

National Park Service
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Glacier National Park
Waterton-Glacier International Peace
Park
Montana



Statement of Findings for Floodplains

St. Mary Microwave Radio Antenna Tower Project
St. Mary Developed Area
Glacier National Park, Montana

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Introduction

Executive Order (EO) 11988 (*Floodplain Management*) directs the National Park Service (NPS) and other federal agencies to evaluate the likely impacts of actions in floodplains. The objective of EO 11988 is to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. In addition, it is NPS policy, as described in Section 4.6.4 of the *NPS Management Policies 2006*, to manage floodplains for the preservation of floodplain values, to minimize potentially hazardous conditions associated with flooding, and to comply with the NPS Organic Act and all other federal laws and EO's relating to management of floodplains. NPS Director's Order (DO) #77-2 (*Floodplain Management and Procedural Manual*) provides NPS policies and procedures for complying with EO 11988. This Statement of Findings (SOF) has been prepared in accordance with the guidelines found in DO #77-2 and serves to document the rationale for the proposed project and the anticipated effect the project will have on floodplain value and functions.

Proposed Action

Glacier National Park (the park) has prepared and made available an Environmental Assessment (EA) for the proposed project. The proposed project involves installation of a new tower and removal of the existing NPS radio tower to increase Internet speed and capacity in the St. Mary developed area. This project is being proposed with the intent of meeting the following objectives:

- Assist CenturyLink in meeting the AFOR agreement with the Montana Public Service Commission.
- Provide DSL Internet service to the surrounding community.
- Conduct work so NPS radio communications capabilities will not be interrupted.
- Minimize the amount of telecommunications infrastructure within the park.

The existing communication facilities at the St. Mary developed area include a 70-foot (including antennas) radio tower and associated equipment shed that is operated by the NPS and, located 120 feet southeast of the NPS infrastructure, a CenturyLink owned and operated equipment building (which has been in the St. Mary developed area since 1955) and associated infrastructure. The NPS communication system provides 360-degree radio coverage for regular and emergency radio communications in the eastern portion of the park. The CenturyLink communication system is the St. Mary Central Office hub for hard-wired telephone service to the St. Mary developed area and to the adjacent St. Mary township located outside of the park.

Century Link's Internet service in the greater St. Mary area is currently not meeting the demands of NPS and non-NPS users. As a part of an "Alternative Form of Regulation" (AFOR) agreement between CenturyLink and the Montana Public Service Commission, CenturyLink has agreed to extend the digital subscriber line (DSL) broadband Internet service to the east side of Glacier National Park (MPSC 2008). The expanded service would include service to the St. Mary developed area and the St. Mary township.

The new tower will be located next to the existing NPS communication building at the St. Mary developed area in the park. It will be an approximately 80-foot tall, three-legged steel lattice structure supported on a concrete footing. Radio communication equipment operated by the NPS and a CenturyLink operated microwave dish will be co-located on the tower. The NPS's existing 50-foot radio tower and 20-foot antennas will be removed. The new tower will be

designed to provide a direct line of sight to the CenturyLink Divide Mountain transfer station and to accommodate NPS radio equipment.

Site Description

The existing St. Mary communication facilities, operated by the NPS and CenturyLink, are located in the St. Mary developed area on the east side of the park and include a maintenance area, residential park housing, and administrative offices. The St. Mary developed area residential housing caters to year-round residents, but experiences an increase in temporary residents during the summer visitor season. The township of St. Mary is located outside of the park to the north of the developed area and is a commercial center for visitors entering or leaving the park. The St. Mary Visitor Center, Entrance Station, and east entrance to the Going-to-the-Sun Road (GTSR) are located approximately one mile northwest of the St. Mary developed area.

The St. Mary developed area is located in the 100-year Divide Creek floodplain, which is on the Divide Creek alluvial fan, and is classified as a Class I Action pursuant to DO #77-2. The active channel of Divide Creek is approximately 450 feet away from the tower location. There are 36 park employee housing units, one administrative building, and a maintenance facility that includes 24 buildings. Most of the buildings were built before EO 11988. These facilities are subject to dangerous floods that risk life and safety. Since 1991, Divide Creek has flooded multiple times, placing lives and government facilities at risk.

