



Environmental Assessment for the Siskiwit Dock Project

Isle Royale National Park, Michigan

April 14, 2016

Executive Summary

Through this Environmental Assessment (EA), the National Park Service (NPS) is evaluating the proposed removal of Siskiwit Bay dock and breakwater at Isle Royale National Park as articulated in the park's General Management Plan (GMP).

Alternatives

This EA outlines a “no action” and two alternative action proposals:

- The No Action Alternative would not make any changes to the current dock or breakwater.
- Alternative A would remove the existing Siskiwit dock and breakwater.
- Alternative B would rebuild the dock with an open-piling design and remove the breakwater.

The Park has identified Alternative A (Dock Removal) as the preferred alternative.

Project Area

Siskiwit Bay is located in the southern portion of Isle Royale. The dock structure is in the southwest corner of the bay. The current dock was built in 1962. The steel bin-wall dock with concrete slab surface is approximately 11 feet wide and 245 feet long, making it the longest dock on the island. The long length of the dock is required because of the shallow water depth at the site. Water depth ranges from approximately 8 feet at the end of the dock to 2-4 feet at the middle of the dock with the east side generally shallower than the west side. The dock has an adjacent, parallel, rubblemound groin breakwater about 50 feet to the east. The dock remains structurally sound; however, there is warping of the dock, minor cracking in the concrete, and some deterioration of the steel bin-wall.

Isle Royale's GMP (1998) identified Siskiwit dock for removal given concerns that it was impeding natural currents and sediment deposition. The site is located on a relatively uniform section of NNW-facing shoreline within Siskiwit Bay. A fillet beach occurs along the east side of the breakwater. It extends about 250 ft east of the dock and about 130 ft offshore. This fillet beach was not present prior to the construction of the first structure in 1952. There is also significant accretion of material between the breakwater and the dock since 1992. Although the precision of satellite imagery from different years and different sources varies, it appears that from 1992 until 2013, the shoreline between the breakwater and dock grew lakeward by approximately 30-35 feet. Even since 2009, approximately 5-7 feet of material accumulated between the structures. Sediments have been steadily accumulating between the dock and breakwater and causing shoaling (decreasing depth due to sediment accumulation) around the dock.

Environmental Consequences

The preferred alternative (Dock Removal) would restore the natural topography of 400 feet of shoreline and sedimentation conditions in the area. Removal of the dock, breakwater and accreted material would restore roughly an area of 39,000 ft² back to open lake. Short term degradation of water quality from increased turbidity would occur due to construction activities. During construction activities individual fish may avoid the area and some benthic organisms would be displaced. There is no expected impact on special concern species. Dock removal would create a short-term impact on visitors from construction activities, but work would be limited to between 8am and 6pm. Loss of approximately 100' feet of dock space would be offset by new dock space at Wright Island, Hay Bay, and Windigo. Additionally, two mooring buoys will be placed in the bay to allow for use of area trails by boaters. Loss of overnight docking and campground access would be offset by the opening of Wright Island dock to overnight camping and the addition of campsites at Wright Island.

Public Comment

If you wish to comment on the Environmental Assessment (EA), please refer to the instructions online at www.parkplanning.nps.gov/ISRO. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can request in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

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1.0 Purpose and Need

The purpose of the proposed action is to “allow for the reestablishment of the natural current and distribution of sediment along the shoreline” in the area of Siskiwit dock as discussed in the park's General Management Plan (GMP). Funding constraints delayed implementation of the project. Recently, Great Lakes Restoration Initiative funding aimed at restoring coastal habitats allowed the park to revisit the project.

Through this Environmental Assessment (EA) the National Park Service (NPS) is evaluating the proposed removal of Siskiwit Bay dock and breakwater at Isle Royale National Park as articulated in the park's General Management Plan (NPS, 1998). NPS requires that natural coastal processes, such as erosion, shoreline migration, deposition, overwash, and inlet formation, be allowed to continue without interference (NPS Management Policies 2006 § 4.8.1.1). That section further states, if “human activities or structures have altered the nature or rate of natural shoreline processes, the Service will... investigate alternatives for mitigating the effects of such activities or structures and for restoring natural conditions.” The GMP noted that “The aerial photography record of this [Siskiwit Dock] area, which dates back to 1930, indicates that these docks have interrupted the natural current along the shoreline and caused a considerable buildup of sand and silt. A small artificial peninsula is being formed....” (See Figure 1) Thus, the park identified removal of the dock as the appropriate action. This Environmental Assessment (EA) evaluates the GMP's dock removal proposal given the current understanding of impacts by the dock on natural conditions and identifies and assesses action alternatives, including no action.

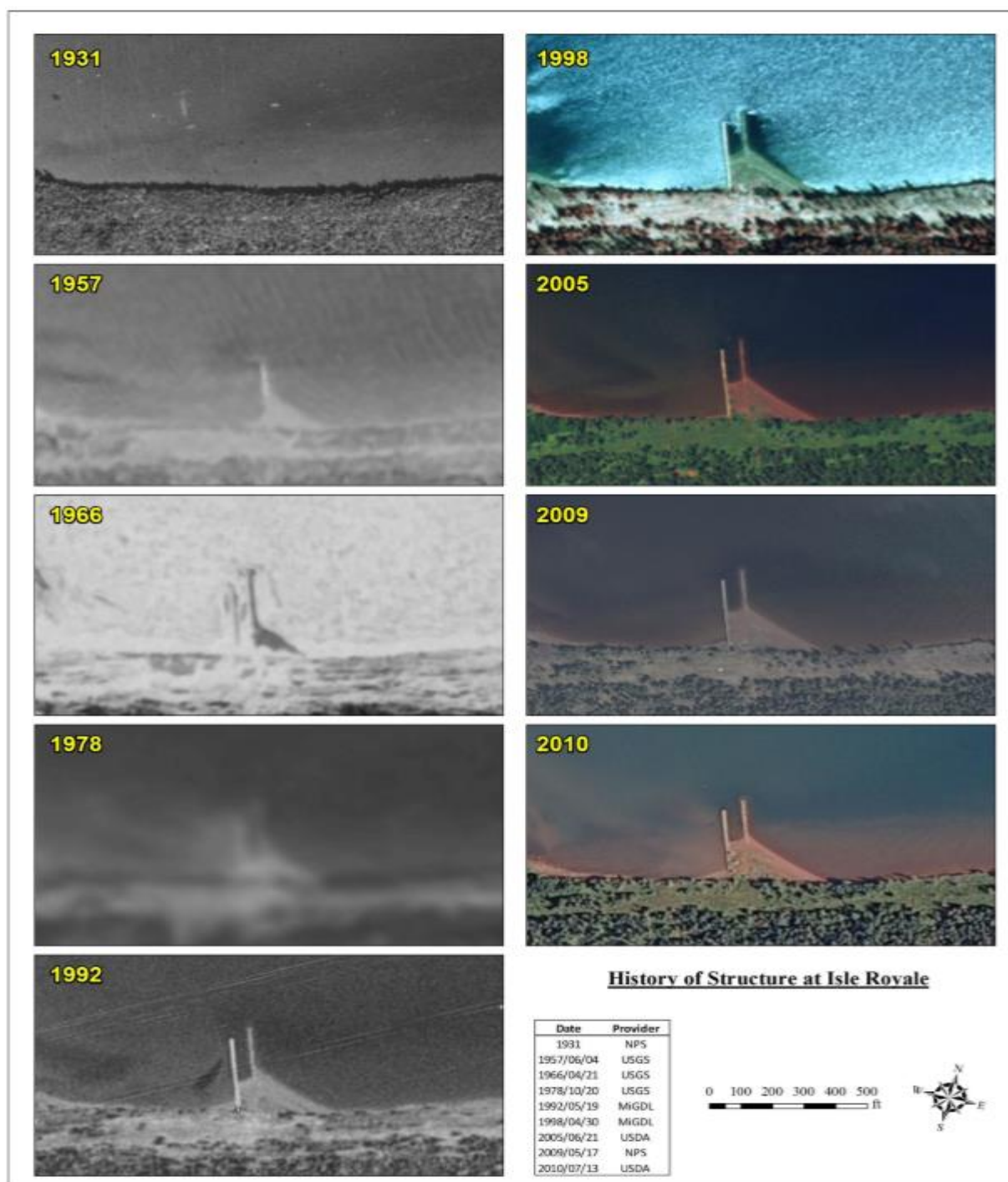


Figure 1. Siskiwit Dock Historical Imagery (Baird, 2011)

1.1 Project Background and Scope

Isle Royale, the largest island in Lake Superior, is located in Keweenaw County Michigan, approximately 30 miles east of Grand Portage, Minnesota (Figure 2). Isle Royale National Park preserves 130,000 acres of land, including the main island and over 450 surrounding islands. The Park encompasses a total area of 850 square miles, including over 400,000 acres of submerged lands extending 4.5 miles out into Lake Superior. Isle Royale National Park was established on April 3, 1940, was designated as a Wilderness Area in 1976 (under the Wilderness Act of 1964 (16 USC §1131 et seq.)), and was made an International Biosphere Reserve in 1980 (NPS, 2013a).

As in many National Parks, there are a variety of types of visitor use ranging from day use boaters and anglers, to overnight visitors staying at the concession-operated lodges, to backcountry hikers seeking a wilderness experience. Although the yearly number of visitors to Isle Royale is less than Yellowstone receives in a day, the Island's per acre backcountry use is among the highest of all National Parks in the United States (NPS, 2013b). Visitors arrive from both Minnesota and Michigan via private watercraft, commercial ferry service, NPS ferry service, or by small plane.

