Sleeping Bear Dunes National Lakeshore
Michigan

National Park Service
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The Water Wheel and Casey's Canoe Livery Restoration Project

Environmental Assessment
June 2007

Produced by Sleeping Bear Dunes National Lakeshore
Natural Resource Division

SLEEPING BEAR DUNES NATIONAL LAKESHORE
THE WATER WHEEL AND CASEY'S CANOE LIVERY SITE RESTORATION,
Benzie County-Lake Township
ENVIRONMENTAL ASSESSMENT

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TABLE OF CONTENTS

1.0 Introduction — Page

1.1 Purpose, Need, and Background…… 1-2, 4
1.2 Relationship to Other Planning Projects…… 4
1.3 Impact Topics Selected for Analysis……. 4-7
1.4 Impact Topics Eliminated from Further Evaluation…….. 7-10

2.0 Alternatives

2.1 Alternative Formation…… 11
2.2 No-Action Alternative……... 11
2.3 Alternative I (Restoration)……. 11-14
2.4 Environmentally Preferred Alternative…….. 14-15

3.0 Affected Environment

3.1 Soils and Streambeds…….. 17
3.2 Water Quality…….. 17
3.3 Streamflow Characteristics……. 18
3.4 Important Habitat (Fish and Wildlife)…….. 18
3.5 Visitor Experience/Recreation…… 18-19
3.6 Long-term Management of Resources…… 19

4.0 Environmental Consequences

4.1 Intensity, Duration, and Type of Impact……. 20
4.2 Cumulative Impacts…… 20
4.3 Impairment Analysis…….. 20-21
4.4 Impacts on Soils and Streambeds…… 21-22
4.5 Impacts on Water Quality…… 23-24
4.6 Impacts on Streamflow Characteristics……... 24-25
4.7 Impacts on Important Habitat (Fish and Wildlife)…… 25-26
4.8 Impacts on Visitor Experience/Recreation…….. 26-28
4.9 Impacts on Long-term Management of Resources…….. 28-29

5.0 References…… 30-31

6.0 Consultation and Coordination…… 32

7.0 List of Preparers…….. 33

Appendices

Appendix A- Contamination Remedial Actions
Appendix B- Current Site Photos
Appendix C- Riverbank Stabilization Guidelines

LIST OF TABLES

Table		Page
1	Restoration Options……	12
2	Impact Comparison Matrix……	16

LIST OF FIGURES

Figure		
1	Vicinity Map……	3
2	Water Wheel and Casey's Properties……..	5
3	Site Drawing……	6

1.0 INTRODUCTION

1.1 Purpose, Need, and Background

Purpose

Sleeping Bear Dunes National Lakeshore (Lakeshore) was established by an act of Congress (Public Law 91-479 on October 21, 1970) and formed from lands purchased from private owners and from lands and water areas donated by the State of Michigan (Figure 1). The Lakeshore mission is *to preserve outstanding natural features including forests, beaches, dunes and ancient glacial phenomena along 64 miles (100 km) of Lake Michigan shoreline, in order to perpetuate the natural setting for the benefit and enjoyment of the public, and to protect the natural and historic features from developments and inappropriate uses that would destroy its scenic beauty, scientific, historic, and recreational value* (National Park Service 2003).

The park contains only five rivers and streams throughout its 71,000 acres, making inland water resources extremely important. In addition, certain waters within the National Lakeshore have been identified by the State of Michigan as "Outstanding State Resource Waters" [Michigan Natural Resources and Environmental Protection Act of 1994 (PA 451)]. These waters are protected by the state so as to preserve their special qualities. Part 31 of PA 451 states that "…rivers flowing into, through, or out of National Parks or National Lakeshores and wilderness rivers…shall not be lowered in quality…" Rule 98 (the "Antidegradation Rule") under the state's Part 4 Rules applies to any action pursuant to Part 31 of PA 451. High quality water bodies designated as "Outstanding State Resource Waters" (OSRW) by the state are protected by applying controls on pollutant sources to the OSRW or tributaries so that water quality in the OSRW is not lowered. All waters (inland lakes and streams, and Lake Michigan) within the designated boundaries of the Lakeshore are designated an OSRW [Rule 98, (6) (c) (i)], which includes the Platte River.

The National Park Service (NPS) compiled a Nationwide Rivers Inventory (NRI), which is a register of river segments that potentially qualify as national wild, scenic or recreational river areas. The NRI is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. The Department of the Interior, with the cooperation of state and local agencies conducted the original NRI, completed in 1982. To be listed, river segments had to meet three basic criteria:

- be free flowing (and generally 25 miles or longer)
- be relatively undeveloped (both river and corridor)
- possess outstanding natural and/or cultural values.

In 1990 park staff inventoried and evaluated rivers and river segments that may have had potential for inclusion into the National Wild and Scenic Rivers System. Five rivers and streams were inventoried: Platte River, Otter Creek, Shalda Creek, Crystal River, and Good Harbor Creek. Only the Platte River was identified by the park at that time for possible study and inclusion.

A major update to the NRI was initiated in 1993. To be eligible for listing on the updated NRI, river segments had to meet two criteria:

- be free flowing (no mileage requirement)
- have at least one "outstandingly remarkable" value

Both Platte and Crystal Rivers were included on the 1993 NRI update.

The Platte River, located in the Lakeshore in Lake Township, Benzie County Michigan, originates in Grand Traverse County, Michigan where it flows out of Long Lake. From there it flows generally west and northwest through Mud Lake (Grand Traverse County), Lake Ann, Bronson Lake, Platte Lake, and Loon Lake (all Benzie County, Michigan) into Lake Michigan at Platte Bay. The Platte River watershed is the largest in the Lakeshore. The entire watershed encompasses approximately 465 km^2 but only 7 percent of the watershed and 8 km of the Platte River system are within the boundaries of the Lakeshore (Boyle and Hoefs 1993).

The Platte River area of the Lakeshore begins just upstream of Michigan Highway 22 (M-22) bridge and ends at the river's mouth where it empties into Lake Michigan. The land directly adjacent to the east of the M-22 bridge (both north and south sides of the river) is the project location for this Environmental Assessment, which includes the former Water Wheel and Casey's Canoe Livery properties.

Need

The Lakeshore's Natural Resources Division has identified restoring disturbed lands as one of its strategic goals (goal Ia1A). This goal states that by September 30, 2008, 5% (21,850 acres) of targeted parklands, disturbed by development or agriculture, are restored (National Park Service 2003). Restoring the former Water Wheel and Casey's Canoe Livery sites will help Natural Resources staff achieve the identified strategic goal and will specifically address the following project site goals:

- To restore a 450 foot reach of Platte River to its natural function and appearance
- To mitigate unsafe visitor access issues due to failing retaining walls and exposed steel sheet piling

Lakeshore and National Park Service's Geologic Resources Division staff have identified several undesirable conditions at the project location. Those conditions, listed below, need to be addressed to ensure protection of the Lakeshore's natural resources.

- Failing retaining walls (concrete, wood, and metal) and exposed steel sheet piling
- Eroding fill from behind retaining walls
- Increasing stream flow depth and velocity due to retaining wall encroachment into river
- Preventing establishment of woody native plants
- Unused monitoring wells remain on Water Wheel side.

Background

The Water Wheel property (tracts 46-112/46-147), located on the north side of Platte River, was formerly a canoe livery, with docks, gas pump, and a small water wheel in the Platte River. In addition, there was a miniature golf course, two cabins, a barn, and gas pumps, located throughout the upland portion of the site. This property was incorporated into federal land over a period of time, beginning in 1979 and ending in 1989.

Figure 1 – Sleeping Bear Dunes National Lakeshore Vicinity Map

Casey's Canoe Livery property (tract 46-108), located on the south side of Platte River, was a canoe livery that also offered gas station and store services. This property was incorporated into federal land in April 1989.

When Casey's building improvements were removed from the site, extensive soil and ground water contamination from benzene, due to leaking underground storage tanks, was discovered. Contamination remediation occurred over a 6-year period (Appendix A).

Even though the contamination issues of the former Casey's property were addressed, some of the features installed for contamination containment remain on site, including the steel sheet piling and three monitoring wells (MW2A-MW4A), which were installed on the former Water Wheel property.

Furthermore, additional man-made features that were in place prior to the contamination clean-up remain on-site, including a concrete retaining wall and fill on the Water Wheel property and a wooden wall and fill on Casey's property (Figures 2 & 3 and Appendix B). These walls are now failing and impacting the natural resources and creating potential safety hazards for Lakeshore visitors.

1.2 Relationship to Other Planning Projects

The Lakeshore's 1979 General Management Plan (GMP) identifies the Casey's/Water Wheel project site area as a natural zone area that is adjacent to the Platte River Development Zone. The natural zone is further defined as a natural environment zone, which provides for environmentally compatible recreational activities that do not affect the conservation of the natural resources (National Park Service 1979).

A new Lakeshore GMP/Wilderness Study is being developed as this environmental assessment (EA) is being written. It is not expected that the new plan/study will be completed until winter 2008-2009. However, the scope of this project and the proposed alternatives do not conflict with the developing GMP since this EA and the developing GMP are consistent with the legislated Lakeshore mission.

The Platte River Management Plan (1992) encompasses the Water Wheel and Casey's sites, but does not directly address development or use proposals at these sites.

1.3 Impact Topics Selected for Analysis

1.3.1 Soils and Streambeds

Streambeds and adjacent bank soils will be impacted in both alternatives that are presented in this document. In the Action Alternative soils will be disturbed while removing fill and steel sheet piling, and the streambed will be disturbed through the process of removing the concrete and wood retaining walls. In the long-term the streambed will be affected due to collapsing retaining walls and subsequent streambank erosion if no action is taken.

