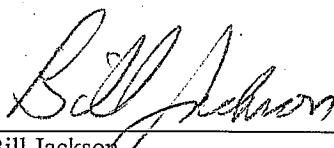


Statement of Findings for Floodplains

for the Going-to-the-Sun Road Construction and Maintenance Staging and Stockpiling Site

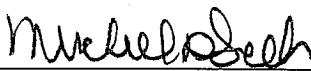
Glacier National Park, Montana

Concurred:


Bill Jackson
Chief, Water Resource Division

Feb. 1, 2008
Date

Approved:


Mike Snyder
Director, Intermountain Region

2/15/08
Date

INTRODUCTION

Glacier National Park (GNP) has prepared and made available an Environmental Assessment (EA) analyzing the continued use of Logan Pit as a construction staging and storage area and formalizing permanent use of the West Glacier Staging Area (formally known as "the ballfield") as an additional staging and stockpiling site area for the west-side of the Going-to-the-Sun Road rehabilitation project and general road maintenance by the park. Logan Pit will remain the preferred site for administrative and emergency helicopter landings. Flooding in November 2006 affected the Logan Pit site. Some changes are required to continue use of this site.

In the 2003, *Going-to-the-Sun Road Rehabilitation Plan/Final Environmental Impact Statement* Logan Pit was identified as the primary construction staging and material storage area for the road rehabilitation project (NPS 2003). Flooding in November 2006, affected the Logan Pit site. Some changes are required to continue use of this site. These changes are evaluated in the proposed action described below and described as the preferred alternative in the environmental assessment.

Executive Order 11988 ("Floodplain Management") requires the National Park Service and other agencies to evaluate the likely impacts of actions in floodplains. NPS Director's Order #77-2: Procedural Manual 77-2: Floodplain Management provides NPS policies and procedures for complying with EO 11988. This Statement of Findings (SOF) documents compliance with these NPS floodplain management procedures.

PROPOSED ACTION

The preferred alternative allows for the continued utilization of the Logan Pit staging and stockpiling site for road rehabilitation and general road maintenance purposes as well as an emergency and administrative helicopter landing site. The area is located adjacent to the Going-to-the-Sun Road (GTSR) at mile post 20.2 and is within the McDonald Creek floodplain. The existing disturbed area is approximately 2 acres (or 90,000 square feet). The area is located on a point bar within McDonald Creek. Concrete forms will be placed around the perimeter of allowable project disturbance for Logan Pit area (as shown on Figure 4) to assist in stabilizing the area during flooding. This will total about 1.5 acres and reduce the amount of area used within this site by approximately 0.5 acres. The allowable disturbance perimeter is based on the 2001 disturbance area. The concrete forms will be placed to construct a wall on the upstream portion of the site (solid line), but only used to mark the site around the rest of the perimeter (dashed line). The access road crosses a back bar flood scour channel which supports excess water during flood stages. A culvert will be installed across the road and countersunk as needed to allow water passage and maintain flow from the back bar flood scour channel during high water and to provide adequate pipe cover. During high water, flows throughout the Logan Pit site jeopardize supplies and equipment. No fill will be placed in Logan Pit. The West Glacier Staging Area will be utilized during flood periods, thus eliminating the danger of damaging supplies and equipment in Logan Pit. The West Glacier Staging Area is located near the entrance of the park and is about 1.8 acres (or 79,000 square feet). Currently it is being used as a temporary site for the additional staging and stockpiling of supplies and equipment associated with the GTSR rehabilitation project. The West Glacier Staging Area site is not within a floodplain or riparian area so it will not be analyzed in the rest of this Statement of Findings (see figure 1).

Though the possibility of flooding at Logan Pit will not be reduced by actions considered in the environmental assessment, the pit floor will be stabilized by the use of concrete forms to prevent further scouring and erosion.

SITE DESCRIPTION

FLOODPLAIN

Arising at a 6,080 foot (1,853 m) elevation, McDonald Creek flows 25.8 miles (41.5km) and contains 8.8 miles (14.2 km) of lake and drains into the Middle Fork of the Flathead River at an elevation of 3,151 feet (960 m). The creek flows in a southeasterly direction, and then turns at the Glacier Wall and flows southwesterly, cascading into Lake McDonald. The Going-to-the-Sun Road forms the east boundary of the stream channel in most areas. Bull trout are known to inhabit Lake McDonald and spawn in Lower McDonald Creek but are physically unable to access the portions of McDonald Creek adjacent to the project area due to several waterfalls that occur between spawning grounds and the project area. Information on floodplain boundaries along Going-to-the-Sun Road corridor is incomplete, but previous studies and inferences based on terrain and observations during flood events provide an indication of the 100-year floodplain areas, of which Logan Pit is inclusive.