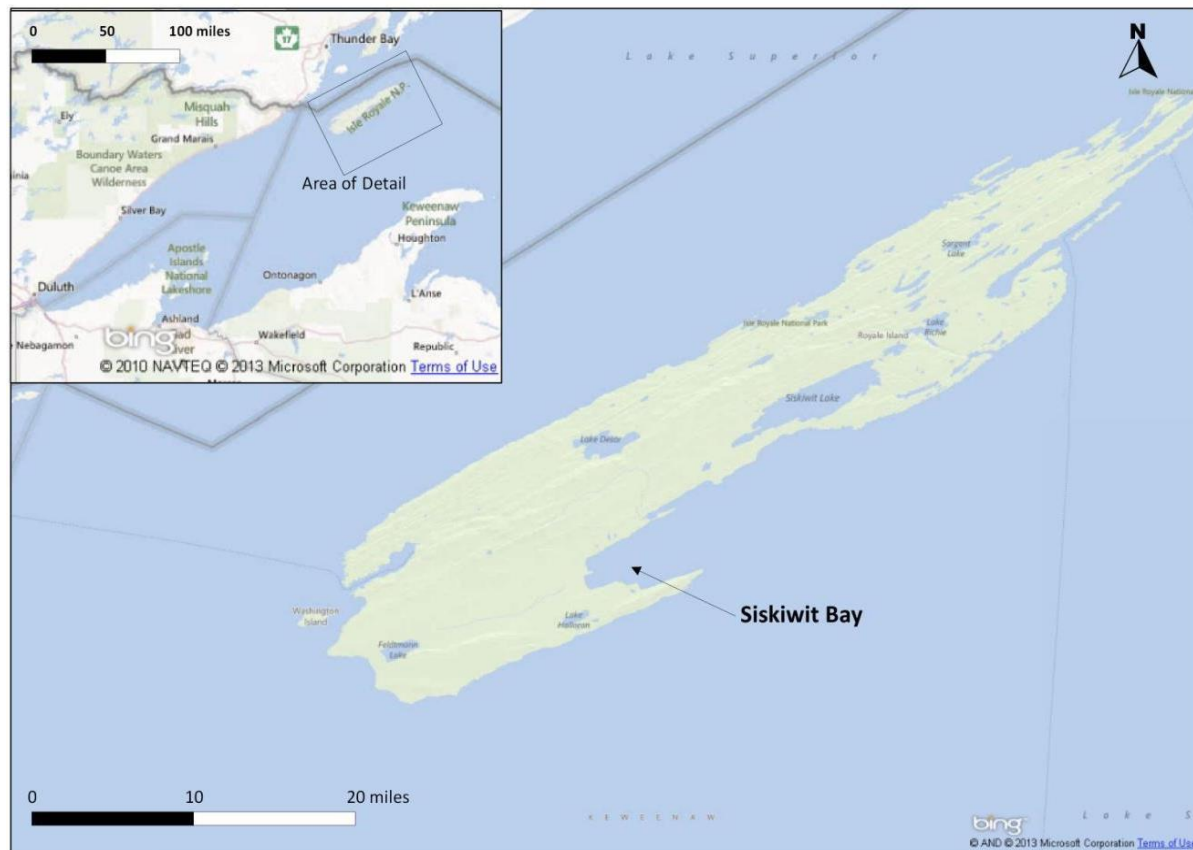


Figure 2. Isle Royale

Project area

Siskiwit Bay is located in the southern portion of Isle Royale. The dock structure is in the southwest corner of the bay. (Figure 3) The dock is one of 20 'public overnight docks' in the Park. There is a designated campground area in close proximity to the dock (about 200 feet inland).

Historic aerial imagery suggests that between 1931 and 1957 there was some type of dock structure built very close to the current dock's location. According to maintenance notes in the park files, a dock was built in 1952. The notes suggest the dock was rebuilt in 1962, though it could be that a new dock was built in basically the same position. Construction of the dock arose out of early park plans to add camping accommodations and docks where feasible at the existing campsites. Those plans for the Island and Siskiwit Bay were shelved after the designation of Isle Royale's as wilderness under the Wilderness Act of 1964.

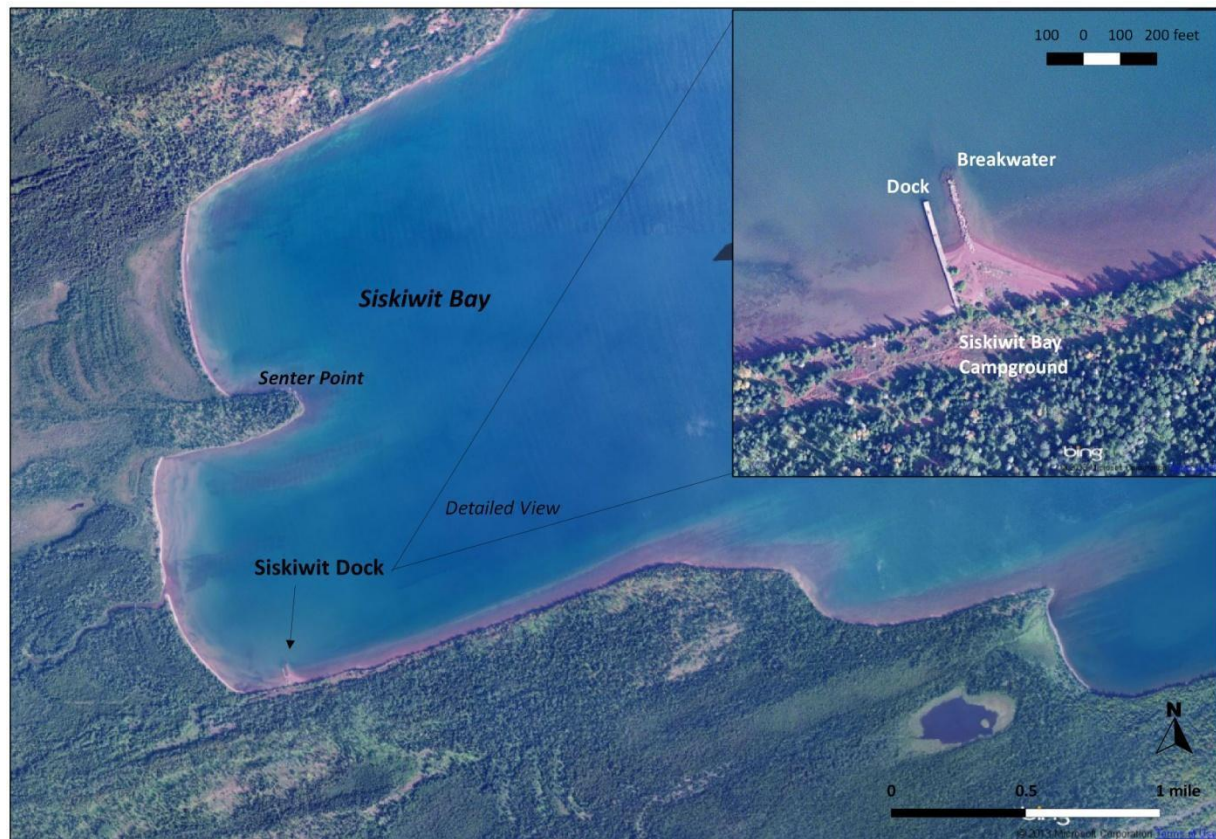


Figure 3. Location of Siskiwit Dock

Key terms:

Breakwater: Any structure that protects the area in its lee from wave attack.

Fendering: A cushioning device, such as a piece of timber, used on the side of a dock to absorb impact or friction.

Fillet beach: A beach that is retained on the upcoast side of a structure such as a groin.

Groin: a structure built perpendicular to shore; installed singly or as a field of groins, designed to trap sand from the littoral drift system or to hold sand in place.

Rubblemound: A mound of nonselectively formed and placed stones which are protected with a covering layer of selected stones.

The dock is constructed with steel bin-walls and a concrete slab surface. It is approximately 245 feet long and 11 feet wide, making it the longest dock on the island. The long length of the dock is required because of the shallow water depth at the site. Water depth ranges from approximately 8 feet at the end of the dock to only 2-4 feet at the middle of the dock with the east side generally shallower. The dock has an adjacent, parallel, rubblemound groin breakwater about 50 feet to the east.

The dock remains structurally sound with only slight warping of the dock and minor cracking in the concrete. However, there is some deterioration of the steel bin-wall (Figure 4). The cleats are in good condition as is much of the timber fendering, with some areas replaced in recent years. However, other areas of fendering are damaged or missing.

The dock is in a remote area of the island which experiences moderate use. Park Rangers and other staff use the dock to access the Siskiwit campground

and nearby trails. Power-boaters use the dock for both day and overnight use. The dock and campground mark the east end of the Feldtmann Ridge hiking trail and the south end of the Island Mine trail. A popular 30.1-mile, multi-day hiking trip is a loop from Windigo to Feldtmann Lake, then east on Feldtmann Ridge trail to overnight at Siskiwit Bay. Hikers continue north along the Island Mine trail and back to Windigo on the Greenstone Ridge trail.



Figure 4. Degradation of Siskiwit Dock cribbing. The binwall panel has rusted and is falling away from dock.

The campground at the dock has four tent sites, three group sites, two lean-to structures, pit toilets, and picnic tables. The 100 acres of surrounding area is zoned as non-wilderness backcountry (Figure 6). However, the draft Wilderness and Backcountry Management Plan states that the Siskiwit dock area has “not seen the anticipated development and would appear to most people to be indistinguishable from wilderness.” Based on 1996 data, the campground had 2,456 overnight stays during the year (Farrell & Marion, 1998) making it one of the top 10 most-visited campgrounds on the island during that year.

The site is located on a relatively uniform section of NNW-facing shoreline within Siskiwit Bay. (Figure 5) To the east of the dock the shoreline is characterized by a beach of cobbles and gravel (known as shingle beach) about 10 yards from the water line to the upland vegetation line. To the west, the shoreline is similar except that the beach material is primarily sand. The mouth of the Big Siskiwit River is located about 0.4 miles west of the dock. A fillet beach occurs along the east side of the breakwater. It extends about 250 feet east of the breakwater and about 130 feet offshore. This fillet beach was not present prior to the construction of the first structure in 1952. Additionally, land has accreted between the two structures.

