment or mechanical transport only for:

- Emergencies where the situation involves an inescapable urgency and temporary need for speed beyond that available by primitive means. Categories include fire suppression, health and safety, law enforcement involving serious crime or fugitive pursuit, removal of deceased persons, and aircraft accident investigations.
- Aircraft or motor boat use established before the area was designated as wilderness by the Act of 1964 or subsequent wilderness legislation.
- Exploration and development of valid existing mineral rights (FSM 2323.7).
- Access to surrounded State and private lands and valid occupancies (FSM 2326.13).
- To meet minimum needs for protection and administration of the area as wilderness, only as follows:
    a. A delivery or application problem necessary to meet wilderness objectives cannot be resolved within reason through the use of non-motorized methods.
    b. An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions.
    c. A necessary and continuing program was established around the use of motorized equipment before the unit became a part of the National Wilderness Preservation System, and the continued use of motorized equipment is essential to continuation of the program.
    d. Removal or aircraft wreckage when non-motorized methods are unsuitable.

36 CFR 293.13 provides specific direction for access to valid occupancies as follows: Persons with valid occupancies wholly within National Forest Wilderness shall be permitted access to such surrounded occupancies by means consistent with the preservation of National Forest Wilderness which have been or are being customarily used with respect to other such occupancies surrounded by National Forest Wilderness. The Forest Service will, when appropriate, issue permits which shall prescribe the routes of travel to and from the surrounded occupancies, the mode of travel, and other

conditions reasonably necessary to preserve the National Forest Wilderness, [39 FR 31321, Aug. 28, 1974]

Issues that affect the wilderness character, visitors and MCID workers include federal dam safety requirements, the length of time required to complete the work, the feasibility of using traditional methods vs. motorized/mechanized methods, the level of impact created by access (trail vs. helicopter), and cost.

The following Minimum Requirements Worksheets are used to document the process to determine the minimum action necessary and reasonable to complete the project (access to Mill Lake Dam for proposed work).

Public comment on the proposed use of mechanical transport will be incorporated into the final decision.

Minimum Requirements Worksheets -DRAFT

STEP 1 – DETERMINIMG THE MINIMUM REQUIREMENTS FOR MOTORIZED EQUIPMENT AND MECHANIZED TRANSPORT TO Mill Lake Dam (A two-part process)

PART A – Minimum Requirement Key to making a determination on wilderness proposals

(Answering these questions will help determine the **minimum required** action in wilderness.)

<table>
<tr><th colspan="3">Guiding Questions</th><th></th><th colspan="3">Use the available space or additional sheets as necessary</th></tr>
<tr><td colspan="3" rowspan="3">Is this an emergency (i.e.. a situation that involves an inescapable urgency and temporary need for speed beyond that available by primitive means, such as fire suppression, health and safety of people, law enforcement efforts involving serious crime or fugitive pursuit, retrieval of the deceased or an immediate aircraft accident investigation)?</td><td rowspan="3"></td><td>Answer:</td><td>YES:</td><td>NO: X</td></tr>
<tr><td colspan="3" rowspan="2">Explain: The request for mechanized access to Mill Lake Dam is not due to an emergency situation. It is to repair an ongoing leakage problem around the outlet works pipe by slip-lining the existing metal pipe with a new pipe. These repairs would meet Federal Dam Safety requirements by eliminating the potential for piping, or internal erosion of the embankment material around the outlet pipe that can result in a dam failure. Piping caused by seepage is one of the leading causes of failure for embankment or earthfill dams. This project will address the deficiency of the deteriorated outlet pipe and reduce the risk of an emergency situation and potential failure from piping around the conduit.</td></tr>
<tr><td></td></tr>
<tr><td colspan="2">If Yes, then:</td><td>If No, then:</td><td></td></tr>
<tr><td colspan="2">Document rationale for line officer approval using the minimum tool form and proceed with action</td><td>⇓
Go to next question</td><td></td></tr>
<tr><td colspan="7"></td></tr>
<tr><td colspan="3" rowspan="2">Does the project or activity conflict with the stated wilderness goals, objectives and desired future conditions of applicable legislation, policy and management plans?</td><td rowspan="2"></td><td>Answer:</td><td>YES:</td><td>NO: X</td></tr>
<tr><td colspan="3" rowspan="3">The Wilderness Act, Forest Service Manual Direction (2320), the Bitterroot NF Forest Plan, the Selway-Bitterroot Wilderness General Management Direction, 1866/1891 Easement and Dam Safety Laws and Regulations list applicable legislation and policy. FSM 2326.1 lists conditions under which the use of motorized equipment or mechanical transport may be approved This analysis indicates that one of the conditions is met; An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions.</td></tr>
<tr><td colspan="2">If Yes, then:</td><td>If No, then:</td><td></td></tr>
<tr><td colspan="2">Do not proceed with the proposed project or activity.</td><td>⇓
Go to next question</td><td></td></tr>
</table>

