National Park Service
U.S. Department of the Interior

Glacier National Park
Waterton-Glacier International Peace Park
Montana

McDONALD CREEK BANK STABILIZATION AT MILEPOST 19.25 ON THE GOING-TO-THE-SUN ROAD FINDING OF NO SIGNIFICANT IMPACT

In November 2006, a rain on snow event caused severe flooding on the west side of the park causing damage to the GTSR, and several bridges, culverts and streambeds. In the spring of 2007, the park identified a portion of stream bank along the GTSR that had sloughed off into McDonald Creek. Temporary measures were installed to stabilize the bank and prevent further damage to the road. The site needs to be permanently fixed to protect the GTSR, a national historic landmark.

The purpose of this assessment is to evaluate alternative ways to stabilize the bank at this location to prevent additional sedimentation in the creek and undercutting of the road. Peak run off for streams along the GTSR corridor usually occurs during fall rain on snow events, during the spring in response to snowmelt, or during summer thunderstorms. The GTSR limits the movement of McDonald Creek to the east allowing flooding to only occur on the western stream bank or, during high water events, undercut the road. The GTSR, a national historic landmark, averages 1.9 million visitors annually and provides access for visitors to experience the park (based on the last ten years, NPS files). Stream banks maintain important aquatic habitat characteristics by providing shade that results in cooler water temperatures, suspending sediment, and offering cover for aquatic species.

The following objectives will be met by this project:

- Minimize impacts on aquatic species, water quality and vegetation
- Protect a national historic landmark road
- Maintain visitors' access and experiences across the park
- Prevent impairment and unacceptable impacts to park resources and values

This EA and Statement of Findings are being prepared with assistance from the FHWA.

This document records 1) a Finding of No Significant Impact as required by the National Environmental Policy Act of 1969 and 2) a determination of no impairment as required by the NPS Organic Act of 1916.

PREFERRED ALTERNATIVE

The preferred alternative will take the following action to stabilize approximately 100 feet of the bank and prevent further erosion. Stone riprap, and vegetation will be used to armor the bank above the high water line. The riprap will ensure long-term stabilization at the site while the vegetation will further stabilize the bank and mitigate the visual impacts of riprap and restore the appearance and function of a vegetated bank.

Large (Class VII), angular riprap will be placed over the sloughed streambank area and up and downstream of the site in order to armor the bank toe; totaling approximately 300 lateral feet. The riprap will extend from the stream edge to the shoulder of the GTSR and instream work will be required to place the riprap at the toe of the slope. It will extend laterally approximately 90 feet from the stream edge of the eroding slope to the road shoulder currently being held in place by soil nails. Additional armoring of the bank toe will be buried in the streambed to reduce scour. The armored bank toe will require excavation into the natural channel substrate and creation of a rock "toe" to ensure high flows do not compromise the structural integrity of the stabilization. The armored bank toe will extend 100 feet upstream of the riprap revetment and approximately 65 feet downstream and will rise 10 feet above the stream bottom. In-channel work will involve the excavation of approximately 3,000 ft^3 of native streambed material, which will be replaced with riprap to form the toe of the slope.

The site will be accessed by cutting the GTSR in this location almost down to the stream level. Access might also occur by driving an excavator up McDonald Creek from the pullout below this location, across the open gravel banks and occasionally crossing the stream. If the stream access is selected, the excavator will only make one trip up to the site and one trip down. If the access road is selected, the area of impact will extend the length of the treatment area (approximately 300ft) and will be within the road prism. Temporary construction pads, made of rock, will be located at the base of the slope to provide a platform for the construction equipment above the water line.

Vegetation will be used to stabilize the upper portion of the bank and along the shoulder of the road. Restoration will include incorporating native species (such as dogwood, cottonwood and willows seedlings) into the riprap revetment between four and ten feet about the stream bottom (see figure 2). The seedlings will further stabilize the stream bank as they sprout and take root. The seedlings will be planted in the soil and then riprap will be placed around them. Planting pockets will be incorporated into the upper portions of the riprap.

