Wilderness Awareness Workshop

# Case Study Discussion – Trail Bridge

**1. Issue:** Trail bridge failure in Wilderness

**2. Situation:** An existing untreated, native stringer packbridge in wilderness, is at the end of its use life. The bridge was constructed in 1984 and has been recently inspected. The native stringers are determined to be rotten and at high risk to failure. The inspection report recommends physically closing the bridge immediately.

The bridge is part of a mainline trail system. Use of the trail system is light to moderate, occurring primarily during the fall hunting season when stream levels are generally low. Use is by both the outfitted public and non-outfitted public.

Access from the north does not open until mid July because of snow drifts across the trail. Little to no use occurs during the spring high water runoff period. Distance to the bridge site to the nearest trailhead is 8 miles and from the bridge site to the net nearest trailhead is approximately 12 miles.

Use patterns and access options have changed during the past 15-20 years and use of this particular trail is estimated to have declined. There is very little to no stock use occuring during high water periods. There are two old fords which were used in the past before the bridge was constructed. The most favorable old ford site would require about ¼ mile of minor trail reconstruction. After looking at the ford sites, the fish biologist is relatively certain that use of the fords would not significantly impact fish habitat.

The bridge has two spans, one 25 feet in length and the other 51 feet supported on a center pier constructed on top of a very large boulder located within the stream channel. Because of the long span there is currently no treated wood, packable bridge design suitable for the site as the maximum design thus far for treated packable bridges is 40 feet. However after viewing the site the regional bridge engineer is relatively confident that a packable bridge design could be developed for the site (as has been done in other FS wilderness areas). The packable bridge designs are designed for a 50 year plus life span and have been successfully packed and constructed within the past few years. A packable bridge design represents a higher initial cost than replacing with an untreated, native log stringer bridge, however, given current knowledge and experience, the treated, packable bridge is expected to produce a signficantly longer lifespan. The appearance of the packable bridge is obtrusive to some due to the steel plates and bolts required to fasten sections of the stringers together.

The forest type surrounding the bridge is mature mixed conifer. There are numerous trees within the immediate vicinity, of the species, size, taper, and grade suitable for use as native log stringers. Generally, untreated native stringer bridges in this locale and climate have a lifespan of 15 to 20 years when the stringers become rotten because of moisture saturation. The current bridge has been in place approximately 20 years. The local wilderness ranger has developed a design and proposed that the lifespan of the untreated, native, log stringers can be significantly extended by covering the top of the stringers with metal sheeting with spacers in between. He has consulted with the wood products lab and the FS Missoula Technology Development Center on the design and indicates they agree that the lifespan can be significantly extended with such a method, however they have not provided data and supporting documentation of such. The bridge engineers are doubtful that covering the tops of the stringers will appreciably extend the lifespan of the stringers. This method is untested and unproven. The untreated, native stringer bridge represents the least initial cost of bridge replacement.

There is room to operate at the site with a helicopter. A helicopter is the only way to transport and place full length treated wood or steel stringers. Steel stringers could theoretically last indefinitely. Use of aircraft would be required initially but would not be required in subsequent replacements. Abutments would have to be replaced every 50 years or so but it is anticipated that this could be accomplished using non-motorized equipment.

**3. Management Question(s):**

1. Does replacement of the bridge represent the minimum requirement for the administration of the area for the purposes of the Wilderness Act?
2. If so, what method of replacement represents the minimum tool, having the least impact upon the wilderness character and values?

**4. Direction/Guidance:**

1. **What does the Wilderness Act say?**

Section 2(a) . Wilderness shall be administered :

* + in such manner as will leave them unimpaired for future use and enjoyment as wilderness to provide for the protection of these areas
  + for preservation of their wilderness character
  + for the gathering and dissemination of information regarding their use and enjoyment as wilderness;

Section 2(c) Definition of wilderness:

* an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain.
* land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable
* has outstanding opportunities for solitude or a primitive and unconfined type of recreation
* is to be preserved in an unimpaired condition
* may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Section 4(b) Purpose of wilderness

“wilderness shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.”