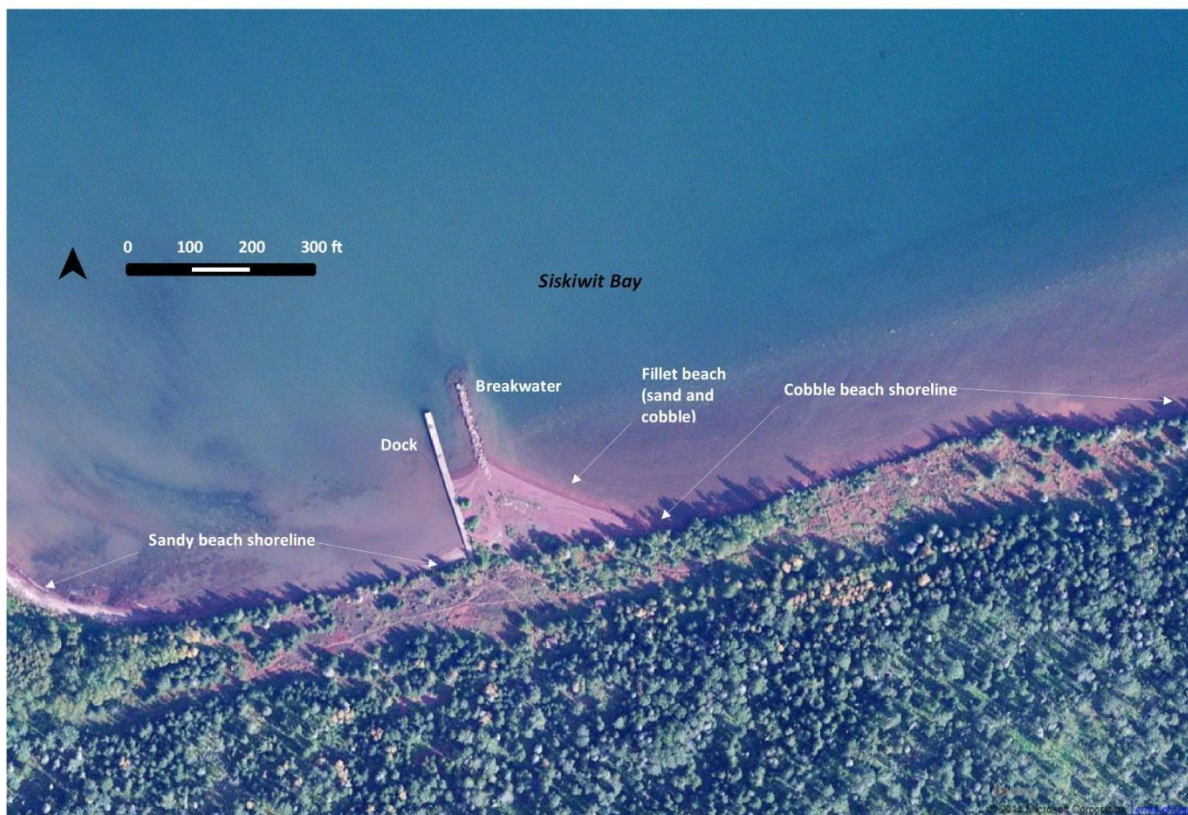


Figure 5. Siskiwit Dock Site

Under both the GMP and draft Wilderness and Backcountry Management Plan (WBMP) (NPS, 2011), the 100-acre area encompassing Siskiwit Bay campground is currently designated as non-wilderness (Figure 6). The GMP states “The dock and breakwater at Siskiwit Bay campground would be removed. Removal of these structures would permit separation of uses and allow for the reestablishment of the natural current and distribution of sediment along the shoreline. Campground shelters would be removed.” Further, in response to a comment the GMP notes that “the Siskiwit Bay dock would not be removed until new docks were available at Wright Island and Hay Bay.” Docks at these locations have been installed or rebuilt at present. The proposed action in the WBMP follows the GMP and adds removal of picnic tables stating “When the docks and shelters at Duncan Bay and Siskiwit Bay campgrounds are removed (per the GMP), picnic tables will also be removed.”

1.2 Impact Topics Selected for Analysis

This assessment considers direct (same time and location of action), indirect (outside of project area or implementation time period), and cumulative (incremental impacts from the project in the context of past, present and reasonably foreseeable future actions regardless of actor). The topics selected for analysis were based on agency concerns during scoping and applicable laws, rules, regulations and policies.

Topography-geology-soil

NPS requires that natural coastal processes, such as erosion, shoreline migration, deposition, overwash, and inlet formation, be allowed to continue without interference. NPS Management Policy § 4.8.1.1 states, if “human activities or structures have altered the nature or rate of natural shoreline processes, the Service will... investigate alternatives for mitigating the effects of such activities or structures and for restoring natural conditions.” A major consideration in this project is the impact of the current dock on long-shore drift/sediment deposition. Additionally, construction activities for the proposed alternatives would cause some shoreline and lake-bed impacts.

Water Resources

Under Management Policy §4.6.3, NPS aims to avoid pollution of park surface and ground waters, whenever possible. The project area is within the ordinary high water mark of Lake Superior and activities in the action alternatives would have direct, but short-term, impacts on the water resources of Siskiwit Bay. Specifically, they would increase turbidity during the maintenance, removal or construction activities.

Aquatic Ecology

NPS aims to minimize “human impacts on native plants, animals, populations, communities, and ecosystems” (Management Policy §4.4.1). The project area is within the ordinary high water mark of Lake Superior. Dock construction or dock removal or dredging activities in the action alternatives would have direct impacts on the aquatic ecology due to short term disruption of the lake-bed and shoreline in the immediate vicinity of the current dock.

Special Status species

Under Management Policy §4.4.2.3, NPS will protect “all species native to national park system units that are listed under the Endangered Species Act.” No threatened or endangered species or their habitats are documented in the project area. National Park Service will consult with the U.S. Fish and Wildlife Service as required by Section 7 of the Endangered Species Act.

Additionally, NPS will “inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species, to the greatest extent possible” (Management Policy §4.4.2.3). The State of Michigan protects endangered species under Part 365, Endangered Species Protection, of the Natural Resources and Environmental Protection Act (Act 451 of the Michigan Public Acts of 1994). No state-listed species are known from the project area.

The coaster brook trout is a species without official designation status as a protected species, but there are ongoing efforts by NPS and others to ensure their protection. Coaster brook trout habitat is located within the project area; therefore it will be included in this EA.

Visitor Use and Experience

NPS Management Policy §8.1.1 states that besides resource protection “the fundamental purpose of all parks also includes providing for the enjoyment of park resources and values by present and future generations.” Dock removal or replacement will impact boaters and other visitors’ experiences at the park.

1.3 Impact Topics Eliminated from Further Evaluation

Wetlands

Under the Clean Water Act §404, Executive Order 11990 *Protection of Wetlands*, NPS policies and DO-77-1 *Wetlands Protection*, parks should prevent the loss or degradation of wetlands (areas that are frequently saturated or inundated and normally support vegetation adapted to such conditions). The project area encompasses cobble lake shoreline which is classified as a wetland. However, this wetland within the project area does not support wetland vegetation. The impacts on the sand and cobble substrate of this wetland are addressed in detail within the topography-geology-soils section of this EA. Therefore this topic was dismissed accordingly.

Floodplains

Under Executive Order 11988 *Floodplain Management*, federal agencies should avoid construction within the 100 year floodplain unless no practicable alternative exists. Director’s Order 77-2 *Floodplain Management* requires preparation of a statement of findings for certain construction activities within a 100-year floodplain. The project area is located within the ordinary high water mark of Lake Superior and does not include

construction within the 100-year floodplain, thus, no statement of findings was prepared and this topic was dismissed accordingly.

Regional Air Quality

Section 118 of the Clean Air Act requires a park to meet all federal, state, and local air pollution standards. The Act also requires that federal land management agencies must “preserve, protect, and enhance the air quality in national parks...” 42 U.S.C. §7470. Construction activities during the dock removal or replacement alternatives would result in temporary increases of vehicle exhaust and emissions from heavy equipment. However, since these emissions would be temporary, localized and dissipate rapidly, they would cause only negligible impacts on air quality. Due to the above this topic was dismissed.

Lightscape

In accord with Management Policies §4.10, NPS is dedicated to protecting natural lightscapes as both environmental and cultural resources by limiting human caused light during the night. Construction activities in removal or replacement would occur during the day and consequently no impact is expected. Due to the above this topic was dismissed.

Terrestrial Resources - Wildlife and Vegetation

Under the Management Policies §4.4.1, NPS strives to maintain all components and processes of natural evolving park ecosystems, including the natural abundance, diversity, and ecological integrity of wildlife and native plant communities. The project area includes approximately 0.6 acres of terrestrial beach immediately adjacent to the dock that was either deposited during construction or accumulated due to the existence of the structures. The area is sparsely vegetated and subject to regular foot traffic.

Opening the Wright Island dock to overnight use will have minor impact on terrestrial resources. Addition of a campsites at Wright Island will have a minor impact on terrestrial resources from clearing of vegetation. Site-specific NEPA compliance will be conducted in conjunction with the Cultural Resources Management Plan currently in development.

Due to the above this topic was dismissed.

Cultural Resources

Under Director’s Order 28 *Cultural Resources Management Guideline*, NPS is charged with protecting and interpreting historic and cultural resources found in parks. Although technically 50+ years old (constructed in 1962), the most recent Siskiwit Bay Dock is not considered a historic resource on Isle Royale. The "Armco" bin-wall construction was of common design, imported for use at Isle Royale and thus not unique or significant to Isle Royale history. Further, the bin-walls are rusting out and in some places breached, allowing interior rock to spill out from enclosure. Therefore, the integrity of the dock is now compromised; the structure is now reaching the end of its use life.

With regard to archaeological resources, none have been located in immediate vicinity of the dock or adjacent campground. Nor are there any submerged cultural resources in the

dock vicinity. The dock interfaces with the shoreline, but ends at grade below a prominent bank. Dock removal would not require disturbance to this bank, only the shore-based gravels found below. The probability of disturbing intact archaeological deposits during dock removal is highly unlikely, much of the area already having been disturbed by dock construction in 1962.

For these reasons, the Park believes there will be NO EFFECT TO HISTORIC PROPERTIES in relation to dock removal.

Finally, the park's Cultural Resource Management Plan currently in development will determine treatment of remnant historical resources at Wright Island. Due to the above this topic was dismissed.

Indian Trust Resources

Secretarial Order 3175 requires analysis of anticipated impact to Indian trust resources for proposed actions. There are no Indian trust resources within the park and this project will not affect any sacred sites (pursuant to EO 13007), and this topic was dismissed accordingly.

Environmental Justice

Executive Order 12898 *General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* requires federal agencies to identify and address disproportionate human health and environmental effects of programs on minorities and low-income populations. There are no low-income or minority populations within the project area, thus no known disproportionate impacts will occur and this topic was dismissed accordingly.

Socioeconomics

The proposed activities would not affect local or regional land use, businesses or agencies. The project may prove beneficial to one or more local communities due to small increases in employment opportunities for construction activities outlined in the action alternatives. However, much work would be performed by park employees and would limit the potential benefit to contractors. Additionally, the work would only be temporary. Due to the above this topic was dismissed accordingly.

Waste Management

Any waste generated during construction activities or dredging operations would be removed from the area and recycled or disposed of appropriately. Due to the above this topic was dismissed.

Energy Requirements and Conservation Potential

Construction and maintenance activities would all require the use of fossil fuels. Energy use is largely unavoidable, but would be minimized through the need for efficiency in all projects that occur in a remote location such as Isle Royale. Energy expenditures are minimal for all the proposed actions. Due to the above this topic was dismissed accordingly.

Park Operations

Any of the alternatives will have minimal impacts related to emergency access and maintenance. Either of the alternative actions may require shifts in operating procedures, but such changes are within the range of standard practice on the island. Due to the above this topic was dismissed accordingly.

Soundscape

Director's Order 47 *Sound Preservation and Noise Management* sets policies to preserve the natural soundscape that exists in the absence of human-cause sound. The type and extent of human-caused sounds considered acceptable may vary among parks and within a park. As a wilderness park, many areas of Isle Royale have a low threshold for noise pollution. However, the Siskiwit Dock area is classified as non-wilderness and construction activities would cause short-term disturbances to the neighboring wilderness soundscape. Impacts from construction noise will be mitigated by limiting activities to 8 am to 6pm. Due to the above this topic was dismissed accordingly.

2.0 Alternatives

2.1 Description of Alternatives

This EA outlines a “no action” and two alternative action proposals. The No Action Alternative would not make any changes to the current dock or breakwater. Alternative A would remove the existing Siskiwit dock and breakwater. Alternative B would rebuild the dock with an open-piling design and no breakwater. The following measures would apply to all alternatives:

- Requiring best practices for dredging, construction, and waste removal.
- Limiting activities to 8 am to 6pm and scheduling the work during low season to minimize impacts on the soundscape and to visitor experience.
- Conduct detailed surveys for species of concern prior to any construction-related activities, if the proposed activities were expected to disturb adjacent habitats.
- Require hull cleaning and other best practices for vessels prior to deploying to the island to reduce risk of introducing aquatic invasive species to the area.