Final work, revegetation and project cleanup will most likely occur in early summer after spring runoff. McDonald Creek will not be diverted during the project. Project work will be started during low water times in the fall and will take about two months to complete.

MITIGATING MEASURES

Under the preferred alternative, mitigation measures as appropriate will be taken to protect natural resources at the project site. They are listed at the end of the document.

ALTERNATIVES CONSIDERED

No Action

Under the no action alternative, McDonald Creek would continue to function in its current semi-natural state. The GTSR forms the east boundary of the stream channel in most areas limiting the streams ability to move across the valley bottom, deposit sediment and channelize in a natural state. The soil nails and jersey concrete barriers would remain in place. The paved widening on the ditch-side of the road would also remain in order to provide adequate travel land width. The road and bank would be monitored and appropriate safety measures would be implemented if the road became hazardous to drive.

Stabilize the Bank Using Riprap and Install Rock Barbs in the Stream

Under this alternative, the following actions would be taken to stabilize approximately 150 feet of the bank and prevent further erosion and sedimentation. Large (class V and VII riprap, 2 – 5 feet in diameter), angular rock would be used to create "barbs" in the stream and armor the slope from the toe of the slope to the shoulder of the road. The temporary soil nails would be removed and riprap would be placed for about 160 feet along the bank below high water line (see figure 3). The site would be accessed as described for the preferred alternative.

The riprap and barbs would require excavation into the natural channel substrate to install a large rock "toe" that would ensure high flows do not compromise the structural integrity of the stabilized bank. In-channel work would involve the excavation of approximately 3,000 ft^3 of native streambed material, which would be replaced with riprap to form the toe of the slope and footer material for the barbs. Most of the streambed material would be hauled away. A small amount would be incorporated into the riprap promote growth of vegetation. Project work would occur during low water times in the late fall/early winter.

Two barbs would be placed in the creek. One barb would be placed immediately upstream and one barb downstream of the sloughed bank area. Barbs are sloping stone sills, angled upstream and used re-direct currents away from the bank, thereby reducing erosion. The barbs would be about 30 feet long total and extend about 15 feet from the bank, angled upstream 25 degrees, counter sunk in the streambed about 3 to 4 feet, and keyed into the eroding bank. The barbs would be about 25 feet wide at the bank end and slope down from a 6 to 7-foot wide center crest into the stream bed. They would be about 5 feet in height above the stream bottom at the bank end and level with the stream bottom at the stream end (not including the countersinking). Consequently, they would have a low profile with only the segment next to the stream bank visible during most of the visitor season. During low water periods about one-half to one-third of the barbs

would be exposed. The barbs would be designed based on a 50-year flood event depth and velocity.

Stone riprap and vegetation would be used to armor the bank above the high water line. The riprap would ensure long-term stabilization at the site. It would extend approximately 100 feet from the stream edge of the eroding slope to the road shoulder currently being held by soil nails. An additional 8-foot wide riprap – toe would be buried in the streambed.

Vegetation would be used to stabilize the upper portion of the bank and along the shoulder of the road. Restoration would include incorporating native species (such as dogwood, cottonwood and willows seedlings) into the riprap. The seedlings would further stabilize the stream bank as they sprout and take root. The seedlings would be planted in the soil and then riprap would be placed around them (see appendix A, figure 4) and planting pockets would be incorporated into the upper portions of the riprap. No planting would be done on the barbs. Final touches, revegetation and project cleanup would most likely occur in early summer after spring runoff. McDonald Creek would not be diverted during the project.

The "riprap only" alternative is the environmentally preferred alternative. The environmentally preferred alternative is the alternative that will promote the national environmental policy as expressed by §101 of the National Environmental Policy Act. This includes alternatives that:

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings

(3) attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;

(4) preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice

(5) achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and

(6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The no action alternative does not fulfill the environmental evaluation criteria. Deterioration of the road at MP 19.25 would inhibit visitors from safe access to the park and eventually would prevent visitors' ability to enjoy the cultural and natural resources, thus criteria 1, 2, 3 and 5 would not be met. Without taking action to permanently stabilize the bank, by redirecting the currents from the bank and fortifying the slope, will lead to deterioration of the Going-to-the-Sun Road, a national historic landmark,

thus criteria 4 will not be met. Criteria 6 is neither achieved nor not achieved by the no action alternative.