Logan Pit is approximately half way down the McDonald Creek drainage with approximately two-thirds of the drainage area above the Logan Pit location. Major streams flowing into McDonald Creek above the Logan Pit site include Mineral, Alder, Haystack, and Logan Creeks. The head of Lake McDonald is located approximately MP 14.5, Avalanche Creek is at MP16.2, and Logan Creek is at MP 20.5.

At Logan Pit soils are characterized as Flooded Soils of floodplains and low terraces (A1) found along streams within a larger complex of Sandy Glacial Soils of glaciated valley bottoms (G3) surrounding the riparian zone. A1 soils consist of floodplains and low stream terraces with deep sandy and gravelly alluvial soils. Rock types are predominantly quartzite and argillite with some limestone and occasional fragments of granitic rock. Soils are frequently flooded, moderately well to poorly drained alluvial soils. There is very little evidence of soil development due to the young age of these soils. They are classified as Cryofluvents or when wet for most of the year, Cryaquents (Dutton et al. 2001).

Available water holding capacity is usually very low. Productivity and revegetation potentials are generally low, but are improved where shallow seasonal groundwater occurs near the surface. Erosion potential is generally moderate (but high for sandy, rock-free layers) and will occur whenever surface vegetation and plant litter is removed or soil is disturbed. This soil type is highly susceptible to weed infestation when disturbed, due to a combination of frequent soil disturbance from flooding (and, in this case, staging operations), rocky, sandy, soil textures, open canopy conditions, available weed seed source, and low elevation. Flooding, very rapid permeability and seasonal high ground water limit sewage disposal options on these sites (Dutton et al. 2001).

It is largely devoid of vegetation due to a combination of past flooding, scouring, deposition, and storage of road construction materials. There is sparse vegetation scattered in the site, primarily around the edges of the site including native species and non-native species. Vegetation in the surrounding forest immediately adjacent to the staging and stockpiling site includes native species, angelica, harebell, cowparsnip, thimbleberry, mountain maple, starry Solomon's plume, ballhead waterleaf, paper birch, devil's club, large-leaf avens, bluejoint reedgrass, blue wildrye, tall mannagrass, western meadowrue, false hellebore, stinging nettle, bracken fern, fowl bluegrass, arrowleaf groundsel, oakfern, ladyfern, foamflower, and violets.

The Logan Pit staging and stockpiling site is located between McDonald Creek and the Going-to-the-Sun Road at milepost 20.2 near the Avalanche Creek area. The pit area is within a point bar on McDonald Creek and the access road crosses a back bar flood scour channel. The pit floor is approximately one to two feet below the elevation of the GTSR. The back bar flood scour channel parallels the GTSR and is approximately two to three feet lower than the GTSR. The access road is elevated approximately 0.5 feet above the back bar flood scour channel. The

site is identified in multiple park environmental documents as the primary staging, stockpile, and helicopter landing site. The site provides a central location, adequate size and safe access for rehabilitation and ongoing maintenance of the GTSR.

During November 2006 the park experienced a weather event that accumulated 9.1 inches of precipitation in a 36-hour time period. A field investigation was completed in April 2007 to assess flood damage. At that time flowing water was observed at depths of three inches. Further site investigation suggested water heights as high as three feet in the pit area. The November flood event likely exceeded the 100-year flood event stage as the pit area is vegetated with moderately abundant 6 to 18 inch diameter trees. Numerous flow paths were observed but the site gave no indication of an imminent avulsion of the main McDonald Creek channel into the pit area or the back bar flood scour channel (see Figures 2 and 3).

WETLAND

Park personnel conducted a wetland determination based on the Wetlands Delineation Manual (Environmental Laboratories 1987). Based on vegetation, soils and hydrological information gathered at the Logan Pit project area, it was determined a small area (0.07 acres) that is located in the surrounding area does qualify as a wetland. Hydrophytic vegetation and drainage pattern requirements were met at four wetland sampling sites but only one of the four sites has hydrologic characteristics needed to qualify as a wetland. This small site is located between the Logan Pit staging and stockpiling area and the GTSR with an immediate vegetative buffer zone around it. Actions proposed in this project will not affect the wetland and therefore a statement of findings for wetlands is not being prepared. (Wetland Survey, September, 2007 by Jennifer Hintz, Biological Science Technician, Glacier National Park)