No Action Alternative

Under this option, no changes would be made to the current dock or breakwater. This option would entail normal maintenance activities to the current dock and breakwater to conserve function and accessibility. Maintenance may include dredging the landing area between the Siskiwit dock and breakwater. A 1980 analysis suggested the need to remove 250 cubic feet of material every 10 years to maintain existing drafts. Maintenance may also include replacing the timber fendering and cleats, repairing concrete, etc.

Alternative A: Removal of Siskiwit Dock – Preferred Alternative

The Siskiwit dock and breakwater would be completely removed, thereby reestablishing natural shoreline processes. Alternative A would include:

- Removal of Siskiwit dock and breakwater.
- Allowing natural redistribution of remaining accumulated sediment and materials through wave and ice action.
- Camping sites, shelters and picnic tables would remain.
- Deployment of two mooring buoys in Siskwit Bay to provide day use access for boaters.
- Opening of Wright Island dock to overnight camping (See Figure 6).
- Addition of campsites at Wright Island.

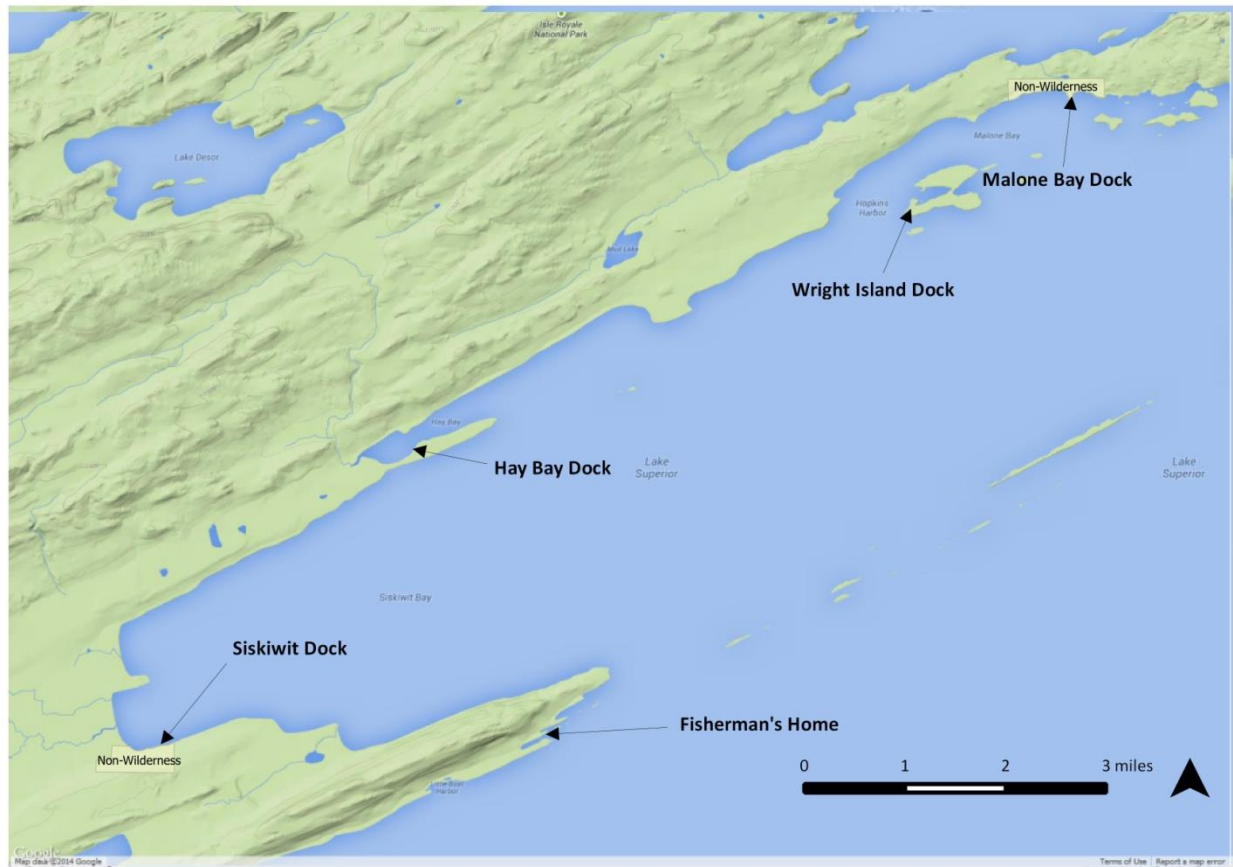


Figure 6. Dock locations in Siskiwit Bay.

Alternative B: Replacement of Siskiwit Dock

The dock and breakwater would be replaced with a new dock in approximately the same location and with a structure allowing for more natural movement of sediment along the shore. Alternative B would include:

- Removal of Siskiwit dock and breakwater.
- Construction of an open-pile type dock structure (Figure 7) of sufficient length to ensure a water depth deep enough to accommodate NPS boats (approx. 3' to 5').
- Allowing natural redistribution of remaining accumulated sediment and materials through wave and ice action.
- Overnight stays by boaters would be at their own risk, given the lack of shelter from the proposed open-pile structure of the dock.
- Opening of Wright Island dock to overnight camping (See Figure 6).
- Addition of campsites at Wright Island.

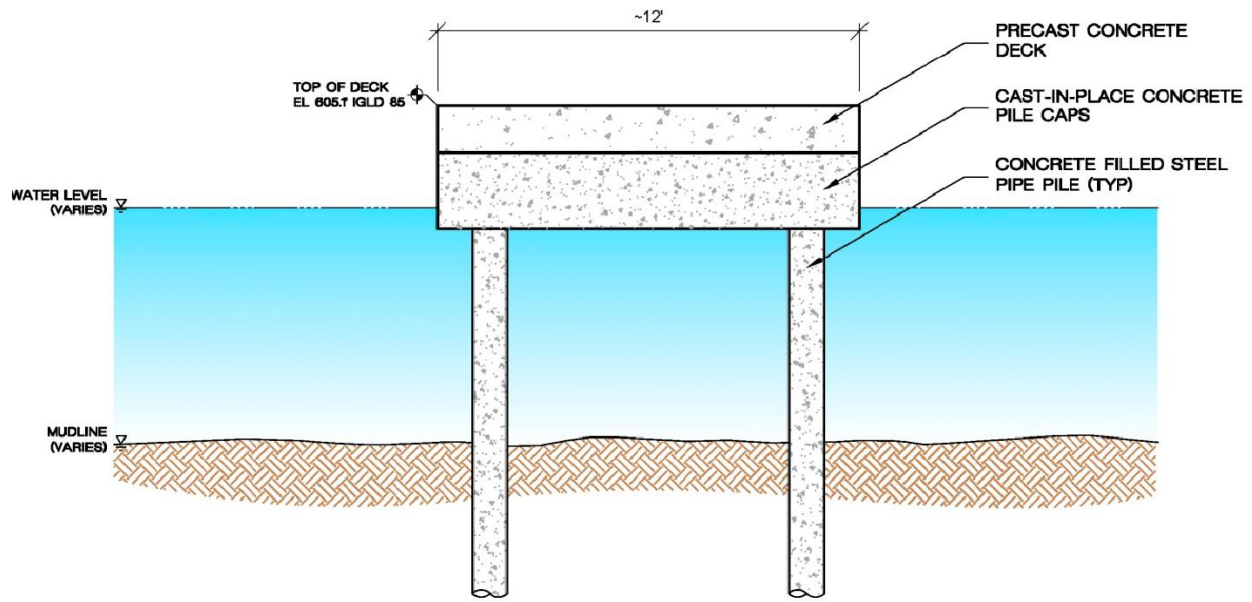


Figure 7. Section view of open-pile dock concept (Baird, 2011).

2.2 Alternatives Considered but Dismissed

The following four alternatives were considered but not carried forward in this EA:

Manual bypass

This option would involve periodically dredging the accumulated material east of the dock and breakwater and placing the material along the shoreline at the southwest end of Siskiwit Bay. Although the rationale behind this action would be to compensate for decades of sediment transport interruption by the dock, such an action does not mimic the natural process of shoreline sediment transport.

Relocation to Senter Point

This option would remove the Siskiwit dock and build a new dock at Senter Point (Figure 8). This alternative is not desirable due to concerns about cultural heritage sites in this location and appears to present a similar potential for disruption of natural sediment transport within Siskiwit Bay.

Relocation to Island Mine Wharf

Under this option a replacement dock would be built at Island Mine Wharf (Figure 8), likely near the site of the previous 1880's-era dock. While addressing the issue of natural shoreline processes at the Siskiwit Dock, a new dock at Island Mine Wharf would require a massive structure given the exposed nature of this site to the full length of Siskiwit bay. This option could allow staff and user access to the Siskiwit Campground area; however, it would require building a new spur trail from the island mine trail to the dock site and involve a significant hike from the dock to the campground.

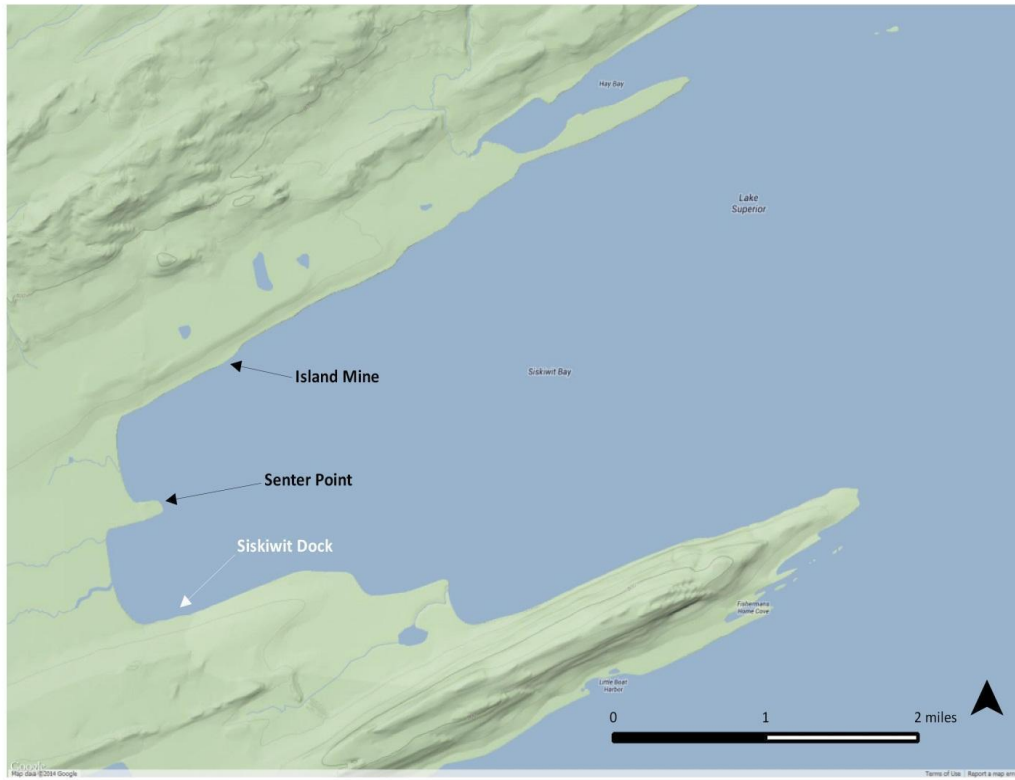


Figure 8. Sites mentioned in Section 2.2 Alternatives Considered but Dismissed

Removable Dock

Under this option, the Park would remove Siskiwit dock and replace it with either a floating or moveable dock. This option does not appear technically feasible as current dock designs could not withstand the severe storms that can occur in Lake Superior. Additionally, storage and deployment would be impracticable.