The Alternative II and Alternative III (Preferred) address 1 – 5 of the evaluation criteria; criteria 6 is neither achieved nor not achieved by the alternatives. By permanently stabilizing the bank along the GTSR at MP 19.25, the park continues to provide access to visitors with the least amount of impact on natural and cultural resources. Implementing Alternative III will have less of an impact to water resources; therefore it best allows the park to fulfill evaluation criteria 3, as compared to the other alternatives, while preserving an important historic landscape (criteria 4). Initially Alternative II was considered the preferred alternative but after great consideration of the impacts to water quality and stream dynamics from installing the rock barbs it was determined Alternative III will have less of an impact on park resources.

WHY THE PREFERRED ALTERNATIVE 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.

Stabilization efforts, as proposed in the preferred alternative, result in minor, beneficial and adverse, site specific and long-term impacts to soil resources. Loss of vegetation along the bank where riprap will be installed will result in minor, long-term adverse impacts to vegetation. And above the bank full line where vegetation will be planted, there will be minor, beneficial impacts to vegetation, partially mitigating the adverse impact. Terrestrial wildlife species will experience minor, adverse, and short-term impacts. Impacts to aquatic resources will be minor, adverse short and long-term as a result of construction activities and permanent changes to conditions in the stream channel. Though there will be increased human activity temporarily in the area near the project site from actions proposed in the preferred alternative, impacts on grizzly bear will be negligible to minor, adverse and short term because they will be preparing for hibernation and or denning at higher elevations than the project site during the construction time. Actions proposed will result in negligible to minor, adverse short-term impacts to Canada lynx and gray wolves due to the incidental use of the project area by these species. Any disturbance that generates fine sediment in the form of bedload is unlikely to reach any bull trout or bull trout critical habitat during construction activities. Suspended fine sediment will likely reach the lower portions of upper McDonald Creek but this sediment will be diluted considerably at this point, therefore impacts to bull trout and rearing habitat will be negligible to minor, adverse, and short-term. Impacts from actions proposed in the preferred alternative will be negligible to harlequin duck since work will begin after females with brood have left the area, thus there will be no risk of displacement. Sediment generation and permanent changes to habitat conditions will result in minor, adverse, short-term impacts to west slope cutthroat trout. The project area is in established ungulate winter range and

construction activity will be scheduled for late fall or early winter which will have minor, adverse, short-term impacts to wolverines and fishers because they prey on ungulate carrion. Impacts to water resources will be moderate, adverse and short-term from excavation in the stream and the installation of rock barbs and riprap but long-term impacts will be minor and beneficial. The proposed action will result in both adverse impacts, due from altered natural process, and beneficial impacts, due to maintaining the floodplain process northwest of the creek and negligible to minor, site-specific, and long-term impacts to floodplains due to the likelihood the stream will retreat a few feet to maintain the effective channel width. Actions proposed for the preferred alternative will have negligible to minor, adverse short-term impacts and moderate, both adverse and beneficial, long-term impacts for visual resources and visitor experience. Impacts to cultural resources will be minor, long-term, site specific and adverse due to the slight change to the visual character of the GTSR, which is a cultural landscape of the Going-to-the-Sun Road Historic District. For purposes of Section 106, the finding of effect will be no historic properties affected. All other resource topics were dismissed because the project will result in "no effect" or negligible impacts for those resources. No major effects are anticipated because of this project.

Degree of effect on public health or safety

Public health and safety are core Service values. Glacier National Park is committed to addressing risk recognition and early prevention for a safe work and recreational environment. Public health and safety will not be affected as there is no change from the current conditions that may impact these values.