Section 4 (c) (Prohibition of certain uses)

“except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act ….there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.”

1. **What is your agency policy?**

FSM 2320.3 - Policy

10. Inform wilderness visitors that they face inherent risks of adverse weather conditions, isolation, physical hazards, and lack of rapid communications, and that search and rescue may not be as rapid as expected in an urban setting in all publications and personal contacts.

FSM 2323.13f (2). Bridges. Design bridges to minimize the impact on the wilderness. Select locations that minimize the size and complexity of the structure. Provide or replace bridges only:

1. When no other route or crossing is reasonably available.
2. Where the crossing, during the primary season of public use, cannot be negotiated afoot safely, or cannot be forded by horses safely.
3. Where unacceptable bank damage will occur from visitors seeking a crossing.
4. Where flood waters frequently destroy or damage less sturdy structures.
5. **What does your forest plan or wilderness plan say?**

***Insert or provide a handout of any relevant forest or wilderness plan standards and guidelines.***

**5. What are your management options?**

Remember to split this minimum requirements decision making process into two parts:

Step 1 – Is any administrative action necessary?

Step 2 – If action is necessary, what is the minimum tool/method that will cause the least

degradation of the wilderness resource and character?

**Step 1: Is administrative action necessary? \_\_\_\_ YES \_\_\_\_\_ NO**

**Why?**

***Use the Minimum Requirements Decision Guide (MRDG) handout and the questions listed for Step 1 in the MRDG to assess the issue presented in this case study.***

If the answer is YES, proceed to Step 2 of the MRDG.

If the answer is NO, explain why and stop the minimum requirements analysis here.

**Step 2: If the answer to Step 1 is YES, administrative action is necessary, then develop and discuss alternatives and others that your group develops:**

1. No Action. Remove the existing bridge to prevent unsafe use only.

2. Remove the bridge,reconstruct the trails to a ford.

3. Replace the bridge using the native stringer design constructed fro materials obtained inthe wilderness and using primitive ad traditional skills and tools.

4. Design and pack in a bridge that uses treated wood materials.

5. Fly-in materials for a full-length stringer, treated wood bridge.

What other alternatives are feasible?

***Use the Minimum Requirements Decision Guide (MRDG) handout and the***

***questions listed for Step 2 to assess the issue presented in this case study.***

**8. What is your decision?**

What mitigation measures are necessary?

**9. What is the rationale for your decision?**

The rationale should link the decision made to wilderness management objectives, law, policy, forest plan standards and guidelines, etc. and explain how this decision best protects the wilderness character while addressing the problem in a feasible manner.

**10. What additional constraints are necessary to minimize disturbance to the wilderness resource and character?**

Timing, location, or frequency of activity?

Maintenance requirements?

Standards or design requirements?

Monitoring?

Actual Decision - Trail Bridge

Selway-Bitterroot Wilderness, Idaho

**Actual Decision** (Selway-Bitterroot Wilderness, Idaho):

Minimum Requirement Decision Guide analysis indicated tha the bridge should not be replaced.

The trail should be reconstructed to access the ford area andthe ford and streambanks should be hardened to accommodate stock use.

Additional Question: What would your decision be whether or not to replace the bridge if there is considerable use of this bridge by stock during spring, summer & fall seasons?

**Rationale for decision:**

The rationale would link the decision made to wilderness management objectives, law, policy, forest plan standards and guidelines, etc. and exlain how this decision best protects the wilderness character while addressing the problem in a feasible manner.

The primary season of use for this trail and stream crossing is during the period where visitor safety issues would not prevent use of a ford. Therefore a bridge structure is not the minimum necessary. In addition,

* Use of native materials obtained in wilderness causes additional impacts to the natural conditions and would need to be repeated every 20 years.
* Constructing a packable bridge fits with the policy of using traditional and primitive skills and elminates the need for a helicopter but the general appearance of the bridge may be more obtrusive due to the steel plates required to holkd the stringer sections together.