2.3 Alternative Comparison Matrix

This table provides a summary comparison of the impacts of the alternatives. For a more detailed discussion of impacts, refer to Section 4.0.

Impact topic	No Action	Alternative A – Removal	Alternative B – Replace
<i>Topography-Geology-Soil</i>	Dock continues to impede longshore sediment transport. Requires maintenance dredging over roughly 6300 ft ² around the dock approximately every 10 years.	Restore the natural topography of 400 feet of shoreline and sedimentation conditions in the area. Remove dock, breakwater and accreted material to re-expose approx. 39,000 ft ² of lake-bed. Addition of two mooring buoys could affect 3200 ft ² from movement of the bottom chain.	Similar to Alternative A, except that a new dock would have pilings spread across approx. 2400 ft ² of lake-bed which will impede sediment movement.
<i>Water Resources</i>	Minor turbidity due to periodic maintenance dredging. Continuing potential for incidental pollution from boats.	Short term degradation of water quality by increased turbidity due to construction activities. Long-term impacts include a decreased risk of incidental pollution from boats at the site.	Short term degradation of water quality by increased turbidity would occur due to construction activities. Continuing potential for incidental pollution from boats.
<i>Aquatic Ecology</i>	Removal of benthic organisms and habitat from periodic maintenance dredging in an approximately 6300 square foot area around the dock.	During construction activities individual fish may avoid the area and some benthic organisms would be displaced. Over 39,000 ft ² of lake-bed	During construction activities individual fish may avoid the area and some benthic organisms would be displaced. Over 39,000 ft ² of lake-bed

		habitat restored.	habitat restored, except for an approximately 2400 square foot open-piling dock.
<i>Special Concern Species</i>	None of the alternatives are expected to have an impact on special concern species.		
<i>Visitor Use and Experience</i>	No Change	Short-term impact on visitors from noise and sights of construction activities. Roughly 100' feet of dock space lost, though offset by new dockage at Wright Island, Hay Bay and Windigo. Loss of overnight camping offset at Wright Island by opening of dock to overnight camping and addition of campsites. Access for boaters to Siskiwit dock area maintained by addition of mooring buoys.	Short-term impact on visitors from noise and sights of construction activities. Replacement would provide less shelter than current dock, which could affect overnight and emergency use, but offset at Wright Island by opening of dock to overnight camping and addition of campsites. Access for boaters to Siskiwit dock area maintained by addition of mooring buoys.

2.4 Environmentally Preferable Alternative

As required by 40 CFR 1505.2(b), NPS must identify the environmentally preferable alternative. Under 43 CFR 46.30, the environmentally preferable alternative is the alternative... "that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historic, cultural, and natural resources... upon consideration and weighing... of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources."

Alternative A is the environmentally preferable alternative. Although an environmentally preferable alternative is identified, it may not be the NPS preferred alternative. The preferred alternative is the alternative the NPS believes would best fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. In this case, Alternative A is both the environmentally preferable alternative and the preferred alternative.

3.0 Existing Conditions/Affected Environment

3.1 Topography-Geology-Soil

Two main types of bedrock underlay Isle Royale: Portage Lake volcanics and Copper Harbor conglomerate. The bedrock is exposed in many locations along the shoreline and inland, giving the island its rugged, rocky appearance. In Siskiwit Bay, the sedimentary Copper Harbor conglomerate is exposed in shoreline outcrops (Kraft et al. 2010). This bedrock is the primary source of the cobble material that covers the beach east of the existing dock.

The existing dock is located on a topographically uniform section of NNW-facing shoreline within Siskiwit Bay. The fairly level forested upland ends abruptly with a transition to unvegetated beach that drops to the water's edge. To the east of the dock the shoreline is characterized by a narrow beach of cobbles and gravel ("shingle beach") between the water line and the upland vegetation. To the west, the shoreline is similar except that the beach material is primarily sand.

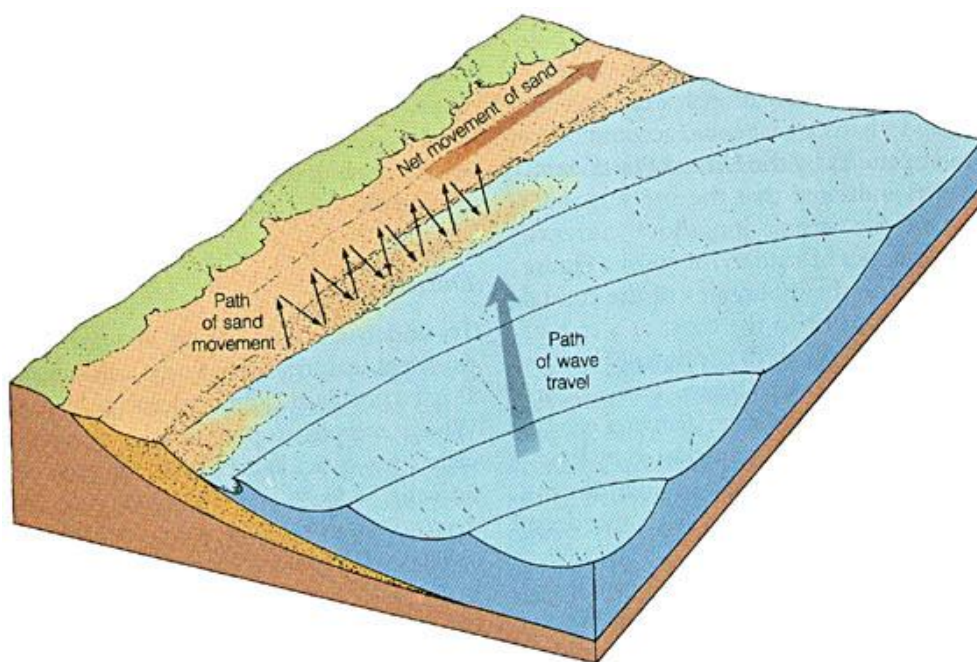


Figure 9. Longshore Drift (Image from <http://www.indiana.edu/~g105lab/1425chap12.htm>)

Isle Royale's General Management Plan (1998) identified Siskiwit dock for removal given concerns that it was impeding natural currents and sediment deposition. Wave action upon shorelines can cause the movement of sediments along the shoreline. When a wave hits a shoreline at an angle, it slowly moves sediment in the direction of the wave parallel to the shoreline (Figure 9). This natural shoreline process of sediment movement by prevailing

wave action is known as longshore sediment transport (LST) or longshore/littoral drift. Easterly winds create such a condition along the shorelines near Siskiwit dock. Ice movement can shift materials in a similar fashion.

Siskiwit dock has an adjacent, parallel, rubblemound groin breakwater about 50 feet to the east. A small triangular peninsula of land exists on the east side of the breakwater (Figure 10). It extends about 250 ft east of the dock and about 150 ft offshore, covering an area of approximately 0.4 acres. This peninsula is known as a 'fillet beach'. Fillet beaches form on the up-coast side of structures such as groins as the structures trap sediments that would otherwise be moving along the shore. It is apparent from analysis of historic air photos that the triangular peninsula of land adjacent to the east side of the breakwater was not present prior to the construction of the groin (Baird 2011).



Figure 10. Siskiwit dock fillet beach

Given the presence of longshore sediment transport, a fillet beach will form following construction of a groin perpendicular to the shore. The beach can form quickly, over the span of a couple of years, and then stabilize, or it can continue to grow until it surpasses the length of the structure and the sediments begin to bypass the end of the structure and cause shoaling (make shallow through material deposits). Sediments can also move through or over the top of rock groins to cause shoaling between the groin and the dock.

An analysis of historic imagery available through GoogleEarth shows clear evidence of accretion of material between the breakwater and the dock since 1992 (Figure 11). Although the precision of satellite imagery from different years and different sources varies, it appears that from 1992 until 2013, the shoreline between the breakwater and dock grew lake-ward by approximately 30-35 feet. This increase is evident in Figure 12, a 1964 photo of the dock showing open water in the foreground where beach currently exists. Even since 2009, approximately 5-7 feet of material accumulated between the structures.



Figure 11. Satellite Imagery of Siskiwit dock (2013) showing accretion between the dock and breakwater but no change to the fillet beach. White line shows 1992 shoreline. Dark purple line shows 2009 shoreline.



Figure 12. Photo from 1964 of Siskiwit dock. The current shoreline extends nearly to the cleat to which the white boat is tied. The breakwater presumably is just to the right of the view of the photo.

As for the fillet beach itself, we have no evidence documenting how long it took for the fillet beach to form (it was not present in 1931, but there was a substantial amount of accumulated material present in 1957 slightly east of the current fillet). It is evident from historical imagery that this fillet was not present prior to the construction of the first structure at this site in 1952.(Figure 13) An analysis by a Baird/URS Joint Venture (Baird Report) suggests that the material comprising the fillet beach may have been manually placed there (Baird, 2011). It is unknown why it would have been manually placed at that position, but potentially for protection of the breakwater, for dock and breakwater construction purposes, to form a beach for recreational or small craft use, or simply as a convenient dumping spot for dredge material.

Siskiwit Bay has considerable amounts of sand and small cobble present. The mouth of the Big Siskiwit River is located about 0.4 miles west of the dock along the shoreline. This is

likely the main potential source of sandy sediment in the area. Given the openness of Siskiwit Bay and the capacity for severe storms on Lake Superior, the Siskiwit Bay dock area is subject to substantial wave and ice action capable of moving sediment.

Evidence suggests that the dock has impeded sediment transport. As discussed above, there has clearly been accretion in the area between the dock and the breakwater. Second, the cleats on Siskiwit Dock extend near shore past where water of sufficient depth for docking occurs. The cleats may have been placed during a period of high water level, but most likely there was sufficient depth to tie up at the time of placement. Finally, anecdotal evidence from park employees and visitors suggest significant shoaling has occurred around the dock. A dredging assessment in 1980 suggested approximately 350 cubic yards of material had accumulated around the dock in the preceding 20 years.