Are there other less intrusive actions that should be tried first (i.e. signing, visitor education or information)?			**Answer:**	**YES:**	**NO: X**
If **Yes**, then:	If **No**, then:		**Explain:** The action is transport of equipment, materials, supplies and people to the dam. Other less intrusive actions would not fulfill the purpose of the project.		
Implement other actions using the appropriate process.	⇓ *Go to next question*				
Can this project or activity be accomplished outside of wilderness and still achieve its objectives (i.e. some group events)?			**Answer:**	**YES:**	**NO: X**
If **Yes**, then:	If **No**, then:		**Explain:** Mill Lake Dam is located in the Selway-Bitterroot Wilderness.		
Proceed with action outside of wilderness using the appropriate process.	⇓ *Go to next question*				
Is this project or activity subject to valid existing rights (i.e. a mining claim or right-of-way easement)?			**Answer:**	**YES:**	**NO: X**
If **Yes**, then:	If **No**, then:		**Explain:** See explanation on the introduction page as well as below.		
Proceed to minimum tool section of this document, STEP 2.	⇓ *Go to next question*				
Is there a special provision in legislation (the 1964 Wilderness Act or subsequent wilderness legislation) that allows this project or activity (i.e. maintenance of dams or water storage facilities with motorized equipment and mechanical transport or control of fire, insects and disease)?			**Answer:**	**YES:**	**NO: X**
If **Yes**, then:	If **No**, then:		**Explain**: The Wilderness Act does not specifically address mechanized access to wilderness dams. In Section 4c it addresses access to all areas in Wilderness "[S]ubject to existing private rights...there shall be no use of motor vehicles [or] motorized equipment…in any such area." Section 5(b) states "In any case where… other valid occupancies are wholly within a designated forest wilderness area, the Secretary of Agriculture shall, by reasonable regulations consistent with the preservation of the area as wilderness, permit ingress and egress to such surrounding areas by means which have been or are being customarily enjoyed with respect to such areas similarly situated." Requests for access with mechanical transport are evaluated on a case-by-case basis, using Forest Service Manual direction and a Minimum Requirements Analysis.		
The proposed project or activity can be <u>considered</u> but it is not necessarily <u>required</u> just because it is mentioned in legislation. *Go to Part B, as needed.*	⇓ *Proceed to Part B, Responsive Questions*				

Minimum Requirements Worksheets -DRAFT

PART B – Determining the Minimum Requirement

EFFECTS ON WILDERNESS CHARACTER	REPONSIVE STATEMENT
How does the project or activity benefit the wilderness resource as a whole as opposed to maximizing one resource?	NA – The MCID has the right to access Mill Lake Dam for the reasonable use and enjoyment of these facilities. All project activities would occur within the MCID easement right-of-ways.
If this project or activity were not completed, what would be the beneficial and detrimental effects to the wilderness resource?	See above
How would the project or activity help ensure that human presence is kept to a minimum and that the area is affected primarily by the forces of nature instead of being manipulated by humans?	See above. The mode of transport chosen will significantly influence the length of time needed for access. Analysis indicates that mechanized round-trip transport would take approximately 4 -5 days with a total length of project time approximately 3-4 weeks. A combination of mechanized/non-mechanized round-trip transport to take in requested equipment/materials as well as packing in the grout material and mixing it on site would take 60-70 days with a total length of project time approximately 6-8 weeks. Helicopter trips would be reduced but stock trips along the trail would substantially be increased. In addition, the length of the project would also be increased. Impacts to the trail would also be increased. See following worksheets and appendixes addressing each alternative.
How would the project or activity ensure that the wilderness provides outstanding opportunities for solitude or a primitive and unconfined type of recreation (i.e. does the project or activity contribute to people's sense that they are in a remote place with opportunities for self-discovery, adventure, quietness, connection with nature, freedom, etc.)?	See above. The mode of transport chosen will influence effects to visitor experience by length of time required to transport equipment/supplies, to complete the project, and by number of encounters along the trail (traditional but requiring visitors to move off the trail and walk along horse manure) vs. sounds of helicopters (more disruptive to the "primitive" experience but no physical trail effects). Primary effects on visitor experience will be the actual work at Mill Lake Dam.