Floodplains and Flooding

Divide Creek is one of the most active and dynamic creeks managed by the NPS. Divide Creek originates at a cluster of small alpine lakes in the park and flows about 9 miles before entering the St. Mary River between the St. Mary lakes immediately north of the project area. Divide Creek drains a watershed of approximately 13 square miles and forms a portion of the eastern boundary of the park. The Blackfoot Indian Reservation and the town of St. Mary are adjacent to the park boundary, east of Divide Creek.

In 1991, the NPS Water Resources Division conducted a flood hazard evaluation for Divide Creek (Smillie and Ellerbroek 1991). Ongoing, more recent, anecdotal observations by park staff indicate that hydrology and sediment transport characteristics described in the report have likely remained the same, or possibly worsened due to increased erosion and runoff following the Red Eagle Fire of 2006. The steep slope of the channel and narrow flow area above the Divide Creek alluvial fan creates high stream velocities and associated stream power that enable the stream to carry large amounts of glacial material. The stream in the area of the fan is less steep and unconfined by canyon walls. As the stream flows across the alluvial fan, velocity is reduced and much of the sediment load is deposited (Smillie and Ellerbroek 1991).

Unstable glacial moraines upstream of the alluvial fan provide a virtually unlimited supply of glacial material (sediment, gravel, pebbles, and cobbles) that is actively deposited along Divide Creek. This deposition effectively raises the stream channel elevation and restricts water flow at the Divide Creek Bridge, causing frequent spring flooding. Deposition amounting from two to three feet at the Divide Creek Bridge has been observed within a period of a few years and possibly even during a single flood event (Smillie and Ellerbroek 1991). Prior to development, Divide Creek flowed unimpeded across the alluvial fan but has been artificially confined at its current location, resulting in rapid deposition in a localized area rather than being dispersed across the entire alluvial fan.

The 1991 report indicated due to the unstable nature of the Divide Creek alluvial fan, that a precise identification of the 100-year floodplain is not possible. Therefore, the entire alluvial fan, including the project area, should be considered within the 100-year floodplain. Furthermore, field observations from January 2006 presented in the *St. Mary Visitor Center/Transit Improvements Environmental Assessment/Statement of Findings* indicate that the entire Divide Creek alluvial fan should be considered as the 100-year floodplain.

Justification for Use of the Floodplain

The decision in Glacier National Park's *General Management Plan* (GMP) (NPS 1999) for the St. Mary developed area is to "relocate employee housing, administration and maintenance facilities that are now in the Divide Creek flood hazard zone to a safe location(s) in or outside the park." Funding has become available to move some employee housing out of the St. Mary developed area, however, funding to relocate all of the infrastructure is not available. In the meantime, park operations must continue, including NPS radio communications, which are essential for human health and safety. Existing utility operations must also continue, and CenturyLink must meet with the Montana Public Service Commission's mandate to update its Internet infrastructure in a timely manner.

Given the park's long-term goal of relocating out of St. Mary as well as the need to maintain the operations there until relocation can occur, the NPS has developed the following criteria to guide decisions on proposed new developments in the St. Mary developed area. These criteria are used to evaluate any future interim development proposals at St. Mary to determine what proposals will be appropriate and necessary, until such time as the NPS is able to relocate all infrastructure out of the floodplain.

- The project is the minimum action to provide for health and safety needs or for necessary functions, services, and facilities until such time as St. Mary development is relocated.
- The project design will incorporate measures to minimize capital investment and overall project cost (e.g. portable structures). It would be designed to be compatible with the historic district, consider sustainable design guidelines, and consider "flood proofing."
- Any new structures will be located as close as possible to the existing development.
- It is impracticable to locate the project outside the floodplain.
- The project will not appreciably increase the hazard to people from flooding.
- Project location and design will avoid, minimize, or reduce adverse impacts on natural resources and adverse effects on cultural resources.