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

The project site is within the floodplain of McDonald Creek. Because of the park's objective to protect the road, any floodplain changes southeast of the creek will be considered a threat to the road and, therefore, adverse. Otherwise, natural changes in the floodplain will not be impeded or considered detrimental for the protection of the road. Slight alterations of the floodplain will cause no more than minor, adverse, long-term impacts. Armoring of the bank toe, as proposed in this alternative, will reduce the risk of accelerated stream bank erosion and undermining the GTSR because it extends further up and downstream, as compared to alternative II. Changes to the floodplain relative to existing conditions will be unlikely or negligible to minor. A Statement of Findings was prepared to address these impacts of the floodplain and is attached to this document. A wetland delineation was not needed as the actions proposed will not affect wetlands. Therefore a Statement of Findings for Wetlands was not prepared.

There are no prime farmlands in the park. Wetlands, wild and scenic rivers, or ecologically critical areas will not be affected.

Degree to which effects on the quality of the human environment are likely to be highly controversial

Public scoping began with a press release and a mailed scoping brochure on January 30, 2008. Scoping brochures were sent to people on the park's environmental assessment mailing list that included members of the public along with federal, state and tribal agencies. The scoping brochure was also placed on the National Park Service's Planning Internet site. Public scoping was completed February 29, 2008.

Two letters were received during the scoping period. One comment letter agreed the need for stabilizing the bank was apparent (opposed to no action or moving the road) but indicated they would wait until the environmental assessment was prepared before commenting further. The other commenter wondered why we were not utilizing the cooperation already in place with Federal Highway Administration and questioned what the public could contribute to FHWA road design to accomplish the tasks proposed in this project. Scoping is the first step in the early planning process of the National Environmental Protection Act (NEPA) and is used to ensure all possible alternatives and effects to resources are considered. Even though the FHWA may be considered an "expert" by the commenter, as cooperator with the park and a federal agency they must also follow federal laws and regulations; including NEPA. FHWA and the NPS developed the alternatives analyzed in this EA and Statement of Findings.

Degree to which the possible effects on the quality of the human environment are highly uncertain or involve unique or unknown risks

The actions proposed in the environmentally preferred alternative will not have effects on the quality of the human environment or involve unique or unknown risks.

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

The preferred alternative does not establish a precedent for future actions or represent a decision about a future consideration.

Whether the action is related to other actions with individually insignificant but cumulatively significant impacts

No major (significant) cumulative effects were identified in the EA. Impacts to water resources will be moderate, adverse and short-term from excavation in the stream and the installation of riprap but long-term impacts will be minor and beneficial.

Degree to which the action may adversely affect districts, sites, highways, structures, or objects listed on National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources

The Going-to-the-Sun Road (24FH0161/24GL0136) is the only cultural resource in the area of potential effect for this project. The road is listed in the National Register of Historic Places and is a designated National Historic Landmark. The GTSR is also a cultural landscape, significant for its engineering features and as an example of National Park Service landscape design. The proposed project will have minor, long-term, site specific and adverse impacts due to the slight change to the visual character of the

GTSR. For purposes of Section 106 of the National Historic Preservation Act of 1966, as amended, the finding of effect will be no historic properties affected. The Montana Historic Preservation Officer wrote stating their concurrence with the park that the project will have no effect on the National Historic Landmark listed in the National Register of Historic Places (September 2, 2008).

Degree to which the action may adversely affect an endangered or threatened species or its critical habitat

The NPS determined that the proposed action "may affect, not likely to adversely affect" grizzly bears, gray wolves and Canada lynx, under section 7 of the Endangered Species Act. The biological assessment (February 13, 2003) prepared for the *2003 Going-to-the-Sun Road Rehabilitation Plan, FEIS* covers this concurring with the park's determination. The NPS determined that the proposed action "may affect, not likely to adversely affect" the threatened bull trout, therefore a Fisheries Biological Assessment was submitted for review and concurrence as the GTSR FEIS did not include bull trout. U.S. Fish and Wildlife Service concurred with the determination for bull trout on September 23, 2008.

Whether the action threatens a violation of Federal, state, or local environmental protection law

This action violates no federal, state, or local environmental protection laws.