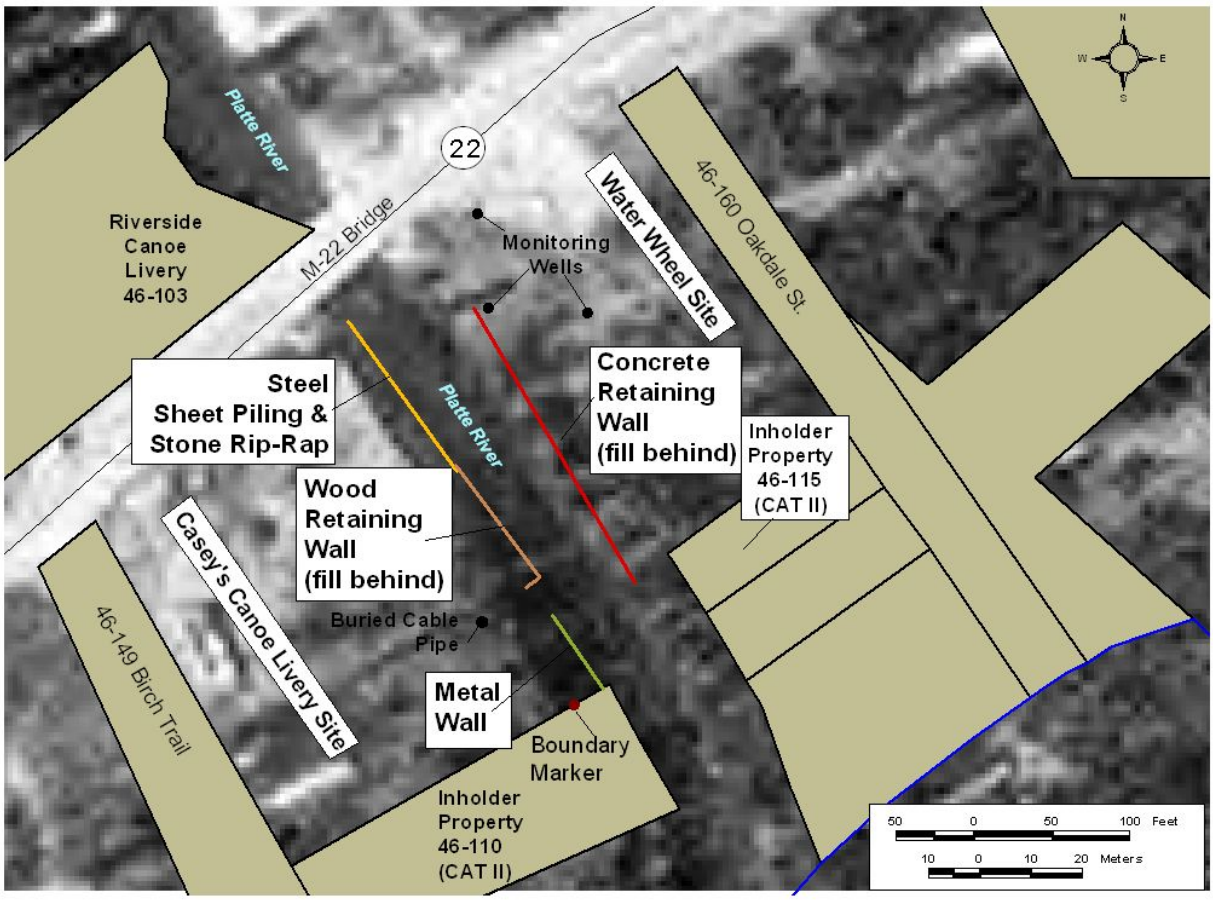

Figure 2- Water Wheel and Casey's Former Canoe Livery Properties

1.3.2 Water Quality

The Platte River watershed has traditionally been considered to be of high quality, however, degradation as a result of nutrient loading from point and non-point sources in the watershed has become a concern over the past decade (Boyle and Hoefs 1993). It is expected that water quality will be affected in the short-term by both alternatives, mainly due to siltation/sedimentation. Additionally, the No-Action Alternative will prevent streambank vegetation from becoming established, causing long-term siltation/sedimentation.

1.3.3 Streamflow Characteristics

Streamflow is very stable through the Water Wheel/Casey's Canoe Livery area and ranges from 90 to 130 cubic feet per second upstream of Platte Lake. However, the retaining walls are deepening the channel in the immediate project area (Pranger 2002). Alternative I will mitigate the modified streamflow by removing the retaining walls. The No-Action Alternative will result in the continued deepening of the channel.

1.3.4 Important Habitat (fish and wildlife)

The park contains only four rivers and streams throughout its 71,000 acres. These waterways are

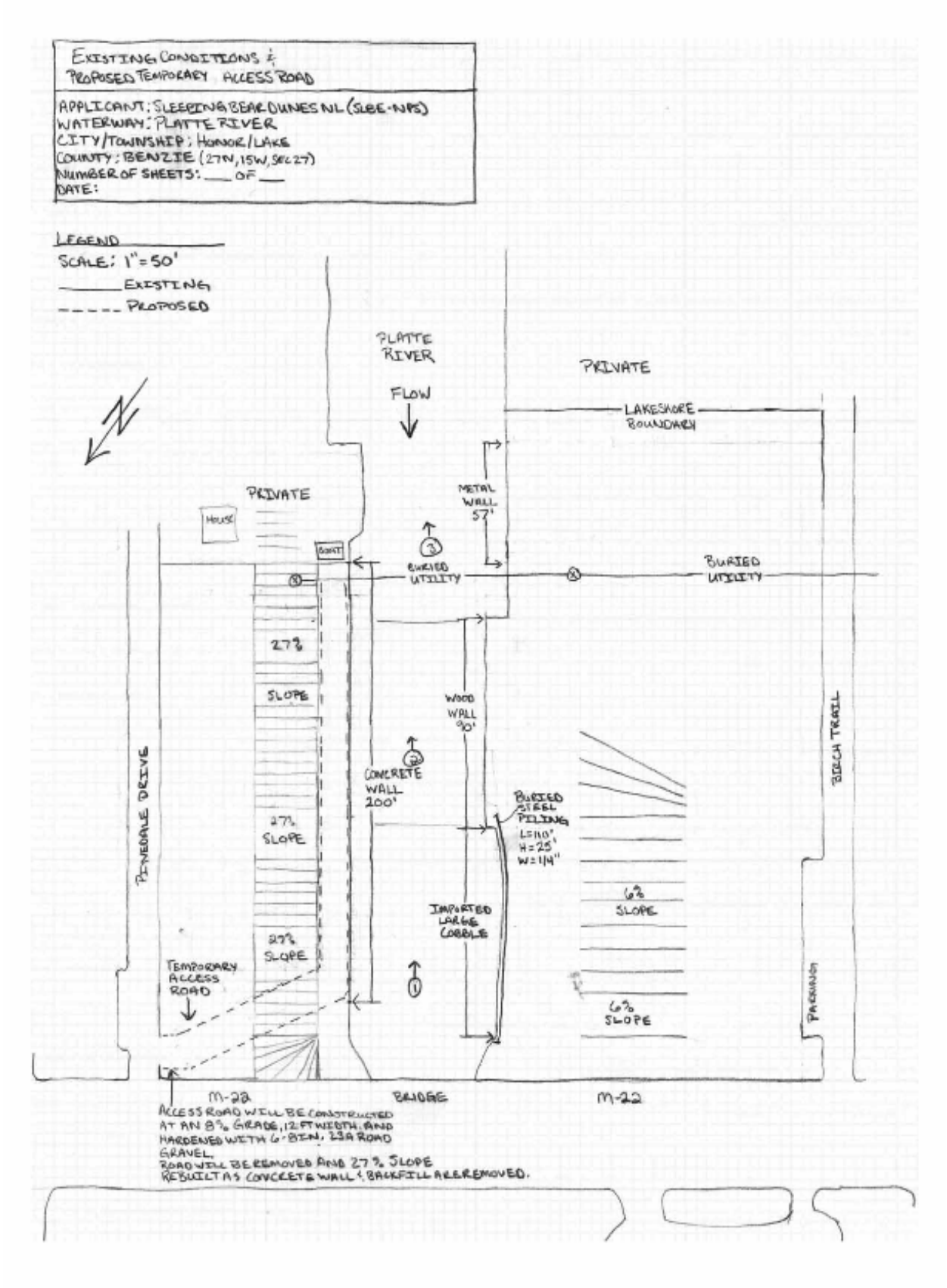

Figure 3- Water Wheel and Casey's Former Canoe Livery Site Sketch

extremely important to wildlife, fish, and invertebrate species. Aquatic macrophytes are important components of several of the Lakeshore's stream systems and function in the ecosystem as nursery areas and habitat for fish and invertebrates (Boyle and Hoefs, 1993). The action alternative would beneficially affect fish habitat by restoring the natural physical components (woody debris, open, sandy bottoms, vegetated banks) in the project area. The No-Action Alternative will adversely affect the habitat due to failing retaining walls, subsequent erosion, and absence of streambank vegetation.

1.3.5 Visitor Experience/Recreation

In the Lakeshore's enabling legislation, visitor access to recreational and scenic opportunities was considered to be a key factor to the establishment of the park. Congress directed that the Lakeshore should be managed in such a way that the scenic, scientific, and historic features of the park contribute directly to the public enjoyment.

Recreational opportunities and access at the project site will be affected by both alternatives. The action alternative proposes to place woody vegetation in and along the river to improve fish habitat and to plant the riverbanks with native woody vegetation. As a result, direct access to the riverbank at this site would be somewhat restricted. However, directly across M-22 is a designated use site for park visitors, which was specifically developed with river users in mind (i.e., foot bridge where visitors can safely walk to canoe livery business, hardened launch pad for boats and fishermen, and parking). The Action Alternative would improve the scenic components of this site and provide immediate resolution to the visitor safety hazards that are present, including the failing retaining walls and irregular terrain as a result of the collapsing walls.

The No-Action Alternative would allow for easy access to the riverbanks since the only existing vegetation is grass and no woody debris along the riverbanks is present.

1.3.6 Long-term Management of Platte River Watershed

The Lakeshore only owns significant portions of the end drainage area of the watershed, making it impossible for staff to manage the entire river system. Both alternatives affect the long-term management of the end portion of this water resource. Most of the watershed is outside Lakeshore jurisdiction, therefore, impacts to the long-term management of this resource is focused on desired conditions for the river channel and riparian habitat only.