Proposed Project

The project proposes to replace the existing NPS structure with a new tower, including a microwave dish, which will provide DSL Internet communication capabilities under a Montana Public Service Commission agreement with CenturyLink. Although there will be an additional negligible negative effect on the floodplain, this project is the most preferable alternative to meet the agreement requirements. The location of the communications tower will remain essentially unchanged; the new tower will be approximately 15 feet from the existing tower's location, and at essentially the same distance from Divide Creek (estimates put the new tower at approximately 4 feet closer to the creek than the existing tower).

Alternative Locations

No other suitable locations for the new tower have been identified. As stated in the EA, CenturyLink does not have the ability to purchase land outside the park and relocate their building while remaining in compliance with the Montana Public Service Commission's timeline requirements for upgrading communications capabilities at its rural exchanges. If CenturyLink were able to relocate the tower outside the park, the existing NPS tower would remain at its current location to continue to provide for radio communications on the east side of the park. The tower is replacing the existing structure in essentially the same location, and will therefore not occupy a new or undeveloped location within the floodplain. CenturyLink infrastructure, including the tower, will be relocated from the floodplain when the NPS relocates government infrastructure. Relocating NPS infrastructure is funding dependent, however, and the resources to relocate the entire St. Mary developed area are not currently available, and may not be available for some time.

Site-Specific Flood Risk

Recurrence Interval of Flooding

Significant flooding has occurred within the project area at least six times since the GTSR was completed in 1933. Emergency circumstances during flood events have required in-stream dredging and cutting of the roadway, as was done in July 1995. Significant floods carrying large glacial material (cobbles and boulders) could potentially damage or destroy the proposed tower.

Hydraulics of Flooding

The USGS estimated that the 100-year flood events for Divide Creek and Wild Creek produce stream flows of 1,980 cubic feet per second (cfs) and 980 cfs, respectively. Using updated regression equations, the 100-year flood event for Divide Creek is estimated to be 2,500 cfs with a standard error of 43 percent (Smillie and Ellerbroek 1991). An independent regression analysis reported in the 1991 Flood Hazard Evaluation (Smillie and Ellerbroek 1991) calculated the 100-year flood flow to be 3,500 cfs with a standard error of 200 percent. As glacial material deposits near the bridge during a 100-year flow event, the channel will rapidly lose capacity to continue to pass the high flows and may result in flooding during prolonged high flows.

A metal floodwall has been constructed along Divide Creek upstream from the bridge to provide the NPS maintenance, residences, and administrative area protection from flooding. The flow required to reach the base of the floodwall is estimated to be 6,000 cfs. An additional three feet of deposition in the channel would reduce the flow required to reach the base of the floodwall to only 1,500 cfs (Smillie and Ellerbroek 1991). The potential for the stream to circumvent the floodwall during a flood flow event causing flooding throughout the local developed area has been identified as a major concern (Smillie and Ellerbroek 1991).

Warning and Evacuation

The Red Eagle fire of 2006 resulted in burned soils and removal of vegetation, together increasing the risk of flooding in the area. Subsequent recommendations included immediate dredging of Divide Creek, reinforcement of the area known as the "nick point" (the area upstream where Divide Creek changes direction) and installation of a flood warning system on Divide Creek. The flood warning system was installed in the fall of 2006 with sensors placed on Divide Mountain and at two locations further downstream. The dredging and reinforcement of the "nick point" occurred during the winter of 2007.

The Divide Creek Emergency Action Plan outlines specific steps in the event of the potential or actual flooding of Divide Creek. This with the exception of a catastrophic flood event (such as damming of Divide Creek, described below), reduces much of the threat to life safety but certainly not all of it. The threat to both government and non-government property is not reduced, nor is it appreciably increased.