APPROPRIATE USE, UNACCEPTABLE IMPACTS, AND IMPAIRMENT

Sections 1.5 and 8.12 of NPS *Management Policies* underscore the fact that not all uses are allowable or appropriate in units of the National Park System. The proposed use was screened to determine consistency with applicable laws, executive orders, regulations, and policies; consistency with existing plans for public use and resource management; actual and potential effects to park resources; total costs to the Park Service; and whether the public interest would be served. The GTSR is a national historic landmark that the National Park Service is committed to preserving. The 1999 *General Management Plan* and the 2003 *Rehabilitation of the Going-to-the-Sun Road Final Environmental Impact Statement* evaluated and further committed the National Park Service to preserving the GTSR for vehicle travel. The NPS Organic Act and 2006 NPS Management Policies also speak to preservation of cultural resources. These same plans, laws and policies also speak to conservation of natural resources. The impacts to McDonald Creek are acceptable and will be mitigated. McDonald Creek's flow and function will not be affected therefore; the Park Service finds that the preferred alternative is an appropriate use. Because the application of mitigating measures is expected to be successful in ensuring that no major adverse impacts would occur and that satisfactory revegetation and restoration of the creek bank, road alignment and stream function is expected to be achievable, implementation of the preferred alternative will not result in any unacceptable impacts.

In analyzing impairments in the NEPA analysis for this project the NPS takes into account the fact that if impairment were likely to occur, such impacts would be

considered to be major or significant under CEQ regulations. This is because the context and intensity of the impact would be sufficient to render what would normally be a minor or moderate impact to be major or significant. Taking this into consideration, NPS guidance documents note that "Not all major or significant impacts under a NEPA analysis are impairments. However, all impairments to NPS resources and values would constitute a major or significant impact under NEPA. If an impact results in impairment, the action should be modified to lessen the impact level. If the impairment cannot be avoided by modifying the proposed action, that action cannot be selected for implementation." "Interim Technical Guidance on Assessing Impacts and Impairment to Natural Resources" National Park Service, Natural Resource Program Center, July 2003.

In addition to reviewing the definition of "significantly" under the NEPA regulations, the NPS has determined that implementation of the preferred alternative will not constitute an impairment to the integrity of Glacier National Park's resources or values as described by NPS *Management Policies* (NPS 2006 § 1.4). This conclusion is based on the NPS's analysis of the environmental impacts of the proposed action as described in the EA, the public comments received, relevant scientific studies, and the professional judgment of the decision-maker guided by the direction in 2006 NPS *Management Policies*. The EA identified less than major adverse impacts on soils, vegetation, wildlife species (including aquatic species, threatened species and endangered species, and species of concern), visitor use and experience, visual resources, cultural resources, water quality, and floodplain. This conclusion is further based on the Superintendent's professional judgment, as guided and informed by the ***General Management Plan and the Going-to-the-Sun Road Rehabilitation Plan/FEIS***. Although the project has some negative impacts, in all cases these adverse impacts are the result of actions taken to preserve and restore other park resources and values. Overall, the plan results in benefits to the park's resources and values, opportunities for their enjoyment, and it does not result in their impairment.

PUBLIC INVOLVEMENT

The environmental assessment was made available for public review and comment during a 30-day period ending September 19, 2008. The announcement was also posted on the National Park Service's public comment website. Letters were sent to the park's mailing list for EAs, which includes various federal, state, and local agencies, including the U.S. Fish and Wildlife Service (USFWS), the Montana State Historic Preservation Officer (MTSHPO), the Advisory Council for Historic Preservation (ACHP), the Blackfeet Tribal Business Council, and the Confederated Salish and Kootenai Tribe.

The MTSHPO concurs with the park that the preferred alternative does not represent an adverse effect to the qualities that make the road a National Historic Landmark in a letter dated Sept. 2, 2008 signed by Pete Brown. One comment letter was received from an individual. They supported the preferred alternative.

The park did not receive substantive comments; therefore no changes to the text of the environmental assessment were made.

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 generally adverse impacts that range from localized to widespread, short- to long-term, and negligible to moderate. 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, it has been determined that an EIS is not required for this project and thus will not be prepared.