1.4 Impact Topics Eliminated from Further Evaluation

1.4.2 Air Quality

The Clean Air Act, as amended (42 USC 7401 et. seq.) Section 118 of the Clean Air Act requires all federal facilities to comply with existing federal, state, and local air pollution control laws and regulations.

Short-term machinery use impacts have the potential to temporarily increase local levels of particulates mainly in the form of localized fugitive dust. Some minor emissions from equipment operations will also be expected, but neither overall park air quality nor regional air quality would be affected. For these reasons, air quality is dismissed as an impact topic.

1.4.3 Hazardous Waste

This soil and groundwater at Casey's was extensively contaminated with gasoline and fuel oil. The Lakeshore contracted Solar Universal Technologies, Inc. to decontaminate the site. In December 1994,

the Chief of Michigan Department of Natural Resource's Underground Storage Tank Division, Mr. Mohammad Yusaf, notified the Lakeshore that Casey's site had been removed from the list of contaminated sites in Michigan. All monitoring wells were removed, except for 3, which are located on the Water Wheel side of Platte River.

In the fall of 2006 Lakeshore staff tested two of the three wells, using U.S. Environmental Protection Agency's (EPA) 8260 volatile organics test (also included lead). The lower well results were "non-detect" for all chemicals tested, and the upper well was "non-detect", except for lead, which was above the State's drinking water criteria level.

On November 6, 2006 Lakeshore staff spoke with Jim Ferrito from the Michigan Department Environmental Quality (MDEQ) Cadillac Office about the monitoring well results and to consult on the removal of these wells. Mr. Ferrito said that the results were irrelevant because a closure order was issued in 1994 that included all wells that were placed as a result of the Casey's clean-up project.

During the Lakeshore's Interdisciplinary Team's (IDT) site visit on November 7, 2006, all three monitoring wells were located. The wells will be plugged or pulled under both alternatives, according to MDEQ protocol.

1.4.4 Rare, Threatened, or Endangered Species

At the present time no known federally threatened or endangered species, proposed species, or designated or proposed critical habitat is present in the project area. The NPS informed the U.S. Fish and Wildlife Service of this determination and they concurred. The NPS has attended to obligations under Section 7 of the Endangered Species act and a Section 7 consultation will not be initiated with the U.S. Fish and Wildlife Service. Rare, threatened, and endangered species will not be discussed further in this EA.

1.4.5 Floodplains

Because the Platte River flows through six lakes in its relatively short course, the discharge tends to be relatively uniform and floods are rare even though the project site is located in an area that is designated as a100-year floodplain, varying from 0 to 150 feet wide inland from riverbanks. In general, the flood hazard is low for the Platte River system. Existing private buildings and residences are mostly located within the floodplain zone. NPS floodplain management guidelines do not apply since the proposal would restore natural resources and functions of floodplains, rather than propose new developments or activities that could negatively affect the floodplain. It is expected that both alternatives will not significantly impact the Platte River floodplain zone: therefore, this topic will not be discussed further in this EA.

The State of Michigan's Floodplain Regulatory Authority, found in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, requires that a permit be obtained prior to any alteration or occupation of the 100-year floodplain of a river, stream or drain. The Lakeshore will apply for a permit prior to any restoration activity.

1.4.6 Socioeconomics

None of the alternatives would affect the local population economy, housing, or transportation. Therefore, socioeconomics will not be discussed further in this EA.

1.4.7 Environmental Justice (Executive Order 12898 Compliance)

No known low-income or minority populations are in the immediate project vicinity nor would any such populations be directly or indirectly impacted by the restoration of the Water Wheel and Casey's riverbanks. Therefore, environmental justice will not be discussed further in this EA.

1.4.8 Soundscape Management

In accordance with NPS Management Policies (2006) and Director's Order #47, Sound Preservation and Noise Management is an important part of the NPS mission. Aside from the temporary short-term noise effects, resulting from the heavy machinery, no long-term noise pollution will result from this project.

1.4.9 Lightscape Management

According to NPS Management Policies (2006), the NPS strives to preserve natural ambient landscapes, which are natural resources and values that exist in the absence of human-caused light. There are no plans to add lighting to the project site. Therefore, lightscape management will not be discussed further in this EA.

1.4.10 Indian Trust Lands

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaskan Native tribes.

There are not any Indian trust resources at the Lakeshore (M. Duwe, National Park Service, pers. comm.). The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian trust resources are dismissed as an impact topic in this EA.

1.4.11 Park Operations

None of the alternatives would result in any noticeable change to park operations, therefore, this topic will not be further discussed in this EA.

1.4.12 Prime and Unique Soils

There are no prime and unique soils located in the project area, according to the Lakeshore's U.S. Department Agriculture, Natural Resources Conservation Service soils GIS coverage (NPS 2006a). This topic will not be further discussed in this EA.

1.4.13 Archeological Resources

The NPS Midwest Archaeological Center surveyed both the Water Wheel and Casey's Canoe Livery sites during the week of September 14-20, 2006. The area surveyed included those areas that will be impacted if the action alternative is chosen, which included both sides of Platte River and significant upland portions on both Water Wheel and Casey's sides. There were no archeological resources identified on this survey, therefore, this topic will not be further discussed in this EA.

1.4.14 Wetlands

According to the Special Wetland Area Management Project (SWAMP) County Wetland GIS Dataset, created by the Northwest Michigan Council of Governments, there are not any designated wetlands within the proposed project area. The following 3 wetland sources were merged to create the GIS coverage:

1) National Wetland Inventory (NWI)
2) Michigan Resource Information System (MIRIS) Land Cover
3) Soils Survey (U.S. Soil Conservation Service)

The wetland probability code of this area is zero (NPS 2006b). This indicates that this area is a non-wetland habitat.

1.4.15 Land Use

Land uses around the project area are a mix of public (Lakeshore and Lake Township), private residences, and a commercial canoe livery business. In addition, the Michigan Department of Transportation owns a right-of-way easement along the M-22 bridge. A former Kampground Of America (KOA) was located to the south of Casey's site and that area was restored to a natural condition when the Lakeshore acquired the property.

The Lakeshore's 1979 General Management Plan calls for improving the visual integrity, reducing traffic congestion, improving visitor safety, and maximizing the preservation of the area's natural features at the intersection of M-22 and Platte River, (National Park Service 1979).

As a result of the 1979 Plan, the Lakeshore developed public facilities (parking, picnic, restrooms, boat landing, fish cleaning station) that are located across M-22, northwest of the project site. An informal parking area on Casey's side has developed and is located along the north side of Birch Trail, approximately 60 meters from the south riverbank (area proposed for restoration).

Overall, the type of land use would not change within the project area. However, access and the type of recreation within the project area may be modified and are further discussed under the visitor experience/recreation impact topic.

2.0 ALTERNATIVES

2.1 Alternative Formation

The Lakeshore's Interdisciplinary Team (IDT), a group comprised of Lakeshore staff that review projects for environmental compliance, and additional staff with restoration expertise developed alternatives that were consistent with Lakeshore goals, existing planning documents, and project objectives.

The IDT initially identified 3 alternatives: No-Action, Partial Restoration, and Full Restoration. Originally, the alternatives were developed based upon the intensity of impacts. However, after the on-site meeting at the former Water Wheel and Casey's Canoe Livery project site, the IDT determined that only 2 alternatives would be appropriate for development. The new action alternative would list a range of restoration options, with varying degrees of impact intensity and duration.

For example, the buried steel sheet piling on Casey's side can either be completely removed or cut and buried at the water table. Complete removal of the piling will require an excavator with a vibratory extractor, which will essentially vibrate the 25' piling sheets out of the ground. This removal method will impact the soil to a greater degree compared to cutting the piling down to the level of the water table. To account for these restoration strategy differences, and depending upon the site feature (i.e., concrete wall, fill, steel sheet piling), the IDT believed that a suite of options within the action alternative would be the most efficient and encompassing.

2.2 No-Action Alternative

Under the No-Action Alternative the Lakeshore would allow the continuation of existing conditions and activities at the former Water Wheel and Casey's Canoe Livery sites, except for the monitoring wells, which will either be plugged or pulled.

The existing conditions include all artificial riverbank materials, including the steel sheet piling, stone rip-rap, wood wall and fill, concrete wall and fill and metal wall. The walls would continue to deteriorate and collapse into the river channel. The fill behind the walls would continue to erode. The erosion process would most likely accelerate once the walls completely collapsed due to the river's natural function and increased human access. Natural stabilization of the riverbanks would not be easily achieved due to the lack of plant colonization along the eroding banks. The steel sheet piling would remain in place, with the top edge exposed at the ground's surface, posing a visitor safety hazard. The stone rip-rap would also remain in place, hardening the river bottom and preventing the colonization of benthic invertebrates and improvement of fish habitat.

2.3 Alternative 1—The Preferred Alternative (Restoration Options)

Under Alternative I, a variety of restoration options have been developed due to differences in potential impacts associated with each feature (Table 1). A choice from either option A or option B will be made unless "Remove" is listed, which means that both options are the same. This alternative will be chosen based upon external scoping comments, EA review comments, and permitting agency comments. A summary for each option is listed below. [Note: In Section 3.0, Impacts, the impacts of the option with the most disturbance (i.e., sheet piling removal), is analyzed.]