However, the Baird report suggests that the shoreline position and Lake Superior wave patterns are unlikely to create conditions necessary for significant LTS. According to the Baird Report, the size of this fillet beach has not changed significantly in the past 30+ years. Similarly, an analysis of historic images in GoogleEarth shows no significant changes to the fillet beach from 1992 to present. Furthermore, the Baird Report states:

"The bathymetry in Siskiwit Bay is fairly uniform, with most of the contours running north to south. The nearshore bathymetry to the east of the dock is very steep with shore-parallel contours sloping down towards the north (Figure 3.2). These observations indicate that the nearshore area along the shoreline east of the dock is likely bedrock. Lake Superior waves entering Siskiwit Bay travel parallel to this shoreline and are unable to cause measurable erosion or create significant longshore drift. The bathymetric contours around the dock do not indicate any noticeable impact of the structure on the nearshore bathymetry."

The Baird Report focuses on the lack of major topographical changes to the overall shoreline of the bay. Major shoreline changes are not expected given the bedrock structure and protected nature of the shoreline in this area. However, it appears clear that the dock has impeded natural sediment movements. Sediments have been steadily accumulating between the dock and breakwater and causing shoaling around the dock.

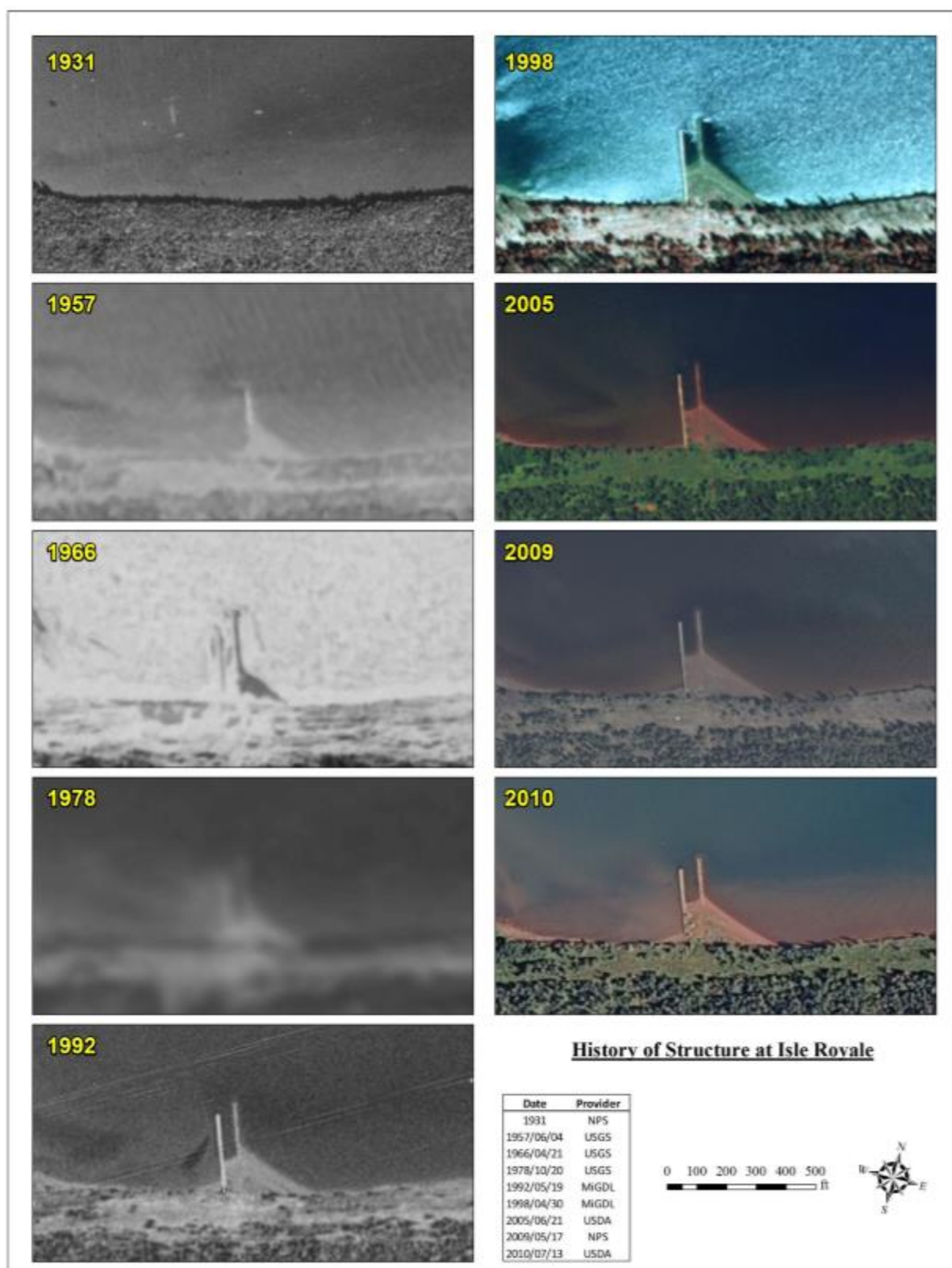


Figure 13. History of Siskiwit Dock Structures (Baird, 2011)

3.2 Water Resources

Aquatic habitats account for more than three-quarters of Isle Royale National Park, including over 430,000 acres of Lake Superior. While the Lake Superior waters around Isle Royale are largely considered pristine, pollution does exist as was described in the park's draft Wilderness and Backcountry Management Plan:

"Despite Isle Royale's remoteness and the lack of industrial or municipal discharges into its inland waters, several air-borne pollutants, capable of being transported long distances in the atmosphere, have been documented in the park's waters, sediments, flora, and fauna. These include sulfur and zinc, mercury, organochlorines, and herbicides. Mercury, for example, has been found in the park's Common Loons, although at levels lower than those documented in loons in most other parts of the country. Several of these heavy metals and organic compounds are subject to biomagnification; that is, reaching increasingly greater concentrations in organisms higher on the food chain...."

The Lake Superior portions of the park, particularly its bays and channels, are used by motorboats.... Accidental oil, fuel and sewage discharges from boats can all damage water quality locally."

Detailed water quality analyses do not exist for Siskiwit Bay. Even with the concerns noted above water quality is considered exceptional.

The park has identified the introduction and spread of exotic species as an issue of serious concern. It has taken active measures in dealing with minor infestations of sea lamprey (*Petromyzon marinus*), zebra mussel (*Dreissena polymorpha*) and the spiny water flea (*Bythotrephes cederstroemi*). None of these species have been identified near Siskiwit Dock. Hull fouling presents a potential source of introduction for aquatic invasive species.

3.3 Aquatic Ecology

No surveys of aquatic vegetation exist for Siskiwit Bay, but aquatic vegetation is generally very sparse in the ultra-oligotrophic waters of Lake Superior. In bays and harbors more sheltered than Siskiwit Bay, the most commonly found species include: quillwort (*Isoetes* spp.), needle spikerush (*Eleocharis acicularis*), long-beak water-crowfoot (*Ranunculus longirostris*), whorl-leaf water-milfoil (*Myriophyllum verticillatum*), Richardson pondweed (*Potamogeton richardsonii*), water sedge (*Carex aquatilis*), and grass-leaved pondweed (*Potamogeton gramineus*).

The barren nearshore aquatic habitat of Siskiwit Bay provides limited habitat for fish. There has been documentation of a population of coaster brook trout (*Salvelinus fontinalis*) in the Bay that spawn in the nearby Siskiwit River (Kraft et al 2010). Henry Quinlan, US Fish & Wildlife Service scientist, and his research team occasionally see coasters near Siskiwit dock, but notes that the dock does not provide spawning or nursery grounds and

only limited foraging and structure. In general, the dock is not critical to existing coaster populations (Quinlan, personal communication). This population is one of the few documented coaster brook trout populations in Lake Superior. The Park is actively supporting measures to protect these populations.

The lake trout (*Salvelinus namaycush namaycush*) population in the waters of Lake Superior on Isle Royale is one of the healthiest in Lake Superior (NPS 2011, p.116). The lake trout use the habitat of Siskiwit Bay as is evident from anglers catching them from the existing dock. There is no comprehensive survey of other fish in Siskiwit Bay, but by all accounts it is sparsely populated.

No specific data are available regarding the invertebrates that are found in Siskiwit Bay. Kraft et al. (2010) provides some general information about invertebrates in nearshore habitats at Isle Royale that are more sheltered than Siskiwit Bay. For example, native species of freshwater mussels are found in sheltered embayments (p.25). Kraft also reports that zooplankton density and abundance is generally very low in Lake Superior, but sheltered embayments have been found to have the highest abundance of zooplankton (p.24). Siskiwit Bay appears more similar to the oligotrophic waters of the open lake.

3.4 Special Concern Species

Section 7 of the Endangered Species Act of 1973 as amended (16 USC 1531-1544) requires consultation with the U.S. Fish and Wildlife Service on any issues impacting endangered species. The U.S. Fish and Wildlife Section 7 Consultation Technical Assistance website was accessed on August 18, 2015. The subsequent review identified no aquatic endangered or threatened species or critical habitat. Four species are listed for Keweenaw County: Canada lynx (*Lynx canadensis*), Gray wolf (*Canis lupus*), Northern long-eared bat (*Myotis septentrionalis*), and Rufa Red knot (*Calidris canutus rufa*). These species are not known to rely on habitat in the project area.

A number of species found at Isle Royale are listed by the State of Michigan as Endangered, Threatened, or Species of Special Concern under Part 365, Endangered Species Protection, of the Natural Resources and Environmental Protection Act (Act 451 of the Michigan Public Acts of 1994). Isle Royale species listed by the State of Michigan are presented in full in Appendix H of the draft Wilderness and Backcountry Management Plan (NPS 2011). None of these state-listed species have been documented in the habitat immediately adjacent to the Siskiwit dock. However, there are many state-listed species found on Isle Royale and their presence near the dock cannot be definitively ruled out without specific surveys. Detailed surveys would be conducted prior to any construction-related activities, if the proposed activities were expected to disturb adjacent habitats.

A population of coaster brook trout (*Salvelinus fontinalis*) has been documented in Siskiwit Bay. This is a species of conservation interest, but since it is not officially designated as a Federally or State listed species, the detailed discussion of this species was included above in Section 4.3 Aquatic Ecology.

3.5 Visitor Use and Experience

Isle Royale is a designated wilderness and 99% of the island is zoned wilderness or potential wilderness. By definition, wilderness is

“...a tract of undeveloped federal land of primeval character without permanent improvements or human habitation; an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain; where the forces of nature predominate and the imprint of human activities is substantially unnoticeable; which provides outstanding opportunities for solitude or a primitive and unconfined type of recreation.” (The Wilderness Act of 1964, Sec. 2c)

The Siskiwit dock and campground and 100 acres of surrounding area is zoned as non-wilderness backcountry (Figure 6), however, outside of the campground the area is generally indistinguishable from wilderness.

The dock and campground mark the east end of the Feldtmann Ridge hiking trail and the south end of the Island Mine trail. A popular hike loops from Windigo to Siskiwit and back, making a 30.1 mile, multi-day hiking trip. This hike is one of the most remote routes on the island. For this reason it attracts many backpackers as well as boaters who are seeking a wilderness camping experience. These visitors use the dock as a structure for fishing and enjoying the beauty of Siskiwit Bay.