MANAGEMENT SITUATION		
What do your management plan, policy and legislation say to support proceeding with this project?	See Step 1 - Part A.	
How did you consider wilderness values over convenience, comfort, political, economic or commercial values while evaluating this project or activity?	See following worksheets and appendixes addressing each alternative.	
SHOULD WE PROCEED?	**YES: X** *Go to STEP 2*	**NO:** *Stop*

Minimum Requirements Worksheets - DRAFT

STEP 2 – DETERMINIMG THE MINIMUM TOOL
(The Minimum Tool Analysis)

Describe the alternatives. Be specific and provide detail.
Alternative 1*: No Action* Under this alternative, the Mill Creek Irrigation District would not be authorized helicopter access for the purpose of repairing their facility. Routine maintenance would be allowed to continue under the existing easement. Mill Lake Dam would remain in its present condition, which is not acceptable in regards to current federal dam safety laws and standards. The dam would continue to deteriorate and potentially threaten downstream forest resources and public safety.
Alternative 2: (MCID Proposal): ***Mechanized transport would be authorized for equipment or materials unreasonable to transport,(weight of pieces, size/shape, equipment sensitivity) with stock. Some materials and people may be transported by mechanized transport. The 40,500 lbs. of grout would be transported by mechanized transport. All other equipment, materials, supplies and people would be transported with stock. All use of motorized tools would be authorized.*** The MCID would use a combination of traditional transport (primarily with stock) and helicopter transport for equipment, materials and supplies. Some personnel may be transported to the dam by helicopter. Most people would access Mill Lake Dam by foot or with stock. The MCID would use motorized equipment at the dam to grout annular space between new insert pipe and the existing pipe. Helicopter transport would bring in the 13.5 cubic yards of grout from a reliable batching and mixing facility in the valley. Digging and moving rocks from around the outlet pipe would be done by non-motorized tools. Length of work period would be from 3 to 4 weeks. Number of days of helicopter traffic would be 4 to 5 days. Estimated 25 - 30 helicopter trips. Estimated 4 stock trips (each with 5 pack stock/one riding horse). All work would be completed in 2005.
Alternative 3: ***Mechanized transport would only be authorized for equipment unreasonable to transport, (weight of pieces, size/shape, equipment sensitivity) by stock. The 40,500 lbs. of grout, and all other equipment, materials, people, and supplies would be transported with stock. Onsite mixing of grout would occur. All use of motorized tools would be authorized*** The MCID would use mechanized transport for only the equipment unreasonable to haul up with stock. All other equipment, people, materials and supplies would be packed in by stock. The MCID would use motorized equipment at the dam to mix the grout material on site and pump the grout into the annular space between new insert pipe and the existing pipe. Approximately, 13.5 cubic yards of grout is needed to slip-line the pipe. Total weight estimated at 40,500 lbs. would be hauled in by stock and mixed on site. Digging and moving rocks from around the outlet pipe would be done by non-motorized tools. Length of work period would be 6-8 weeks. Number of days of helicopter traffic would be 3 days. Estimated 8 – 10 helicopter trips. Estimated 60-70 stock trips (each with 5 pack stock/1 riding horse). The quality of the grout would be compromised, and the work may not be completed in 2005.
Alternative Not Looked at in depth: ***No mechanized transport or motorized equipment would be authorized. All equipment, materials, supplies and people would be transported with stock.*** The MCID would use traditional transport and equipment to slip line the outlet pipe. Because the 92 foot pipe, holding tank, agitator and grout pump could not be transported up by stock, increased length of time to complete the project, impacts to the trail, and the impacts to wilderness this alternative was eliminated from further consideration.
Alternative Not Looked At In Depth: ***Fusion Welding (HDPE Pipe*****)** This alternative requires helicopter transport of 3800 lb. Fusion welding machine and generator to weld sections of the new 92 foot long outlet pipe. The sections of pipe could be transported by stock; however, the fusion welding machine requires mechanized transport and motorized power source. There would also be increased costs to the irrigation district for the lease or purchase of this equipment. Because of the increased costs, preference for a single joint of pipe by the engineering representative for the irrigation district, and no benefit related to Wilderness impacts, this alternative was eliminated from consideration.