	Restoration Choice	**Option A**	**Option B**
Casey's Side-			
South side of River			
Steel Sheet Piling	Choose one from Options A or B	Cut below grade,	Remove entire sheet
25' deep x 100' long		leave remainder	
Stone Rip-Rap	Remove	Remove	Remove
Wood Wall	Remove	Remove	Remove
90' long			
Fill Behind Wood Wall	Choose one from Options A or B	Partially Remove, leave gradual slope and all tree roots	Completely Remove, create steeper bank; Some tree root damage may occur
42.5 cubic yards			
Metal Wall	Remove	Remove	Remove
57' long			
Recreation Access	Choose one from Options A or B	No woody debris will be placed in river	Woody debris will be placed in river
		Plantings will not deter usage of site as an unofficial access point	Plantings will deter usage of site as an unofficial access point and stabilize banks
Water Wheel Side-			
North side of River			
Concrete Wall	Remove	Remove	Remove
200' long			
Fill Behind Concrete Wall	Choose one from Options A or B	Partially Remove, leave gradual slope and all tree roots; Cut bank for access	Completely Remove, steeper bank and some damage to trees and roots; Cut bank for access
267 cubic yards			
Inholder-Concrete Wall Interface	Lakeshore management will coordinate with affected landowner	n/a	n/a
(tract #46-115)			
Monitoring Wells (3)	Remove or Plug	Remove or Plug	Remove or Plug

Table 1-
Alternative I
Restoration Options

Steel Sheet Piling-Option A
The steel sheet piling would be cut at the water table level by Lakeshore staff and the remaining sheet would be covered with on-site soil. The edge would no longer be exposed.

Steel Sheet Piling-Option B
The steel sheet piling would be completely removed using an excavator and a vibratory driver extractor. A contractor would be hired for this removal process. It is possible that the cost of hiring a contractor would be recovered through the salvaged steel sheets; however, this is unknown until the condition of the sheets is assessed.

Stone Rip-Rap-Both Options
The stone rip-rap that is located in the Platte River in front of the steel sheet piling would be removed.

Wood Wall-Both Options
The wood wall, located in the Platte River, would be removed. Removal of this structure would require minimal effort since it has greatly deteriorated.

Fill Behind Wood Wall-Option A
The fill that is located behind the wood wall would be partially removed using an excavator. A gradual slope from the upper bank to the river's edge would be contoured. A silt boom/curtain would be placed in the Platte River during the fill removal process. Re-vegetation of the riverbank would occur before silt boom/curtain is removed (refer to Appendix C for re-vegetation guidelines). Care would be taken to minimize damage to roots of existing trees.

Fill Behind Wood Wall-Option B
The fill that is located behind the wood wall would be completely removed using an excavator. The slope from the upper bank to the river's edge would be steep, matching the adjacent bank's contour that is located to the east of the wood wall fill area. A silt boom/curtain would be placed in the Platte River during the fill removal process. Re-vegetation of riverbank would occur before silt boom/curtain is removed. Some damage to existing tree roots is anticipated as they have grown into the filled areas. Hand removal of some fill may be needed to not compromise the native trees.

Metal Wall-Both Options
The metal wall would be removed by hand. Removal of this structure would require minimal effort since it has greatly deteriorated.

Recreation Access-Option A
Access to the river's edge along the south side of the river (Casey's site) would be available, both from land and the river (anglers). The re-vegetation plantings would minimize erosion but not deter riverbank access. No woody debris would be placed in and along the riverbank.

Recreation Access-Option B
Access to the river's edge along the south side of the river (Casey's site) would be available from the river (anglers) and from the land. However, access would be somewhat restricted due to the woody debris and plantings along the riverbanks. The re-vegetation plantings would minimize erosion and deter riverbank access. Woody debris would be placed in and along the riverbank to create fish and invertebrate habitat.

Concrete Wall-Both Options
The concrete wall, located on the north side of the Platte River (Water Wheel), would be completely removed.

Fill Behind Concrete Wall-Option A
The fill that is located behind the concrete wall would be partially removed. Machinery would be used to remove the fill, and a temporary road would be built by cutting into the hill to access the site. The adjacent cedar trees would be wrapped with a material, such as burlap, and anchored back toward the upper bank to minimize damage and cutting of limbs for machinery access. A gradual slope from the upper bank to the river's edge would be contoured. A silt boom/curtain would be placed in the Platte River during the fill removal process. Re-vegetation of riverbank would occur before silt boom/curtain is removed. Care would be taken to minimize damage to roots of existing trees.

Fill Behind Concrete Wall-Option B
The fill that is located behind the concrete wall would be completely removed. Machinery would be used to remove the fill, and a temporary road would be built by cutting into the hill to access the site. The adjacent cedar trees would be wrapped with a material, such as burlap, and anchored back toward the upper bank to minimize damage and cutting of limbs for machinery access. The slope, beginning at the base of the cedar trees to the river's edge, would be steep, matching the natural riverbank slope. A silt boom/curtain would be placed in the Platte River during the fill removal process. Re-vegetation of riverbank would occur before silt boom/curtain is removed. Some damage to existing tree roots is anticipated as they have grown into the filled areas. Hand removal of some fill may be needed to not compromise the native trees.

Inholder Concrete Wall Interface-Both Options
Lakeshore management will contract a survey of the property boundary and coordinate with the affected landowner on how to reinforce or re-shape the riverbank on the west side of the adjacent landowner's retaining wall.

Monitoring Wells-Both Options
The removal or plugging of the 3 monitoring wells has been approved by the MDEQ Cadillac Office and will occur under both alternatives.

Recreation Access-Option A
Access to the river's edge, along the north side of the river (Water Wheel's site), would be available, both from land and the river (anglers). The re-vegetation plantings would minimize erosion but not deter river access. No woody debris would be placed in and along the riverbank.

Recreation Access-Option B
Access to the river's edge, along the north side of the river (Water Wheel's site), would be available from the river (anglers) and from the land. However, access would be somewhat restricted due to the woody debris and plantings along the riverbanks. The re-vegetation plantings would minimize erosion and deter riverbank access. Woody debris would be placed in and along the riverbank to create fish and invertebrate habitat.

All Restoration Options
For all restoration options, no heavy equipment will be operated in the Platte River channel and an absorbent boom will always be on site while heavy machinery is in use in case of an accidental oil release. In addition, riverbanks will be temporarily closed to visitor use with signs to allow the vegetation to become established.

2.4 Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested by the CEQ, which provides direction in its guidance *Forty Most Asked Questions Concerning DEQ's National*

Environmental Policy Act Regulations (1981). The CEQ defines the environmentally preferred alternative as, "…the alternative that causes the least damage to the biological and physical environment. It also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources."

Table 2
Impact Comparison Matrix

Impact Area	No-Action Alternative	Alternative I (Restoration)
4.4 Soils and Streambeds		
Soil/Substrate Disturbance	Long-Term: Moderate, adverse Cumulative: Moderate, adverse	Short-Term: Minor, adverse Cumulative: Minor, beneficial
Erosion/Sedimentation	Long-Term: Moderate, adverse Cumulative: Moderate, adverse	Short-Term: Moderate, adverse Cumulative: Minor, beneficial
4.5 Water Quality		
Surface Water Quality	Long-Term: Minor to Moderate, adverse Cumulative: Minor to Moderate, adverse	Short-Term: Moderate, adverse Cumulative: Moderate, beneficial
4.6 Streamflow Characteristics		
Streamflow Depth and Velocity	Long-Term: Minor, adverse Cumulative: Negligible	Long-Term: Moderate, beneficial Cumulative: Negligible
4.7 Important Habitat (fish and wildlife)		
Alteration of Habitat	Long-Term: Minor, adverse Cumulative: Negligible	Long-Term: Minor, beneficial Cumulative: Negligible
Displacement of Species	Long-Term: Minor, adverse Cumulative: Negligible	Long-Term: Minor, beneficial Cumulative: Negligible
4.8 Visitor Experience/Recreation		
Change in Access	Long-Term: Negligible, beneficial Cumulative: Negligible	Long-Term: Negligible, adverse Cumulative: Negligible
Change in Recreation	Long-Term: Negligible, beneficial Cumulative: Negligible	Long-Term: Negligible, adverse Cumulative: Negligible
4.9 Long-term Management		
River Channel and Riparian Condition	Long-Term: Moderate, adverse Cumulative: Moderate, adverse	Long-Term: Negligible-Minor, beneficial Cumulative: Minor, beneficial

3.0 AFFECTED ENVIRONMENT

3.1 Soils and Streambeds

The Platte River Management Plan Environmental Assessment describes the general soils within the M-22/Platte River Bridge area as evolved from former sand dunes and beach ridges. The soils are characterized as deep, having low to very low water storage capacity and are very porous, sandy soils. The soils have slight to severe erosion hazards, and they are subject to severe blowing if vegetative cover is removed. Specific records obtained during Casey's 1992 well/boring drilling operation indicate that both Casey's and the Water Wheel sites are comprised of sandy soils ranging from fine to coarse materials.

Because of the project site's close proximity to the M-22 bridge, the Michigan Department of Transportation's geotechnical staff reviewed the site's soil records to determine if it would be feasible to include the complete removal of the steel sheet piling as a restoration option, without adversely affecting the bridge. Their conclusion was that the complete removal was feasible.

In addition, the project area was surveyed for archaeological resources during the 2006 field season, and all test results were negative.

For both alternatives, native riparian grass and shrub seeds and plants will be collected locally or obtained from credible nursery sources and planted immediately in all disturbed areas to stabilize soils, protect riverbanks, and accelerate the revegetation process.

3.2 Water Quality

The water quality of the Platte River, within the Lakeshore, is significantly influenced by factors outside Lakeshore jurisdiction. Baseline data were collected from previous studies (Handy and Stark 1984 and Stockwell and Gannon 1975) and indicated that both the surface and ground water were of good quality and appeared to be suitable for most uses as determined by chemical analyses and observations of biological indicator organisms (Stockwell and Gannon 1975). Handy concluded that the overall stream water quality was excellent when compared to U.S. Environmental Protection drinking water standards. The rapid flushing times for Loon Lake may also be an important factor in maintaining good water quality in the lower Platte River (National Park Service 1991).

In 1993, Boyle and Hoefs conducted a water resources inventory and stated that the Platte River has traditionally been considered to be of high water quality, but degradation as a result of nutrient loading from point and non-point sources in the watershed has become a concern in recent years. A sole point source discharge of phosphorus was from the Platte River Anadromous Fish Hatchery as a result of salmon production (Boyle and Hoefs 1993).