Approved: _____ _____

Regional Director, Intermountain Region Date

MITIGATION MEASURES

Soils

- All activities will be confined to areas defined by the drawings and specifications. Stone, soil, or other materials displaced into un-cleared areas will be removed by the contractor.
- No diversion dike will be installed, because removal of the diversion will release a large amount of sediment at one time that will have more harmful effects downstream than if sediment is slowly released during construction.
- Deposit excavated material where it will not erode into nearby watercourses by surface runoff or high stream flows.
- Loose, granular materials from project site will be stored in well-drained area on solid surfaces to prevent mixing with foreign matter. Granular stored materials will be covered with secured tarps at all times.
- Local mulch will be used to stabilize soil and fill slopes as appropriate.
- Design and construct surface runoff features in a non-erosive manner.

Vegetation

- Best Management Practices will be implemented to prevent wind and water erosion.
    - Disturbance to vegetation and ground will be avoided as much as possible and be contained to as small of footprint as possible while meeting project objectives.
- Landscaping design features will be used to minimize visual impacts and to aid in creating suitable site conditions for revegetation.
- A restoration analysis will be completed to decide if revegetation is necessary throughout the life of the project. If it were determined to be necessary the following mitigation measures will apply:
    - Soil amendments, mulches, organic matter and other measures will be applied as appropriate to facilitate revegetation.
    - Native vegetation will be used to revegetated disturbed areas.
    - Native species from genetic stocks originating in the park will be used for revegetation seeding and planting efforts. Plant species density, abundance, and diversity will be restored as nearly as possible to prior conditions for non-woody species.
- Vegetation cover will be monitored and evaluated and contingency and maintenance plans will be developed if vegetation cover is not similar to original ground cover.
- A vegetation management plan will be prepared for the project.
- Aggressive noxious weed control measures will occur and noxious weed populations will be controlled along the GTSR.
- Riprap, gravel, and topsoil sources will be inspected prior to use, and material currently supporting invasive exotic plants will be avoided.

- Construction vehicles will be inspected and washed to prevent the import of noxious weeds from tires and mud on the vehicles.
- Fertilizers that might favor weeds over native species will be limited or prohibited.
- Periodic inspections and spot controls will occur to prevent noxious weed establishment. If noxious weeds invade an area, an integrated noxious weed management process to selectively combine management techniques to control the particular noxious weed species will be used.

Wildlife and Aquatic Resources

- A stormwater management plan will be prepared to minimize erosion and the introduction of sediments to aquatic habitat.
- Drainage improvements will be used to control runoff and reduce erosion.
- No food garbage or items that will be considered attractants to wildlife will be stored on site.
- Equipment will be inspected for hydraulic fluid, antifreeze and oil leaks prior to use at staging and stockpiling sites, and materials will be kept on site for clean up of any motor vehicle or heavy equipment fluid spills that might occur (such fluid spills are potential unnatural attractants to wildlife species).
- The amount and duration of instream work, as well as the number of live water equipment crossings will be limited as much as possible.
- Broadcast seed and mulch will be distributed on any disturbed ground to reduce erosion immediately following construction.
- Any damage to stream banks or habitat as a result of equipment access to the work site will be addressed.
- Incorporate a woody vegetation component into revegetation efforts where appropriate.

Threatened and Endangered Species and Species of Concern

- Measures to reduce potential for bear-human conflicts will be implemented.
- Regulations that prohibit feeding of wildlife and that require proper food storage will be enforced.
- Adequate portable restroom facilities for construction workers to eliminate human waste as a wildlife attractant at construction sites will be provided.
- Best management erosion and sediment control measures to prevent sedimentation of aquatic habitats used by westslope cutthroat trout will be used.
- Minimize fine sediment generation in project area.

Water Quality

- Filter barriers will be installed (silt fences, certified weed seed free straw bales, coir logs)
- Fuel, heavy equipment, and hazardous materials will be stored at least 100 feet from the stream channel, where any spill of fuel and lubricants cannot reach flowing water.

- An emergency fuel spill kit on-site during staging and construction will be maintained.
- Clean angular riprap will be used.
- Work will be completed prior to potential flood periods, rain-on-snow events, and spring/early summer.

Floodplain

- Work will be completed during the fall at low water times such that any impact to the floodplain will be remediated by spring floods.