The dock is one of approximately 70 docks and one of 20 ‘public overnight docks’ in the Park. Anecdotally, the dock is relatively popular with sport fishers and other boaters. Siskiwit dock provides an opportunity for boaters to access the area trails.

Siskiwit campground has 2 shelters and 7 campsites. Total number of overnight stays in the campground in 1998 was over 2,400, suggesting that the campground experiences steady use (Farrell & Marion, 1998, p. 24). However, the proportion of hikers and boaters is not known.

The GMP documents campground users’ dissatisfaction with excessive boat noise and ‘inappropriate boater behavior’ (NPS 1998). However, this conflict currently does not appear as significant given recent visitor use patterns. Approximately 80 boater permits were issued each year from 2010-2013. There have not been many recent complaints related to user conflicts at the site. However, that could be in part due to less monitoring of the site due to the limited boater use in recent years.

The existing dock is used periodically (up to 6 times per season) as a site for assisting with medical rescue operations. Due to the protection afforded by the rock breakwater, the dock is a safe place to bring a boat for the purpose of dispatching rescue teams and for receiving injured hikers from the backcountry.

4.0 Environmental Consequences

4.1 Assessment of Impacts

The assessments of impacts likely to result from proposed actions are organized by alternative. The impacts were quantified wherever possible in order to convey the intensity of impacts. No significant impacts were identified in this assessment.

This evaluation of alternatives takes into account both direct and indirect impacts.

- A direct effect is caused by an action related to the project.
- An indirect effect is a reasonably foreseeable consequence of an action.

4.2 Duration of Impacts

Duration of impacts is characterized based on the short- or long-term nature of alternative-associated changes on existing conditions.

- Short-term is defined as lasting only during the construction period, or no longer than two years after project completion.
- Long-term is defined as lasting beyond two years after the construction period, essentially permanent post-project impacts.

4.3 Cumulative Impacts

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered for all proposed alternatives. The geographic scope for this analysis is limited to the Siskiwit Bay area.

The project background and existing conditions sections describe the impacts from past actions. Given the isolation of the island in general, historical activities with notable environmental impacts on the project area are limited.

The park has no current or planned projects in the immediate project area. However, the park has considered removing the Siskiwit River Bridge spanning the river just upstream of its entrance into Siskiwit Bay, about ½ mile northwest of the dock. This report does not assess the impacts of that endeavor, but it is unlikely to add to the impacts of any of the proposed actions. The park has not identified any other concurrent projects in the vicinity of the dock or any that could impact use of the dock. No actions by others outside of NPS with potential environmental impacts are currently known.

The park has not identified any other reasonably foreseeable projects in the area. Potential future actions considered in the sections below include climate change and changes in visitor numbers and use.

Conclusion: Past, ongoing, or reasonably foreseeable future actions by others, in combination with the impacts described in this chapter, would not result in cumulative impacts.

4.4 Topography-Geology-Soil

Overview

NPS Management Policy § 4.8.1.1 requires that natural coastal processes, such as erosion, shoreline migration, deposition, overwash, and inlet formation, be allowed to continue without interference. This section addresses changes to the shape and the composition of the shoreline and submerged lands at the proposed action site and within Siskiwit Bay.

	Topography-Geology-Soil Impacts
<i>No Action Alternative</i>	Continue to impede longshore sediment transport and require maintenance dredging over roughly 6300 ft ² around the dock approximately every 10 years.
<i>Alternative A</i>	Restore the natural topography of 400 feet of shoreline and sedimentation conditions in the area. Remove dock, breakwater and accreted material to re-expose approx. 39,000 ft ² of lake-bed. Addition of two mooring buoy could affect 3200 ft ² from movement of the bottom chain.
<i>Alternative B</i>	Similar to Alternative A, except that a new dock would have pilings spread across approx. 2400 ft ² of lake-bed which will impede sediment movement.

Impacts of No-Action Alternative

Based on historic trends, changes to the topography of the shoreline and submerged lands may continue due to the effects of the existing dock and breakwater on sediment transport. This would include a gradual increase in the size of the existing beaches adjacent to the breakwater and dock. As noted, the beach area between the dock and breakwater has grown lakeward by roughly 1 foot per year since 1992. The triangular fillet beach has not changed noticeably in size since 1992.

Shoaling (accumulation of sediments) around the dock will also continue. The resulting reduction in water depth along the dock will require periodic maintenance dredging to provide sufficient draft for use by visitor and park boats. An analysis conducted in 1980 suggests that maintenance dredging would produce an estimated 250 cubic yards of material when clearing out roughly 6300 ft² around the dock. Water levels in Lake Superior fluctuate and could be exacerbated by climate change. To the extent that water levels are below average in the future, dredging may be required on a more frequent basis. Dredged spoil materials would be placed on Mott Island for reuse or removed in

accordance with applicable regulations. Maintenance dredging would produce an estimated 250 cubic yards of spoils approximately every 10 years.

Conclusion: Overall the no-action alternative would continue to impede longshore sediment transport in the area and require maintenance dredging over roughly 6300 ft² around the dock. No cumulative impacts are expected.

Impacts of Alternative A - Dock Removal

Removal of the dock and breakwater would result in topography similar to that found prior to construction of the dock and breakwater along the 400 feet of shoreline at the base of the dock, breakwater, and fillet beach area. Removal would restore roughly 39,000 ft² to the lake. This, in turn, would restore the longshore sediment transport to its natural state. Changes to the lake-bed are expected in the short-term as wave and ice action redistribute material in the area. Placement of mooring buoys in a maximum of 15 feet deep water would require a bottom chain 22.5 feet long creating a potential 1600 ft² area of impact. Thus addition of two mooring buoy could affect 3200 ft² from movement of the bottom chain as it pivots around the anchor. However, it is unlikely that this big of an area will actually be impacted as the chain will not move frequently.

Construction activities would involve minimal impacts to topography-geology in the short-term. Construction barges would anchor in the area surrounding the dock, but would disrupt a minimal area of lake-bed and only during the construction period.

Little impact is expected to areas above the high water mark, except for foot traffic from construction activities along the 400 feet of shore. Thus, terrestrial impacts on soils and topography are deemed minimal.

Conclusion: Alternative A would restore the natural topography of 400 feet of shoreline and natural sedimentation conditions in the area. Removal of the dock, breakwater and accreted material would restore roughly an area of 39,000 ft² back to open lake. No cumulative impacts are expected.

Impacts of Alternative B - Dock Replacement

Removal of the dock and the breakwater would lead to the same impacts discussed above for Alternative A, specifically, restoration of the natural topography of 400 feet of shoreline and reclamation of roughly 39,000 ft² of lake-bed. A new dock would be built at the site. The dock would be an open-piling pier structure in order to minimize the impact of the dock on longshore sediment movement. The exact size and location will depend on subsurface analysis and overall feasibility. However, an approximately 12 feet wide by 200 feet long dock should be sufficient to meet the water depth need of current uses. Construction of a piling dock requires anchoring the dock to the underlying bedrock and would result in pilings spread across roughly 2400 ft² of lake-bed. These pilings will impede sediment movement; however, the magnitude of that disruption would be much less than the existing dock and breakwater.

Construction activities would involve minimal impacts to topography-geology in the short-term. Construction barges would anchor in the area surrounding the dock, but would disrupt a minimal area of lake-bed and only during the construction period. Little impact to the soils is expected to areas above the high water mark, except for soil compactions along the 400 feet of shoreline from foot traffic associated with deconstruction activities and construction of the new dock.

Conclusion: This alternative would largely restore the natural topography of 400 feet of shoreline and reclaim roughly 39,000 ft² of open lake. However, a new dock would have pilings spread across 2400 ft² of submerged lands. These pilings will impede sediment movement, but the intensity of that disruption would be much less than the existing dock and breakwater structures.

4.5 Water Resources

Overview

NPS policies implementing the Clean Water Act require protection of water quality. The project area is within the ordinary high water mark of Lake Superior. Climate change and continuing airborne deposition of chemicals will continue to impact Lake Superior and Isle Royale waters. However, given the short term nature of the impacts described below, the project activities will have negligible cumulative impacts on water quality.

	Water Resources Impacts
<i>No Action Alternative</i>	Minor turbidity due to periodic maintenance dredging. Continuing potential for incidental pollution from boats.
<i>Alternative A</i>	Short term degradation of water quality by increased turbidity due to construction activities. Long-term impacts include a decrease in incidental pollution from boating activities at the site.
<i>Alternative B</i>	Short term degradation of water quality by increased turbidity would occur due to construction activities. Continuing potential for incidental pollution from boats.

Impacts of No-Action Alternative

Under the no-action alternative, we expect minor short-term adverse impacts from periodic maintenance dredging. Dredging can cause temporary increases in the water turbidity in the area immediately adjacent to the dredging operation. The area of turbidity would be dependent on water movement at the time of dredging. Fluctuating water levels in Lake Superior could be exacerbated by climate change and dredging may be required on a more frequent basis. Given current rates of deposit, dredging would be required roughly once every 10 years.

Continuing use of the dock by vessels presents a risk of water pollution. Vessels pollution may be inadvertent or intentional and includes discharges of sewage and waste, motor emissions, and aquatic invasive species. However, given the low number of vessels using Siskiwit dock, the potential impact is small.

Conclusion: Periodic maintenance dredging would have minor, short-term adverse impacts adjacent to the dock by temporarily increasing the water turbidity as a result of the disruption of the lake bottom sediments. Long-term impacts include the risk of pollution from vessels using the dock. No cumulative impacts are expected.

Impacts of Alternative A - Dock Removal

Construction activities would cause short-term impacts to water quality in the vicinity of Siskiwit dock. Removal of the dock and breakwater may increase water turbidity during dock and breakwater removal and also creates a risk of incidental pollution from construction vessels. In the long-term, the absence of dock space should decrease incidental pollution from operation of motor boats and also decrease the risk of significant petroleum or other chemical spills. It should also limit the opportunity for introduction of invasive species into this part of the bay. However, addition of two mooring buoys would keep some boat traffic in the area. To the extent that boater use shifts from Siskiwit dock to other docks, the potential impacts from boat activities would minimally increase at other sites.

Conclusion: Short term degradation of water quality by increased turbidity would occur due to construction activities. The long-term impacts on water quality at the Siskiwit dock area would include a decrease in risk of incidental pollution from boating activities. No cumulative impacts are expected.

Impacts of Alternative B - Dock Replacement

Construction activities would cause short-term impacts to water quality in the vicinity of Siskiwit dock including an increase in water turbidity and incidental pollution from construction vessels. In the long term, use of the dock by vessels presents a risk of water pollution, either inadvertent or intentional, and including discharges of sewage and waste, motor emissions, and aquatic invasive species. However, given the low number of vessels using Siskiwit dock, the potential impact is small.

Conclusion: Short term degradation of water quality by increased turbidity would occur due to construction activities. In the long term, the potential for incidental pollution from boats, both chemical and biological, will continue. No cumulative impacts are expected.

4.6 Aquatic Ecology

Overview

This section focuses on impacts to the aquatic resources in proximity to the project area. Aquatic resources include aquatic flora and fauna, such as fish, mollusks, and macro- and

micro-invertebrates. This section also discusses impacts to habitat as it relates to these populations.