Also in 1993, a Platte River study to assess the ecological integrity of the river's invertebrate community was conducted by Nancy Hoefs. The extent of this study's location was isolated to the river bottom located in front of the Water Wheel and Casey's sites. Hoefs concluded that specific community parameters (oligocheates, EPT taxa, and mollusks) appeared to be affected by the contamination that had leached from Casey's site. However, community parameters and biotic integrity of the river system appeared to recover rapidly at sites below and downstream from the spill area, indicating a higher degree of water quality (Hoefs 1993).

3.3 Streamflow Characteristics

The streamflow in the general project area is very steady, stable, and uniform, creating an ideal condition for channel bank restoration. The streamflow ranges mostly from 90 to 130 cubic feet per second upstream of Platte Lake, with Platte Lake dampening any flow spikes observed upstream of the lower Platte River (Pranger 2002). The streamflow has not significantly changed over the years. According to former records, in 1968 the range of discharge was 56-98 cubic feet per second, recorded at the U.S.-31 bridge east of Honor (Taube 1974). Seeps and springs characterize the Platte River, and the groundwater inflow seems to be a significant component of streamflow throughout the year (Handy and Stark 1984).

In Pranger's report, he stated that the streamflow depth and velocity were increasing in the project area due to the encroachment of the artificial retaining wall structures into the river channel.

3.4 Important Habitat (fish and wildlife)

Rivers are a unique habitat in that they offer a lot of shoreline per acre of water and provide a unique array of food items for wildlife, including crustaceans, aquatic insects, plants, fish, amphibians, and reptiles (Benyus 1989). Streambanks provide access to drinking water, protected sites for dens and nests, and a place for plants to grow that provide nourishment to a variety of mammals and birds.

Rivers also provide natural corridors for wildlife species survival and dispersal. Lakeshore staff has verified that 85% of the expected wildlife species are found throughout the Lakeshore **(**NPS Species 2007). Most of these species have been either directly or indirectly (tracks, scat, etc.) observed in the Platte River area.

The Platte River has a long history of fish management practices, including stocking, river mouth dredging, and sea lamprey control. The grayling, which inhabited the Platte River when settlement of this region began, became extinct before 1895. The grayling was replaced by the brook trout, which was abundant into the 1930s. The brown trout was introduced in 1921 but evidence suggests that its establishment progressed slowly. The rainbow trout appeared around 1920 and was numerous during the 1930s and 1940s. The rainbow trout greatly decreased in the 1950s and early 1960s from predation by sea lampreys in Lake Michigan. The rainbow became plentiful again by the mid-1960s but never to same the population level prior to its decline. Coho salmon were first planted in 1966, and Chinook salmon were first planted in 1971 (Taube 1974). The MDNR continues to stock the Platte River with salmon and operates a salmon harvesting weir halfway between the M-22 bridge and the mouth of the Platte River and a hatchery facility upstream in Honor, Michigan.

In 1979 Kelly and Price documented 53 species of fish (including lampreys) in the Platte River, representing the most diverse fish fauna in the park's rivers and streams.

Fish and invertebrate species benefit from having woody debris, vegetated banks, and tree canopy cover along riverbanks. Most often, these natural components of a healthy river system are removed once humans occupy and develop an area, thereby, adversely impacting the populations of fish and wildlife species. In addition, non-native species such as zebra mussels, round gobies, and Eurasian water milfoil also adversely impact native populations.

3.5 Visitor Experience/Recreation

The Lakeshore has had several studies conducted to determine the visitor use patterns along the Platte River (Kemezis 1983; Lime 1988; Lehman 1990), however, the study areas did not include the Water Wheel/Casey's project site since it is located upstream of the developed recreational access areas (i.e.,

existing canoe livery business and Lakeshore developments). Therefore, it is believed, based upon the studies and Lakeshore staff observations, that the majority of the recreational usage occurs to the west of the M-22 bridge. However, evidence of social trails, leading from the upland areas to the riverbanks on both the Water Wheel and Casey's sites, indicate at least a minimal visitor use pattern within the project area.

The Platte River Management Plan identified water-based activities as the most popular type of recreation in the Platte River Corridor, which includes the Water Wheel/Casey's project site. The river provides exceptional opportunities for canoeing, boating, tubing, fishing, and swimming; 95% of river boating is with non-motorized craft (National Park Service 1992). The river is especially popular during autumn when salmon migrate upstream from Lake Michigan. Steelhead fishing is also quite popular during the spring of the year. In Lehman's 1990 study, he found that the landowners along the Platte River, located within the Lakeshore boundary, generally supported management actions that protected the environment while river recreationists supported management actions that would provide more information for the user and also provide more developed places to stop downriver from the M-22 bridge to rest and eat lunch.

The deteriorating retaining walls and exposed steel sheet piling and cobbles at the project site are not aesthetically compatible with the area being managed as a natural environment zone and also pose safety hazards to visitors using this area.

3.6 Long-term Management of Platte River Watershed

According to Shelby and Heberlein, there are 4 types of carrying capacities that can be applied to recreational settings (cited in National Park Service 1991). Physical capacity involves the number of visitors who can be accommodated by the actual space within an area. Facility capacity involves improvements that are intended to satisfy the needs of park visitors. Ecological capacity is concerned with impacts on the natural environment. Social capacity refers to the number of people who can be in an area without altering or impairing recreational experiences. Within the Platte River area, all of these carrying capacities are interconnected and affect and/or produce desirable or undesirable conditions, as defined by Lakeshore policies and mandates. The Lakeshore is interested in developing methods to determine the user capacity of the Platte River, however, the actual determination is problematic (National Park Service 2002).

Multi-jurisdictional involvement along the Platte River within the Lakeshore's boundary, include the Benzie County Road Commission, Lake Township, MDNR fish weir, residential properties, and a canoe livery business. In addition, there are many more stakeholders within the Platte River watershed, located outside the Lakeshore's boundary, whose management actions affect the quality of the Platte River as it flows through Lakeshore property.

Section 4.6.6 of the NPS Management Policies 2006 (Watershed and Stream Processes) states that the NPS will manage streams to protect stream processes that create habitat features such as floodplains, riparian systems, woody debris accumulations, terraces, gravel bars, riffles, and pools.

Therefore, impact determination will be made in relation to river channel and riparian desired conditions, as listed above, since the Platte River is not entirely within the Lakeshore's jurisdiction.

4.0 ENVIRONMENTAL CONSEQUENCES

This section of the EA forms the scientific and analytic basis for the comparisons of alternatives as required by 40 CFR 1502.14. This discussion of impacts (effects) is organized by impact topic parallel with Section 3.0 (Affected Environment). The No-Action Alternative and the action alternative are

discussed within each impact topic. To the extent possible, individual, short-term, long-term, beneficial, and adverse impacts of each alternative are described for each impact topic, followed by conclusions. Cumulative impacts are then discussed for each impact topic. A summary of impact topics is found in Table 2.

4.1 Intensity, Duration, and Type of Impact

The evaluation of alternatives takes into account whether the impacts would be negligible, minor, moderate, or major. Duration of impacts is evaluated based on the short- or long-term nature of alternative associated changes on existing conditions. More exact interpretations of intensity and duration are given for each impact topic examined. Professional judgment, gathered from meetings with Lakeshore staff and affected agencies, is used to reach reasonable conclusions as to the intensity and duration of potential impacts. Type of impact refers to the beneficial or adverse consequences of implementing a given alternative.

4.2 Cumulative Impacts

The Council of Environmental Quality (CEQ) regulations, which implement NEPA, require an assessment of cumulative impacts in the decision-making process for federal projects. 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 were determined by combining the impacts of the alternatives with potential other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or foreseeable future projects within the vicinity of the Water Wheel/Casey's project site and, if necessary, the surrounding region.

The only other known actions within the project area potentially having a cumulative impact on, or currently being cumulatively impacted by, the identified alternative options is the recreational use of the Platte River that is adjacent (west) of the project area, the restoration of former landowner properties along the river, the MDNR's Platte River State Fish Hatchery upstream, and the NPS annual dredging of the Platte River mouth for boat access and safety. The only foreseeable action in the project area would be to remove the signs barring access once the vegetation has established itself along the riverbanks.

4.3 Impairment Analysis

The National Park Service Management Policies (National Park Service 2006) require an analysis of potential effects to determine whether or not actions would impair park resources or values. The fundamental purpose of NPS, as established by the Organic Act (1916) and reaffirmed by the General Authorities Act (1970), as amended, begins with a mandate to conserve park resources and values. The 1970 Lakeshore enabling legislation, as amended, further mandates resource protection. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable, actions that would adversely affect the Lakeshore resources and values.

These laws give NPS the management discretion to allow impacts to Lakeshore resources and values when necessary and appropriate to fulfill the purposes of the park, so long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within the park, the discretion is limited by the

statutory requirement that NPS must leave the park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

A prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values. An impact to any park resource or value may constitute impairment. Impairment may result from NPS activities in managing the park from visitor activities or activities undertaken by concessionaires, contractors, and any other operators inside the park. Impairment of resources can also occur from activities outside the Lakeshore boundaries. An impact would be more likely to constitute impairment to the extent that it has a major or severe adverse affect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park
- Key to the natural or cultural integrity or to opportunities for enjoyment of the park
- Identified as a goal in the park General Management Plan/Environmental Impact Statement or other relevant NPS planning documents.

A determination of impairment is made within this section, Environmental Consequences, under each alternative for soils and streambeds, water quality, streamflow characteristics, important habitat (fish and wildlife), visitor experience/recreation, and long-term management of Platte River watershed. The analysis takes into account the greatest degree of impacts to the resources in the alternatives.

4.4 Impacts on Soils and Streambeds

Analysis focused on the impacts to soils and substrate that could be affected by the construction of a temporary access road, heavy machinery use for retaining wall and fill removal, steel sheet piling removal, and re-contouring of the riverbanks.

4.4.1 Methodology

Basis of Analysis—

- **Soil and Substrate Disturbance—**Analysis is discussed in terms of the disturbance of soils, including compaction, in the development of a temporary road access, wall and fill removal, steel sheet piling removal, and re-contouring of the land.
- **Erosion/Sedimentation—**Analysis is based on the disturbance of soils and consequent erosion and migration of sediments into Platte River.