JUSTIFICATION FOR USE OF THE FLOODPLAIN

The purpose of this project is to provide a staging and stockpiling site for general road maintenance and the rehabilitation of the Going-to-the-Sun Road. The Logan Pit site has also served as an emergency and administrative helicopter landing site. In order to meet the purpose of this planning effort, the following objectives would need to be addressed:

- Minimize travel distance between staging and stockpiling site and the project work on the GTSR to reduce conflicts with visitor traffic and minimize transportation costs.
- Provide adequate room for materials staging and stockpiling.
- Insure safe access in and out of the staging site.
- Minimize impacts to natural and cultural resources.

The preferred alternative proposes to continue to utilize Logan Pit for construction staging and material storage, but only during low water periods. During high water periods the park and contractors will utilize the West Glacier Staging Area. Logan Pit is situated within the floodplain of McDonald Creek and has been used as a staging and stockpiling site probably since the road was constructed in the 1930's. Its central location and accessibility make it the ideal site for staging and stockpiling for construction contractors and park personnel for road rehabilitation and maintenance projects and for helicopter flight landings. There is no other suitable location along the road that could be used for this purpose that provides adequate space. Construction of a new staging area would require impacting previously undisturbed areas, removing 1-2 acres of trees and vegetation and would likely be visible to visitors. Continued use of this site is not projected to alter floodplain conditions, but with sporadic weather events and climate change, site stabilization is necessary for access and functional requirements.

The preferred alternative will have the least impacts to natural and cultural resource in the vicinity of the site, including the floodplain. Mitigation measures will reduce or eliminate adverse impacts on the environment (see Mitigation section).

INVESTIGATION OF ALTERNATIVE SITES

In addition to the preferred alternative two other locations were identified and assessed as possible staging and stockpiling sites. A No Action alternative was also assessed. The two alternative locations were Packer's Roost and Moose Country. Both locations were determined to be inadequate and did not meet all the criteria objectives defined by the project needs. Enlargement of the alternative locations would have affected the natural environment to a greater extent than choosing to utilize the Logan Pit site. Both alternative locations would not be easily accessible and would not provide an adequate landing zone for helicopters. The Moose Country site is situated within a floodplain/wetland.

The No Action alternative will not meet the purpose of this project. Glacier National Park has identified the need for a staging and stockpiling site, as well as a need for an emergency and administrative helicopter landing site in multiple documents. Not providing or maintaining a sufficient site will hinder the progress of other projects and protection of resources; thereby will not meet the guidelines set before the park by the park's General Management Plan (GMP) (NPS 1999) and the NPS Organic Act.

SITE-SPECIFIC FLOOD RISK

The November 2006 flood exceeded the 100-year flood levels, and the park must take into consideration all reasonable scenarios as weather patterns may become more sporadic and severe.

The following information based on the HEC-RAS model for McDonald Creek was developed by Federal Highway Works Administration (FHWA) (Leon pers comm 2007). Overbank flow of McDonald Creek enters the backbar flood scour channel at floods equal to and larger than the 2-year flood event (3,030 cubic feet per second (cfs)). The access road to Logan Pit crosses this channel and is approximately 0.5 feet below the bank of the channel. The pit area is inundated at floods greater than the 2-year flood event. Flood water depth within the pit area is approximately 0.5 feet for the 25-year flood event (4,350 cfs), one foot for the 50-year flood event (5,670 cfs), and two feet for the 100-year flood event (7,650 cfs). The Going-to-the-Sun Road would not be inundated by floods up to and including the 100-year flood event, only the access road nearest the pit area would be inundated.

MITIGATION

Actions proposed in the floodplain will not affect the flood storage capacity of the floodplain. The natural floodplain value will not be affected but due to sporadic and severe weather events mitigation measures will be implemented to lessen impacts to natural resources throughout the project. The project design will further minimize potential hazards to human life and property destruction.

- Development within the floodplain will not result in an increase of the base flood level more than 0.5 feet.
- Adequate erosion protection (such as concrete forms, trees) will be installed to prevent the pit floor from being exposed to flood waters.
- No overnight storage of hazardous materials or fuels, with the exception of

constructions vehicles, will occur within the floodplain during high water times and in the event of an off season flood

- The pit staging and stockpiling area will be reduced to a smaller area than the 2001 size (based on GPS waypoints and aerial photography) (see Figure 4). A reduction of approximately 0.5 acres from the current (2007) size.
 - A vegetative buffer zone will be increased and maintained to provide habitat protection for harlequin ducks.