	Aquatic Ecology Impacts
<i>No Action Alternative</i>	Removal of benthic organisms and habitat from periodic maintenance dredging in an approximately 6300 square foot area around the dock.
<i>Alternative A</i>	During construction activities individual fish may avoid the area and some benthic organisms would be displaced. Over 39,000 ft ² of lake-bed habitat restored, but roughly 700 linear feet of dock and breakwater structure would be lost.
<i>Alternative B</i>	During construction activities individual fish may avoid the area and some benthic organisms would be displaced. Over 39,000 ft ² of lake-bed habitat restored. While roughly 700 linear feet of dock and breakwater structure would be lost, a new dock would provide some structure.

Impacts of No-Action Alternative

Direct impacts to aquatic species would likely be undetectable to minor. The dock provides a structure for fishing, but fishing activity is currently limited. Lake Superior fishing is regulated by the Michigan Department of Natural Resources for conservation. Even if more liberal harvest policies were enacted and fishing pressure increased, it does not appear that Siskiwit dock fishing would pose a threat to the resource.

Maintenance dredging of areas adjacent to the dock will occur as needed to provide sufficient draft for use by visitor and park boats. An analysis conducted in 1980 suggests that maintenance dredging would produce an estimated 250 cubic yards of material every 10 years when clearing out roughly 6300 ft² around the dock. Dredging would remove entrained organisms and disrupt habitat in the dredged area. It would also temporarily increase the water turbidity as a result of the disruption of the lake bottom sediments. However, the frequent wave action of the lake would gradually disperse the sediments and is unlikely to cause harm to organisms because benthic invertebrates, such as mussels, are adapted to the littoral transport of sediments.

Conclusion: The no-action alternative would have minimal impacts on benthic organisms from periodic maintenance dredging in an approximately 6300 square foot area around the dock. No cumulative impacts are expected.

Impacts of Alternative A - Dock Removal

Dock removal would result in the restoration of roughly 39,000 ft² of lake-bed habitat natural littoral sediment transportation patterns. Placement of mooring buoys is expected to have negligible effect on aquatic organisms. Roughly 700 linear feet of dock and breakwater structure would be lost. The dock provides a structure for fishing, thus,

removal would decrease fishing pressure to some extent. Given the relative lack of organisms in the area, the overall impacts will be minor. A discussion of impacts on the coaster brook trout, a species of conservation interest, can be found below in Section 5.7 Special Concern Species.

Construction vessels from other ports of call create a risk of introducing aquatic invasive species to the area. However, the harsh, oligotrophic nature of Siskiwit Bay decreases the risk of establishment and the park could require hull cleaning and other best practices prior to deploying to the island.

Conclusion: During construction activities individual fish may avoid the area and some benthic organisms would be displaced. Over 39,000 ft² of lake-bed habitat restored. No cumulative impacts are expected.

Impacts of Alternative B - Dock Replacement

In the short-term, individual fish may avoid the area and some benthic organisms would be displaced. Construction of an estimated 12 foot by 200 foot piling dock requires anchoring the dock to the underlying bedrock and the pilings would disrupt a portion of the 2400 ft² of submerged lands below the dock. While roughly 700 linear feet of dock and breakwater structure would be lost, the new dock would partially offset this loss. The new dock would continue to provide fishing, but fishing pressure would likely remain low.

Construction vessels from other ports of call create a risk of introducing aquatic invasive species to the area. The harsh, oligotrophic nature of Siskiwit Bay decreases the risk of establishment and the park could require hull cleaning and other best practices prior to deploying to the island.

Conclusion: During construction activities individual fish may avoid the area and some benthic organisms would be displaced. The project would restore over 39,000 ft² of lake-bed habitat. While roughly 700 linear feet of dock and breakwater structure would be lost, the new dock would offset this loss. No cumulative impacts are expected.

4.7 Special Concern Species

The U.S. Fish and Wildlife Section 7 Consultation Technical Assistance website was accessed on August 18, 2015. The subsequent review identified no aquatic endangered or threatened species or critical habitat. Four species are listed for Keweenaw County: Canada lynx (*Lynx canadensis*), Gray wolf (*Canis lupus*), Northern long-eared bat (*Myotis septentrionalis*), and Rufa Red knot (*Calidris canutus rufa*). However, there are no expected impacts on these species from any of the proposed alternatives. For these reasons, the proposed project, regardless of the alternative selected, will have “no effect” on any federally listed species, their habitats, or designated critical habitat.

A number of species listed by the State of Michigan as Endangered, Threatened, or Species of Special Concern are found at Isle Royale. Isle Royale species listed by the State of Michigan are presented in full in Appendix H of the draft Wilderness and Backcountry

Management Plan (NPS 2011). None of these state-listed species have been documented from the habitat immediately adjacent to the Siskiwit dock. However, there are many state-listed species found on Isle Royale and their presence near the dock cannot be definitively ruled out without specific surveys. These detailed surveys and habitat assessments would be conducted prior to any construction-related activities, if the proposed activities were expected to disturb adjacent habitats.

A population of coaster brook trout (*Salvelinus fontinalis*) has been documented in Siskiwit Bay and spawns in the nearby Siskiwit River (Kraft et al 2010). The proposed dock removal would eliminate the roughly 700 linear feet of dock structure. However, the dock does not provide spawning or nursery grounds, provides only limited foraging and structure, and is not critical to existing coaster populations (Quinlan, personal communication). Impacts should be minor, but construction activities can be timed to minimize impacts on the local coaster brook trout population. The removal of the dock may decrease fishing pressure in the area while the other alternatives would allow fishing to continue. However, the current fishing pressure is low and is expected to remain low.

Conclusion: None of the alternatives are expected to have an impact on special concern species.

4.8 Visitor Use and Experience

Overview

This section focuses on visitor use in and experience of the Siskiwit Bay campground area. It also considers the broader park in terms of overall visitor use as it relates to the project.

	Visitor Use and Experience Impacts
<i>No Action Alternative</i>	No change.
<i>Alternative A</i>	Short-term impact on visitors from noise and sights of construction activities. Roughly 100' feet of dock space lost, though offset by new dockage at Windigo, Hay Bay and Wright Island. Loss of overnight boater camping offset at Wright Island by opening of dock to overnight camping and addition of campsites. Access for boaters to Siskiwit dock area maintained by addition of mooring buoys.
<i>Alternative B</i>	Short-term impact on visitors from noise and sights of construction activities. Replacement would provide less shelter than current dock, which could affect overnight and emergency use, but offset at Wright Island by opening of dock to overnight camping and addition of campsites. Access for boaters to Siskiwit dock area maintained by addition of mooring buoys.

Impacts of No-Action Alternative

Under this alternative there would be negligible change to the current visitor use and experience. During maintenance dredging operations there would be a temporary interruption of use of the dock by visitors, but this would be very infrequent (approximately once every 10+ years) and of short duration (2-3 days).

Impacts of Alternative A - Dock Removal

In the short term, the presence of heavy equipment would disturb the remote nature of the site. However, best management practices such as limiting operations to shoulder seasons would help to minimize the impact.

In the long-term, removal of the dock could help protect wilderness character at the site. It would increase the solitude and opportunity for primitive recreation by decreasing the chances of visitors meeting other people and avoiding motorized boats at the site. However, removal of the dock would eliminate use of the dock for swimming, fishing, and gaining a different perspective on the bay.

Boaters would no longer have dock space or access to the campground area, unless they anchor out or use the mooring buoy under the right conditions. The existing Siskiwit dock provides roughly 80 – 100 feet of dock space (draft of at least 3 feet), including both the east and west sides of the dock. However, the southwest end of the island has seen a substantial increase in dock space since passage of the GMP, including the addition of a 50 foot long dock at Hay Bay, repair of the 54 foot dock at Wright Island, and three 24 foot long extension docks at Windigo. Boaters would lose dock access to overnight camping at the Siskiwit dock and at the 2 shelters and 7 campsites at the Siskiwit bay campground. However, the dock at Wright Island provides approximately 50 feet of dock space and the Park will open it to overnight use. The park will also create campsites on Wright Island. The exact number and location will be determined within the Cultural Resources Management Plan currently under development.

Boater access to the Siskiwit area trails would change. The park would install two mooring buoys in Siskiwit bay so that boaters could tender over to the campground and trails. Alternatively, boaters would have to access the area trails through Windigo.

Currently, the dock provides rescue operations access for Feldtmann and Island Mine trails. Vessels can tie up at Siskiwit to deploy an evacuation litter team. Without a dock, evacuations would likely require launching a landing team in a beachable boat from a larger vessel. In times of severe weather that larger vessel may need to return to a sheltered harbor and come back when the rescue team is ready. Alternatively, rescuers could hike in from Windigo, but that could create significant delays in evacuation times. The park could alternatively purchase a rescue vessel capable of shallow water beach landings, or following further review use a clearing area in non-wilderness for helicopter evacuation. Overall, the changes are manageable and present a minimal impact.

Relatedly, this dock would not be available for boaters as a safe harbor during windy conditions (although easterly winds make docking difficult even at the current dock).

However, Hay Bay and Wright Island are similar distances from Point Houghton, thus safe harbor options would remain.

Conclusion: There would be a short-term impact on visitors from construction activities. Roughly 100' feet of dock space would be lost, but this loss is offset by new dockage at Windigo, Hay Bay and Wright Island. Loss of overnight camping would be offset by opening of dock to overnight camping and addition of campsites at Wright Island. Loss of the dock would require changes to rescue operations.

Impacts of Alternative B - Dock Replacement

During construction, boat access to Siskiwit Bay Campground via a dock would be limited. Construction-related noise levels may impact the experience of visitors to the campground, but best management practices like limiting operations to shoulder seasons would help minimize the impact.

Long-term impacts include the eventual loss of the fillet beach which serves as a scenic picnic area. This option would retain swimming, fishing, and viewing access for all users. A new open-piling dock, may look fairly modern and could be considered aesthetically unpleasing.

The removal of the breakwater would result in a loss of protection for boats along the dock from northeastern wind and waves, thus limiting practical use of the dock by boaters. Additionally, a shorter dock may not have as deep of draft and may not provide dock space for some boats. Water levels in Lake Superior fluctuate and could be exacerbated by climate change. To the extent that water levels are below average in the future, it could further limit dock space.

Currently, the dock provides rescue operations access for the Feldtmann and Island Mine trails. Vessels would be able to tie up at the replacement Siskiwit dock to deploy an evacuation litter team during calm lake conditions. However, the dock would not provide a sheltered berth for emergency rescues whenever there were strong winds from the northeast or east. Relatedly, the open-piling dock would not provide suitable safe harbor for boats trying to take shelter from storms with strong northeast or east winds.

Conclusion: There would be a short-term impact on visitors from construction activities. The replacement would provide less shelter than the current dock and could affect overnight and emergency use of the dock. Loss of overnight boater camping would be offset by opening of the Wright Island dock to overnight camping and the addition of campsites at Wright Island.

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