Intensity:

- **Negligible—**The soil and substrate are essentially left intact. Little or no sediment migrates to Platte River
- **Minor—**The impacts to soil and substrate are detectable but slight. A few instances where sediments breach barriers (silt boom/plants) and migrate into Platte River.
- **Moderate—**The impacts to soil and substrate are readily apparent, but the area of disturbance is localized. Numerous areas where sediments breach barriers (silt boom/plants) and migrate into Platte River.
- **Major—** The impacts to soil and substrate are substantial and there is widespread loss. Sedimentation into Platte River is widespread.

Duration:

- **Short-Term—**Lasting less than a year, or only during the period of construction.

- **Long-Term—**Lasting for more than one year or permanently.

4.4.2 No-Action Alternative

Analysis—

- **Soil and Substrate Disturbance—**The No-Action Alternative would result in soil and substrate disturbance from the continued deterioration of the retaining walls, hardening of river bottom by keeping stone rip-rap in place, and lack of native vegetation to stabilize soils.
- **Erosion/Sedimentation—**The No-Action Alternative would result in erosion and sedimentation due to the eroding of fill from behind the retaining walls, and lack of native vegetation to stabilize riverbanks.

Conclusion—Long-term, moderate, adverse impacts to site soils and substrate. This alternative would also have long-term, moderate, adverse impacts on soil erosion and subsequent sedimentation.

4.4.3 Alternative I (Restoration)

Analysis—

- **Soil and Substrate Disturbance—**Alternative I would result in site grading on the Water Wheel side to build the temporary access road resulting in temporary soil compaction. Disturbance to soils on both sides of the river would occur during retaining wall and fill removal. Approximately 310 cubic yards of fill would be removed. Also short-term machinery usage would impact soils. Removal of the steel sheet piling will cause some soil disturbance. Re-vegetation of the exposed riverbanks would occur within 7 days after fill has been removed and prior to silt boom removal.
- **Erosion/Sedimentation—**Alternative I would result in site grading across 25% of the Water Wheel site during the temporary road construction. During the period of construction and machinery use for wall/fill removal, there could be short-term erosion of the surface soils into the river. Additionally, minimal sedimentation could occur prior to re-vegetation of the impacted areas. Riverbanks will be planted with live stakes of alder, willow, and dogwood species. The area will also be planted with grass seed and mulched with weed-free straw to help stabilize bare areas.

Conclusion—Short-term, minor, adverse impacts to soils and short-term, moderate, adverse impacts from erosion/sedimentation are possible.

4.4.4 Cumulative Impacts

Future recreational use along the Platte River may result in long-term, moderate adverse impacts to soils and subsequent sedimentation of the River under the No-Action Alternative. The impact to soils under Alternative I would be minor and beneficial due to the active management of disturbed sites along the river. Recreational activities include using restored sites as access points and picnic areas, causing riverbank erosion and loss of vegetation. These uses also increase the sediment released into the river. Therefore, the usage along the river would contribute, cumulatively, to the overall impact on soils and sedimentation from each alternative.

4.4.5 Impairment

Implementation of either alternative will not result in the impairment of soil resources.

4.5 Impacts on Water Quality

4.5.1 Methodology

Analysis focused on the impacts to surface water quality that could be affected by site run-off.

Basis of Analysis—

- **Surface Water Quality—**Analysis is discussed in terms of potential impacts on aquatic life by smothering benthic habitat or restricting light penetration.

Intensity:

- **Negligible—**Impacts are effects that are not detectable, well above water quality standards, and within historical baseline water quality conditions.
- **Minor—**Impacts are effects that are detectable but well within or above water quality standards and within historical baseline water quality conditions.
- **Moderate—**Impacts are effects that are detectable, within or above water quality standards, but historical baseline water quality conditions are being altered on a short-term basis.
- **Major—**Impacts are effects that are detectable and significantly and persistently alter historical baseline water quality conditions.

Duration:

- **Short-Term—**Lasting less than a year, or only during the period of construction.
- **Long-Term—**Lasting for more than one year.

4.5.2 No-Action Alternative

Analysis—

- **Surface Water Quality—**Although quantities of current sediment levels eroding into Platte River are unknown, it can be assumed that continued failure of the retaining walls and increased human foot traffic along the riverbank would likely increase sediment erosion into the river. This alternative could result in long-term, minor to moderate adverse impacts to aquatic habitat.

Conclusion—Long-term, minor to moderate, adverse impacts to surface water quality.

4.5.3 Alternative I (Restoration)

Analysis—

- **Surface Water Quality—**Alternative I would build a temporary access road to remove the concrete wall and fill on the Water Wheel side. Walls and fill will be removed from Casey's side. The temporary destabilization of soils may affect the aquatic habitat through sedimentation. To mitigate this potential, a silt boom/curtain will be installed in the river along the area where removal is taking place. Additionally, re-vegetation of the recently exposed riverbank will occur prior to the removal of the silt/boom curtain.

Conclusion— Short-term, moderate, adverse impacts to surface water quality.

4.5.4 Cumulative Impacts

The possible restoration of the project site may result in long-term, moderate, beneficial impacts to the surface water quality, both at the site, as well as along the downstream segment of the river. Restoration would contribute to the past efforts (contamination mitigation) to restore this site to natural conditions and prevent the need for future actions to mitigate retaining wall failure. The No-Action Alternative may result in long-term, minor to moderate adverse affects to the water quality when factored into the overall water quality impacts along the Platte River.

4.5.5 Impairment

Implementation of either alternative will not result in the impairment of soil resources.

4.6 Impacts on Streamflow Characteristics

Analysis focused on the impacts to the streamflow that could be affected by the artificial features (retaining walls) located in the river channel.

4.6.1 Methodology

Basis of Analysis—

Streamflow Characteristics—Analysis is discussed in terms of streamflow depth and velocity in the project area.

Intensity:

- **Negligible—**Impacts are effects that are not detectable and within historical baseline streamflow depth and velocity.
- **Minor—**Impacts are effects that are detectable but well within historical baseline streamflow depth and velocity.
- **Moderate—**Impacts are effects that are detectable, within or below historical baseline streamflow depth and velocity but are being altered on a short-term basis.
- **Major—**Impacts are effects that are detectable and significantly and persistently alter historical baseline streamflow depth and velocity.

Duration:

- **Short-Term—**Lasting less than a year, or only during the period of construction.
- **Long-Term—**Lasting for more than one year or permanently.

4.6.2 No-Action Alternative

Analysis—

- **Streamflow Depth and Velocity—**Under the No-Action Alternative, the retaining walls would remain in the river channel. Encroachment into the channel and subsequent erosion behind the artificial structures would continue, increasing streamflow.

Conclusion—There would be long-term, minor, adverse impacts to the streamflow and depth characteristics.

4.6.3 Alternative I (Restoration)

Analysis—

- **Streamflow Depth and Velocity—**Under Alternative I, the retaining walls would be removed from the river channel. The expected channel response is a relatively unaltered flow regime. Channel processes would be unconstrained within the project site.

Conclusion—There would be long-term, moderate, beneficial impacts to the streamflow and depth characteristics.

4.6.4 Cumulative Impacts

The flow of Platte River is uniformly steady and stable, therefore, the cumulative impacts to the overall velocity and depth of the Platte River is negligible.

4.6.5 Impairment

Implementation of either alternative will not result in the impairment of soil resources.

4.7 Impacts on Important Habitat (Fish and Wildlife)

4.7.1 Methodology

Analysis focused on impacts to fish and wildlife species habitat and displacement that could be affected by the management of the project site.

Basis of Analysis—

- **Alteration of Habitat—**Analysis is based on the potential gain, loss, degradation, or improvement of habitat for aquatic and terrestrial species.
- **Displacement of Species—**Analysis is based on the potential displacement or repopulation of fish and wildlife species.

Intensity:

- **Negligible—**Degradation of habitat and/or impacts to fish and wildlife species populations are detectable only through long-term monitoring. Subtle changes in vegetative composition, compared to surrounding, undisturbed areas, are evident.
- **Minor—** Degradation of habitat and/or impacts to fish and wildlife species populations are detectable by Lakeshore biologists without the use of long-term monitoring. Obvious changes in vegetative composition are evident compared to surrounding, undisturbed areas.
- **Moderate—** Degradation of habitat and/or impacts to fish and wildlife species populations are detectable by Lakeshore visitors and are of concern by the NPS and other agencies. Very discernable changes in vegetative composition are evident, compared to surrounding, undisturbed areas.
- **Major—** Degradation of habitat and/or impacts to fish and wildlife species populations are considerable and obvious to all visitors in the vicinity, which could result in the NPS or other agencies' regulatory actions. Habitat is completely changed or destroyed, compared to surrounding, undisturbed areas.

Duration:

- **Short-Term—**Lasting less than a year, or only during the period of construction.
- **Long-Term—**Lasting for more than one year or permanently.

4.7.2 No-Action Alternative

Analysis—

- **Alteration of Habitat—**Under the No-Action Alternative the habitat would continue to be comprised of a few trees and grasses covering the project site. The vegetative composition would not match the surrounding, undisturbed areas and the riverbanks would not match the natural riverbank contour. The river channel would be devoid of any woody vegetation.
- **Displacement of Species—**Habitat use by fish and wildlife species would continue but would lack the components (i.e., cover, food sources, etc.) that are requisite for a healthy ecosystem.

Conclusion—The No-Action Alternative would have long-term, minor, adverse impacts to the habitat and species displacement.

4.7.3 Alternative I (Restoration)

Analysis—

- **Alteration of Habitat—** Under Alternative I the vegetative composition would eventually match the surrounding, undisturbed areas through a diversified planting scheme. The riverbanks would match the natural riverbank contour by removing fill and planting with appropriate native Platte River riverbank species. Woody vegetation would be placed in and along the river channel. Navigation by boat would still be possible.
- **Displacement of Species—**Habitat use by fish and wildlife species would most likely increase since the components (i.e., cover, food sources, etc.) that are requisite for a healthy ecosystem would be restored.