SUMMARY

The preferred alternative was designed to minimize impacts to the floodplain along McDonald Creek while maintaining a storage and stockpile site for the rehabilitation and continued maintenance of the GTSR. Utilizing the West Glacier Staging Area during flood periods will allow floodplain dynamics at the Logan Pit site to occur in a semi-natural condition. The culvert installation at the Logan Pit site will enhance the floodplain conditions below the access road by allowing continuous water flow during flood stages. Continued use of the Logan Pit site as a staging and stockpiling site will not allow the floodplain to fully return to a natural state. The Going-to-the-Sun Road border on the eastern side of McDonald Creek also hinders the natural meandering of McDonald Creek.

There will be no loss of floodplain area or impacts to floodplain dynamics upon implementation of the proposed action. Therefore the NPS finds this proposed action is consistent with the policies and procedures of NPS Director's Order #77-2: Procedural Manual 77-2: Floodplain Management which provides NPS policies and procedures for complying with Executive Order 11988.

REFERENCES

- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, US Army Engineers Waterways Experiment Station, Vicksburg, Mississippi. 100 pp.
- Dutton, B.L., J. Hadlock, M. Arthur, D. Marrett, A. Goldin, and A. Zhu. 2001. Soils of Glacier National Park. Land and Water Consulting, Inc., Missoula, MT.
- Leon, Sven PE. 2007. Personal communication. Western Federal Lands Highway Division, Hydraulics Engineer.
- National Park Service. United States Department of Interior. 2003. Director's Order 77-2. Floodplain Management. Washington D.C.
- _____. 2003. Going-to-the-Sun Road Rehabilitation Plan Final Environmental Impact Statement. Glacier National Park. West Glacier, MT. 353 pp.
- _____. 1999. General Management Plan. Glacier National Park. West Glacier, MT. 340 pp.

Figure 1. Location Map of Logan Pit and the West GLAC staging area

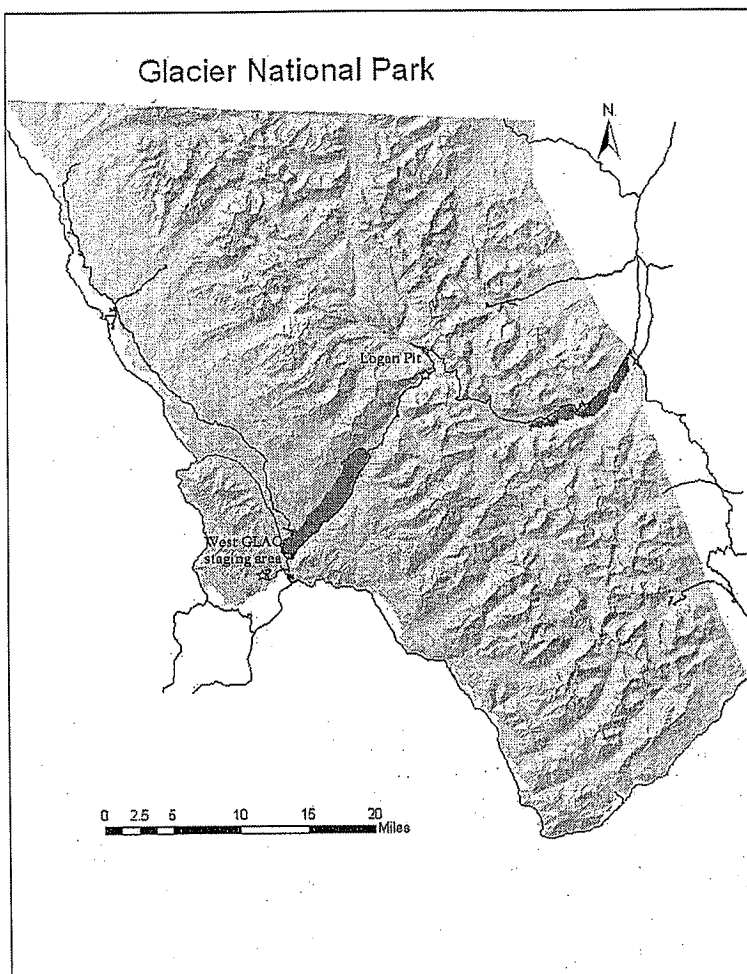


Figure 2. Photo, November 2006 flooding of Logan Pit



Figure 3. Photo, Logan Pit access road flooding



Figure 4. Logan Pit Disturbance Area