Alternative Not Looked At In Depth: ***PVC Pipe.*** PVC is not an acceptable piping material for high hazard earthfill embankments. It has typically been used on small low-head, low hazard dams, such as stock ponds. However, PVC is joined using a bell and spigot connection with a gasket. This type of joint can easily leak during normal settlement of an earthfill dam. This leakage would likely result in piping, or internal erosion, of the embankment materials around the outlet pipe. Piping failure due to excessive seepage through the dam that results in internal erosion of the embankment fill material is one of the leading causes of failure for earthfill dams. The other reason that PVC is typically not used in outlet works for high hazard dams is that the material becomes brittle with decreased temperature, and a point load, such as a rock in the embankment, could crack and fail the pipe. Therefore, the use of PVC pipe for the outlet work is not acceptable because its use in this application would result in an increased risk of failure for this high hazard dam.

Alternative Not Looked At In Depth: ***Breaching Mill Lake Dam.***
This alternative is outside the scope of Forest Service authority.

Economic, Logistical and Timing Considerations
Notes: • **Alternatives are still being evaluated. While costs may be revised, they are used here to indicate relative values.** • **The estimated transport, equipment and labor costs are NOT total project costs. Certain material, off-site logistics, insurance, fees and permits, and standard contingency mark-ups are not included in these comparative costs.** • **One season is approximately 60 days (August, September). Snow and weather conditions outside this timeframe limit work and productivity.** • **These timeframes do not thoroughly evaluate ways project pieces may overlap or ways additional support could speed work. They are used here to indicate relative values**

	Alt 1	Alt 2	Alt 3
Estimated Project Costs	**0.00**	**$50,000 to $60,000**	**$85,000 to $95,000**
Estimated days for mechanized access	**none**	**4-5**	**3**
Estimated time for project completion	**none**	**@ 3-4 Weeks**	**@ 6-8 Weeks**

*Opportunity Class – A hypothetical set of conditions that will be maintained or restored within wilderness. More than one opportunity class description is developed in order to reflect the varying levels of human-caused change, solitude, challenge, and management activities experience within the wilderness.

Biophysical Effects
Common to All Alternatives: The Mill Creek drainage is in Opportunity Class 2* and receives relatively moderate use. Opportunity Class 2 is characterized by an unmodified natural environment. Ecological and natural processes on some sites are slightly affected by the actions of users. Environmental impacts are restricted to minor loss of vegetation where camping occurs and along most travel routes. Impacts in a few areas persist from year to year, and are noticeable to a few visitors. The area around Mill Lake exceeds Forest Plan standards by the number of campsites that are too heavily impacted
Alternative 1 This alternative would have no effect on wilderness in the short term. However, in the long term, if the dam is not repaired there is the possibility of breach and subsequent destruction of vegetation, catastrophic soil movement, and stream channel scouring which would be an irreversible indicator of man's presence. A dam failure would also be expected to produce short term water quality and fishery degradation.
Alternative 2: Effects on fisheries, vegetation, sensitive plants and cultural resources would be low with air transport (unless a helicopter crashes – which has fuel spill and aircraft removal problems). Effects on management indicators or T&E species would be low. Effects to mountain goats and Peregrine Falcons disturbed by air transport would be increased. There would be temporary wildlife displacement but primary effects would occur during the work operations. Effects to the Mill Lake worker campsite would be minimal because extensive camps have also been used in recent repair projects. These campsite impacts are considered traditional and able to be mitigated.
Alternative 3: Helicopter effects would be the same as in Alternative 2. Possible effects on fisheries, vegetation, sensitive plants and cultural resources would be increased by stock impacts on Mill Creek Trail. The amount of time needed for transport and for work would be higher than in Alternative 2 (increasing wildlife displacement). Effects to the Mill Lake worker campsite would be higher than during recent projects due to longer project timeframes. There would be increased stock impacts to the Mill Creek Trail tread and drainage structures. Effects on campsites associated with stock transport would be increased compared to past work projects that used stock on-site (and included containment).