Conclusion— Alternative I would have long-term, minor, beneficial impacts to the habitat and species displacement.

4.7.4 Cumulative Impacts

The Water Wheel/Casey's project site is primarily covered with native and non-native grasses. The riverbanks are devoid of woody vegetation and limited woody debris is found along or in the waterway. The alteration of habitat and displacement of species would be negligible when compared to the overall management and size of the Platte River watershed but would still be beneficial in the long-term. Restoration would contribute to the completion of past restoration efforts and eliminate current resource damage concerns. Restoration would not contribute to any reasonably foreseeable future actions.

4.7.5 Impairment

Implementation of either alternative will not result in the impairment of soil resources.

4.8 Impacts on Visitor Experience/Recreation

4.8.1 Methodology

Analysis focused on impacts to visitor access to the site and type of recreational use.

Basis of Analysis—

- **Change in Access—** Analysis focused on the potential for change in visitor experience by determining whether the changes would affect visitor access.
- **Change in Recreation—** Analysis focused on the potential for change in recreational use by determining whether the changes would affect the type(s) of recreational use.

Intensity:

- **Negligible—**In the long-term, visitors would not be aware of any changes associated with visitor access and recreational use. Any changes in visitor ability to access and recreate would be so slight that only NPS personnel and repeat visitors to the site would notice.
- **Minor—**In the long-term, most visitors would not be aware of any changes associated with visitor access and recreational use. Any changes in visitor ability to access and recreate would be minimal and only those with some long-term familiarity of the project site would notice any change.
- **Moderate—**Changes to the site would result in visitors being readily aware of diminished access and recreational opportunity. The impacts could be either short- or long-term and may require visitors to access and/or recreate in other areas of the park.
- **Major—** Changes to the site would severely or exceptionally affect visitor access and recreation. The changes to the site would preclude future generations of visitors from enjoying the park's resources or values.

Duration:

- **Short-Term—**Lasting less than a year, or only during the period of construction.
- **Long-Term—**Lasting for more than one year or permanently.

4.8.2 No-Action Alternative

Analysis—

- **Change in Access—**Under the No-Action Alternative the access to the site would not change. Visitors would be able to continue to easily access the river's edge both from upland areas and from within the river.
- **Change in Recreation—** Under the No-Action Alternative the types of recreational use within the project site would remain the same. The main types of existing recreational uses include viewing along the river's edge, fishing (usually wading into the river), and launching canoes/kayaks from the river's edge.

Conclusion—There would be long-term, negligible, beneficial impacts to the access and recreational uses of the site.

4.8.3 Alternative I (Restoration)

Analysis—

- **Change in Access—** Under the Action Alternative the access to the site would change. Visitors would not be able to easily access the river's edge from the upland areas but would be able to continue to access the edge from within the river (anglers). The access availability would change due to the woody debris placement and re-vegetation of the site and "restoration area-please keep off" signs would be placed along the riverbanks until the plants became established. Visitors would still be able to access the river from numerous other public and

private launching sites including the Lakeshore's developed boat landing/parking area directly across M-22.

- **Change in Recreation—** Under the Action Alternative the types of recreational use within the project site would change. The main type of existing recreational uses that would change includes viewing along the river's edge. The launching of canoes/kayaks from the river's edge would also be limited, but this recreational use would be little affected since numerous other public and private launching sites are available. Fishing would not change since access could be achieved from within the river channel. Opportunities for the activities that would change are offered directly across M-22 at the canoe livery business and at the Lakeshore's developed boat landing/parking area.

Conclusion— Since access to the river and the same recreational opportunities are provided through a variety of other access points there would be long-term, negligible, adverse impacts to the access and recreational uses of the site.

4.8.4 Cumulative Impacts

The overall cumulative impact to access and recreation from the alternatives is negligible based upon the fact that directly across M-22, there are developments that provide direct access and opportunities to kayak, canoe, fish, and park. Restoration would contribute to past restoration efforts and eliminate current hazards associated with the deteriorating retaining walls. Because this is not an official river access point it would not contribute to reasonably foreseeable future actions.

4.9 Impacts to Long-term Management of Platte River Watershed

Analysis focused on the impacts to the long-term management of the Platte River watershed in the Platte River/M-22 area.

4.9.1 Methodology

Analysis focused on impacts to the long-term management of the natural resources at the intersection of M-22 and Platte River based on the desired conditions for the river channel and riparian habitat as outlined in the Watershed and Stream Processes 2006 NPS Management Policies (p. 20).

Basis of Analysis—

- **River Channel and Riparian Condition—**The analysis is based on the presence and condition of riparian vegetation, debris loading, and channel erosion control.

Intensity:

- **Negligible—**The river channel is not eroding, woody debris is vastly present, and the riparian vegetation cover is representative of the surrounding "intact" plant community.
- **Minor—**The river channel is slightly eroding, woody debris is significantly present (>50%), and the riparian vegetation cover (>50%) is significantly representative of the surrounding "intact" plant community.
- **Moderate—**The river channel is noticeably eroding, woody debris is only slightly present (25-50%), and the riparian vegetation cover is slightly representative (25-50%) of the surrounding "intact" plant community.
- **Major—** The river channel is extremely eroding, woody debris is non-existent, and the riparian vegetation cover is completely different from the surrounding "intact" plant community.

Duration:

- **Short-Term—**Lasting less than a year, or only during the period of construction.
- **Long-Term—**Lasting for more than one year or permanently.

4.9.2 No-Action Alternative

Analysis—

- **River Channel and Riparian Condition—**The No-Action Alternative would keep the human established features (i.e., retaining walls, fill, grass cover). In-channel erosion would continue due to the presence of the concrete retaining wall. The site would not become established with the same vegetative cover as the natural areas along the river. Only one tree has fallen into the waterway, which serves as woody debris.

Conclusion—The condition of the river channel and riparian vegetation would be long-term and the impact would be moderate and adversely affect the overall management of the watershed.

4.9.3 Alternative I (Restoration)

Analysis—

- **River Channel and Riparian Condition—**The Action Alternative would remove the human established features (i.e., retaining walls, fill, grass cover) and restore the site with the same vegetative cover as the natural areas along the river. Trees would be placed in and along the riverbanks to accumulate woody debris.

Conclusion—The condition of the river channel and riparian vegetation would be long-term and the impact would be negligible to minor and beneficially affect the overall management of the watershed.

4.9.4 Cumulative Impacts

The cumulative impact by restoring the project site would be long-term in duration, minor in impact, and beneficial. Since the Platte River receives high visitor use, any areas that are restored along the River will help managers mitigate the overall impact to the river channel and riparian vegetation. The No-Action Alternative will not contribute to the overall integrity of the Platte River watershed on a long-term basis. As a result, cumulatively, the impact will moderately and adversely affect the overall health of the Platte River system.

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Appendix A
Contamination Remediation Actions

The following list is a chronological summary of events that occurred at this site as a result of the soil and groundwater contamination clean-up process.

- Nov. 1989, Structures were demolished and underground gasoline tanks were removed (soil contamination was observed).
- Mar. 1990, A leaking underground fuel oil storage tank was discovered and removed (soil contamination was observed).
- Feb.-Dec. 1991, Monitoring well clusters were placed and the Environmental Protection Agency (EPA) staff monitored water and soil on a monthly basis. This was a one-year study to monitor and assess the natural biodegradation and bioremediation of contaminants.
- Apr. 1992, Solar Universal Technologies, Inc. conducted an additional site investigation and included the property across from Casey's – the Water Wheel property. Fifteen soil borings were completed to collect soil cores and water samples and 8 monitoring wells (MW2A-MW9A) were installed.
- Jun., Jly., Aug., 1992, A study to assess the ecological integrity of the stream invertebrate community was conducted by Nancy Hoefs, Colorado State University-density of specific communities appeared to be affected by the leachate, however, the effects appeared to be isolated to the area directly adjacent to the spill site.
- Sept. 1992, Contract for site remediation was issued to Solar Universal Technologies, Inc.
- Nov. 1992, A series of steel sheet pilings were driven along the south bank of Platte River to a depth of 25' and a length of 100' to prevent the contaminant plume from flowing into the Platte River.
- Dec. 1992, 4 pumping/purge wells and groundwater treatment system installed (part of activated carbon groundwater treatment system). This system pumped 2 million gallons of groundwater per month through carbon filters before discharging it into the Platte River.
- May 1993, 3,000 cubic yards of contaminated soil were treated through low temperature thermal desorption. The cleaned soil was then returned to site, saving landfill space. Seventy-five thousand gallons of contaminated groundwater was pumped from Casey's during the soil excavation process and hauled to the Saginaw Waste Water Treatment plant for disposal.
- Oct. 1993, Cost estimate was developed for crushed stone rip-rap, which was placed on top of sheet piling to protect visitors from the sharp edges of the metal and to prevent erosion and "beautify" the area.
- Dec. 1993, Pumping discontinued after several months, in which Benzene (the hydrocarbon constituent of concern) was tested as non-detect at the system influent. The NPS received permission from the Michigan Department of Natural Resources (MDNR) to shut the ground water pumping system off.
- Jan.-Jly. 1994, Monthly testing of the ground water continued for six months after the system was turned off per permit stipulations.
- Dec. 1994, Closure report was prepared by Global Environmental Engineering, Inc. and submitted to MDNR Underground Storage Tank Division.
- Dec. 1994, Chief of MDNR's Underground Storage Tank Division, Mr. Mohammad Yusaf, mailed a letter stating that the MDNR had removed Casey's from the list of contaminated sites in Michigan.
- Apr. 1995, Purge wells were pulled and casings were plugged with bentonite per State regulations (Mike Duwe requested).
- May 1995, All monitoring wells and equipment were removed from site except for 3 monitoring wells on the Water Wheel property.
- July. 1996, National Pollutant Discharge Elimination System permit from State Department of Environmental Quality was terminated.