Geomorphic Considerations

An earthen dike is located upstream from the Divide Creek Bridge to prevent the channel from reclaiming an adjacent historical abandoned channel. This abandoned channel runs through the developed area and would cause flooding if it were reclaimed by Divide Creek. A flow of approximately 3,000 cfs is required to reach the base of the dike. Due to the unconsolidated nature of the dike construction material, the dike could be expected to fail at flows much less than 3,000 cfs. Therefore, the combination of aggradation and high flows makes the dike a likely candidate for catastrophic failure. This type of failure would cause rapid flooding of the developed area with little or no warning and could result in loss of life and property (Smillie and Ellerbroek 1991).

The flood risks described above necessitated the decision in the GMP to relocate NPS infrastructure off the floodplain. Relocation is occurring as funding becomes available, beginning with a current proposal to move park employee housing out of St. Mary. Site-specific flood risks are not, however, affected by this project. The proposed tower will not increase or decrease the risk of flooding, and because the tower is not and will not be an inhabited structure, its presence on the floodplain presents little to no risk to human safety. To minimize flood risk to the structure itself, the tower will be constructed so that it can be moved with sufficient notice.

Mitigation

The installation of a microwave radio antenna tower meets with the previously described interim criteria developed by the NPS to guide new developments in St. Mary. The new tower will provide increased Internet communication capabilities, which will help provide for health and safety. The project will incorporate measures to minimize capital investment and project cost. It will be designed to be compatible with the historic district, consider sustainable design guidelines, and will be resistant to minor low energy flooding. The new tower will be constructed in a way that will make it possible to move with sufficient notice, however, not within an emergency timeframe. The new tower will replace an existing structure, within the existing development, at nearly the same location as the existing tower. No other practicable locations are known at this time, and the project will not increase the hazard to people from flooding. The project location and design will avoid, minimize, or reduce adverse impacts on natural resources and adverse effects on cultural resources. The new tower will be designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60). The long-term goal is to move the park's operations out of the St. Mary developed area. Until that time, the tower will be considered a permanent structure.

Summary

Divide Creek is recognized as one of the most active and dynamic creeks within the continental U.S. that is administered by the NPS. Due to this and the virtually unlimited supply of glacial material available for transport by the creek, structures within the Divide Creek floodplain will always be at risk of flood damage unless appropriate channel maintenance and protective

structures are implemented and properly maintained. The risk of flooding within the Divide Creek floodplain can be minimized but not eliminated.

This proposal will not result in a significant impact on the floodplain of Divide Creek. It is not placing any structure in the floodplain that will significantly impede flood flows. The EA for the project determined that replacing the existing NPS tower with the new tower would result in a negligible modification of floodplain acreage (approximately 256 square feet), with negligible, long-term, adverse effects on floodplains.

The 1999 GMP resulted in a decision to remove infrastructure within the St. Mary developed area from the floodplain. In accordance with EO 11988 (*Floodplain Management*), it is anticipated that all structures except for the visitor center and entrance station will be moved out of the flood hazard zone of Divide Creek to a site in or outside the park to allow Divide Creek to follow its natural channel to St. Mary Lake. Until such time as funding is acquired to select an alternate location and make the move, park functions and essential services, including existing utility operations, must continue to operate within the St. Mary area.

The proposed improvements to the Internet communication capabilities have been evaluated against criteria intended to minimize the investment of new development in the area. While the NPS's existing tower is considered adequate for health and safety concerns, the higher proposed tower could provide improved communication distances with a corresponding increase in emergency response capabilities.

References

- [MPSC 2008]. Montana Public Service Commission Alternative Form of Regulation Order, Docket No. D2008.1.6, December 16, 2008.
- [NPS 2006]. National Park Service Management Policies. U.S. Department of the Interior, National Park Service, Washington D.C. 2006.
- [NPS 1999]. Final general management plan and environmental impact statement for Glacier National Park. U.S. Department of the Interior, National Park Service, Glacier National Park, West Glacier, MT. 1999.
- [Smillie and Elleborek 1991]. Flood Hazard Evaluation for Divide and Wild Creeks, Glacier National Park, Technical Report NPS/NRWRD/NRTR-91/02, Water Resources Division, USDI National Park Service, August 1991.