Social/Recreational/Experiential Effects
Common to All Alternatives: The Mill Creek drainage is in Opportunity Class 2 and receives relatively moderate use. Opportunity Class 2 is characterized by an unmodified natural environment. Ecological and natural processes on some sites are slightly affected by the actions of users. Environmental impacts are restricted to minor loss of vegetation where camping occurs and along most travel routes. Some sign of human modification and visitors can expect to see some human impacts that persist from year to year. The area around Mill Lake exceeds Forest Plan standards by the number of campsites that are too heavily impacted. Mill Creek Trail # 364 is a popular stock and foot trail.
Alternative 1: This alternative would have no effect on the visitor's expectations of naturalness, remoteness and solitude in the short term. However, in the long term, if the dam is not repaired there is the possibility of breach and subsequent destruction of vegetation, catastrophic soil movement, and drainage scouring which would be an irreversible indicator of man's presence.
Alternative 2: Visitor expectations of naturalness, remoteness and solitude would be impacted by the sight and sound of helicopters, by landings at the lake (considered an intrusion of wilderness character); by encounters with motorized equipment at the lake; and by camping restrictions associated with the work project. The physical effects of transport would total approximately **4-5 days** and the work project would take approximately **3-4 weeks** to complete.
Alternative 3: Visitor expectations of naturalness, remoteness and solitude would be impacted by the sight and sound of helicopters, by landings at the lake (reduced slightly from Alternative 2); by encounters with motorized equipment at the lake; and by camping restrictions associated with the work project. Effects to visitor experience would be increased by trail encounters with stock trains. The physical effects of transport would total approximately **60-73 days (3 days with helicopters and 60-70 days with stock** – NOT done simultaneously because of site constrictions) and the work project would take approximately **6-8 weeks** to complete.
Societal/Political Effect
Common To All Alternatives: The MCID is liable for damages associated with dam failure, particularly if the dam owner is determined to be negligent. Negligence is the lack or failure of actions that a reasonable dam owner would perform in constructing, maintaining, and operating a dam.
Health and Safety Concerns
Common to All Alternatives: If the deficiency of the outlet pipe is not completed to acceptable standards within a reasonable timeframe, there is an increased risk of failure caused by piping around the outlet conduit, which is one of the leading causes of failure for earthfill dams. There is a risk of loss of life if Mill Lake Dam fails because it is a high hazard dam. As the dam owner, MCID is the responsible party and can be held liable for damages if they are negligent in repairing the deteriorated outlet works.
Alternative 1: This alternative would have no effect in the short term. However, in the long term, if the dam is not repaired there is the possibility of dam failure. Homes and buildings could be flooded as well as Highway 93 near Mill Creek. Consequences could include loss of life, economic loss to residents and property owners, and damage to public and private natural and economic resources.
Alterative 2: There would be risk of severe injury or death associated with helicopter use. There would be some risk associated with use and transport of hazardous materials (to on-site workers, visitors and down-stream properties). There would be some risk of moderate or severe injury associated with stock use. This alternative corrects the dam safety deficiencies within a reasonable timeframe utilizing accepted engineering practices.
Alterative 3: There would be risk of severe injury or death associated with helicopter use (but slightly less than in Alternative 2). There would be some risk associated with use and transport of hazardous materials (to on-site workers, visitors and down-stream properties). Risk of stock and construction-related injuries in this alternative would be higher than in Alternative 2. This alternative does not meet acceptable quality control for the batching and mixing of the grout utilizing an approved facility (based on recommendations from MCID's engineering representative).

Formulate a preferred action. Be specific and describe in detail below.

Alternative 2 meets three of the conditions listed in FSM, WO Amendment 2300-90-1, 2326.1- Conditions Under Which Use May Be Approved. Allow the use of motorized equipment or mechanical transport only for:

- **Emergencies or inescapable urgency and temporary need for speed beyond that available by primitive means. – As shown in Step 1 part A the request for mechanized access to Mill Creek Dam is not due to an emergency situation. It is to repair an ongoing leakage problem around the outlet works pipe. These repairs would correct deficiencies affecting the integrity of the structure by reducing the potential for piping, or internal erosion of the embankment material around the outlet pipe that can result in a dam failure. Piping and seepage is one of the leading causes of failure for embankment or earth-fill dams. By completing this work the dams structural integrity would be improved and the risk of an emergency situation would be reduced.**
- **Access to surrounded State and private lands and valid occupancies (FSM 2326.13)**
- **To meet minimum needs for protection and administration of the area as wilderness, only as follows: (b.) An essential activity is impossible to accomplish by non-motorized means because of such factors as time or season limitations, safety, or other material restrictions.**

Alternative 2 corrects the deficiency associated with the outlet works in a reasonable timeframe to prevent an emergency condition and would affect visitor experience for the shortest amount of time (although this would be offset by the affects of motorized & mechanized use).

The following individuals were involved in preparing and reviewing this minimum requirement worksheet:

Debra Gale – Wilderness/Trails Program Manager
Terri Anderson – Civil Engineer, Dams
Dan Ritter – Acting District Ranger – Stevensville Ranger District
Pete Zimmerman – Assistant Planner
Ed Snook –North Zone Hydrologist
Robb Brassfield – North Zone Fisheries
Dave Lockman – North Zone Wildlife Biologist
Elizabeth Ballard – Acting North Zone Id Team Leader