APPENDIX B

Current Site Photos

Historic site photos can be accessed on-line at:
http://www.coheadquarters.com/PennLibr/BenzieCounty/Water Wheel/Platte RiverX.XXxx.jpg

X.XXxx = 3.1Axx
3.2Axx
3.3Axx
3.3Bxx
3.1Cxx

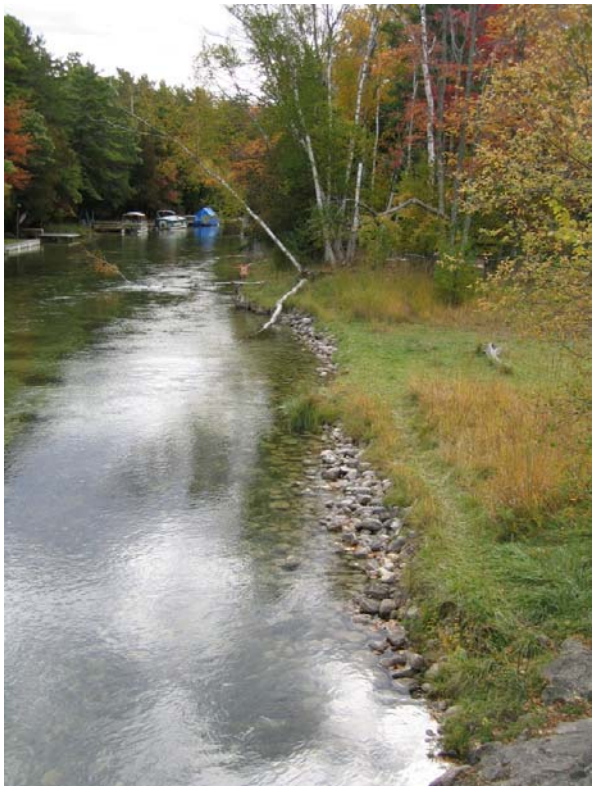
Water Wheel and Casey's Canoe Liveries-View From M-22 Bridge

Water Wheel-Concrete Retaining Wall

Water Wheel-Concrete Retaining Wall

Water Wheel-Concrete Retaining Wall

Water Wheel-Concrete & Inholder (46-115) Retaining Walls Intersection



Casey's-Steel Sheet Piling (Buried) & Cobble

Casey's-Steel Sheet Piling (Buried) & Cobble

Casey's-Steel Sheet Piling

Casey's-Wood Retaining Wall

Appendix C
Riverbank Stabilization Guidelines

WATER WHEEL PROJECT BANK STABILIZATION GUIDELINES
December 2006

Source Data: USDA NRCS Engineering Field Handbook Chapter 16 – Streambank & Shoreline Protection

Live stakes—Live staking involves the insertion and tamping of live, rootable vegetative cuttings into the ground (Figure 1). If correctly prepared, handled, and placed, the live stake will root and grow. A system of stakes creates a living root mat that stabilizes the soil by reinforcing and binding soil particles together and by extracting excess soil moisture. Most willow species root rapidly and begin to dry out a bank soon after installation.

Applications and effectiveness

• Effective streambank protection technique where site conditions are uncomplicated, construction time is limited, and an inexpensive method is needed.
• Appropriate technique for repair of small earth slips and slumps that frequently are wet.
• Can be used to peg down and enhance the performance of surface erosion control materials.
• Enhance conditions for natural colonization of vegetation from the surrounding plant community.
• Stabilize intervening areas between other soil bioengineering techniques, such as live fascines.
• Produce streamside habitat.

Construction guidelines

Live material sizes—The stakes generally are 0.5 to 1.5 inches in diameter and 2 to 3 feet long. The specific site requirements and available cutting source determine sizes.

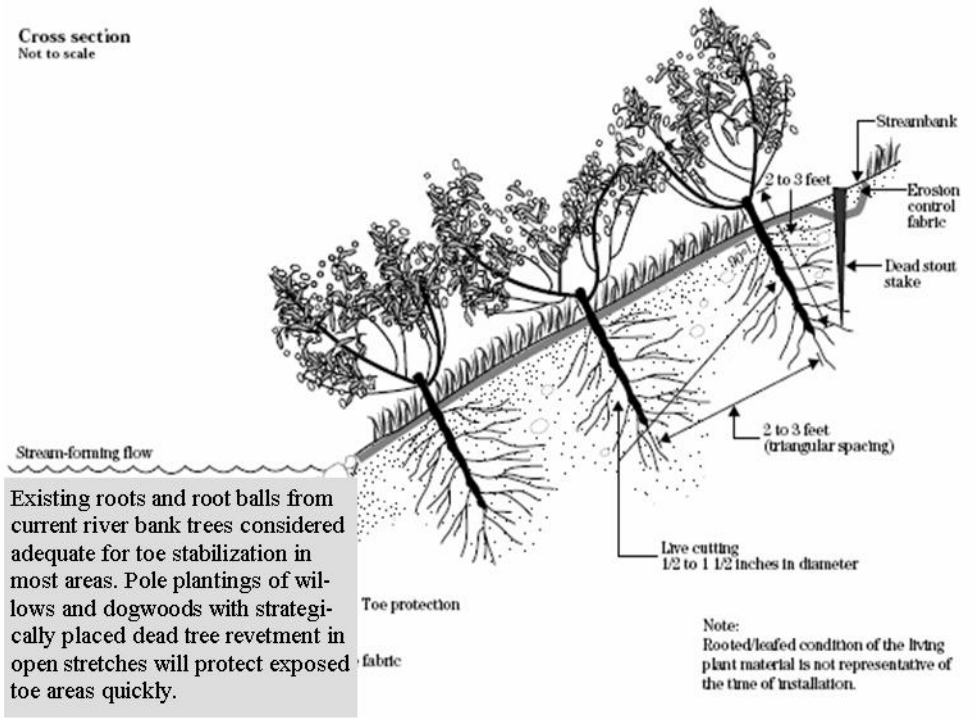
Live material preparation

• The materials must have side branches cleanly removed with the bark intact.
• The basal ends should be cut at an angle or point for easy insertion into the soil. The top should be cut square.
• Materials should be installed the same day that they are prepared.

Installation

• Erosion control fabric should be placed on slopes subject to erosive inundation.
• Tamp the live stake into the ground at right angles to the slope and diverted downstream.
The installation may be started at any point on the slope face.
• The live stakes should be installed 2 to 3 feet apart using triangular spacing. The density of the installation will range from 2 to 4 stakes per square yard. Site variations may require slightly different spacing.
• Placement may vary by species. For example, along many western streams, tree-type willow species are placed on the inside curves of point bars where more inundation occurs, while shrub willow species are planted on outside curves where the inundation period is minimal.
• The buds should be oriented up.
• Four-fifths of the length of the live stake should be installed into the ground, and soil should be firmly packed around it after installation.
• Do not split the stakes during installation. Stakes that split should be removed and replaced.
• An iron bar can be used to make a pilot hole in firm soil.
• Tamp the stake into the ground with a dead blow hammer (hammer head filled with shot or sand).

Figure 1: Typical design for live stakes (Source NRCS Streambank & Shoreline Protection, Eng. Field Handbook, Chapter 16).



***(ii) Live fascines*—**Live fascines are long bundles of branch cuttings bound together in cylindrical structures (fig. 2). They should be placed in shallow contour trenches on dry slopes and at an angle on wet slopes to reduce erosion and shallow sliding.

Applications and effectiveness

• Apply typically above bankfull discharge (stream-forming flow) except on very small drainage area sites (generally less than 2,000 acres).
• Effective stabilization technique for streambanks. When properly installed, this system does not cause much site disturbance.
• Protect slopes from shallow slides (1 to 2 foot depth).
• Offer immediate protection from surface erosion.
• Capable of trapping and holding soil on a streambank by creating small dam-like structures, thus reducing the slope length into a series of shorter slopes.

• Serve to facilitate drainage where installed at an angle on the slope.
• Enhance conditions for colonization of native vegetation by creating surface stabilization and a microclimate conducive to plant growth.

Construction guidelines

Live materials—Cuttings must be from species, such as young willows or shrub dogwoods that root easily and have long, straight branches.

Live material sizes and preparation
• Cuttings tied together to form live fascine bundles normally vary in length from 5 to 10 feet or longer, depending on site conditions and limitations in handling.

• The completed bundles should be 6 to 8 inches in diameter, with all of the growing tips oriented in the same direction. Stagger the cuttings in the bundles so that tops are evenly distributed throughout the length of the uniformly sized live fascine.

• Live stakes should be 2.5 feet long.

Inert materials—String used for bundling should be untreated twine.

Dead stout stakes used to secure the live fascines should be 2.5-foot long, untreated, 2 by 4 lumbers. Each length should be cut again diagonally across the 4-inch face to make two stakes from each length.

Only new, sound lumber should be used, and any stakes that shatter upon installation should be discarded.

Installation
• Prepare the live fascine bundle and live stakes immediately before installation.
• Beginning at the base of the slope, dig a trench on the contour approximately 10 inches wide and deep.
• Excavate trenches up the slope at intervals specified in table 16–1. Place one or two rows over the top of the slope where possible.
• Place long straw and annual grasses between rows.
• Install jute mesh, coconut netting, or other acceptable erosion control fabric. Secure the fabric.
• Place the live fascine into the trench.
• Drive the dead stout stakes directly through the live fascine. Extra stakes should be used at connections or bundle overlaps. Leave the top of the dead stout stakes flush with the installed bundle.
• Live stakes are generally installed on the downslope side of the bundle. Tamp the live stakes below and against the bundle between the previously installed dead stout stakes, leaving 3 inches to protrude above the top of the ground. Place moist soil along the sides of the bundles. The top of the live fascine should be slightly visible when the installation is completed.

Figure 2: Typical design for live fascines (Source NRCS Streambank & Shoreline Protection, Eng. Field Handbook, Chapter 16). Note: The toe protection is not anticipated for the Platte River due to its low gradient and rare flooding history.

Recommended Species Native to SLBE
Live Stake and Fascine species

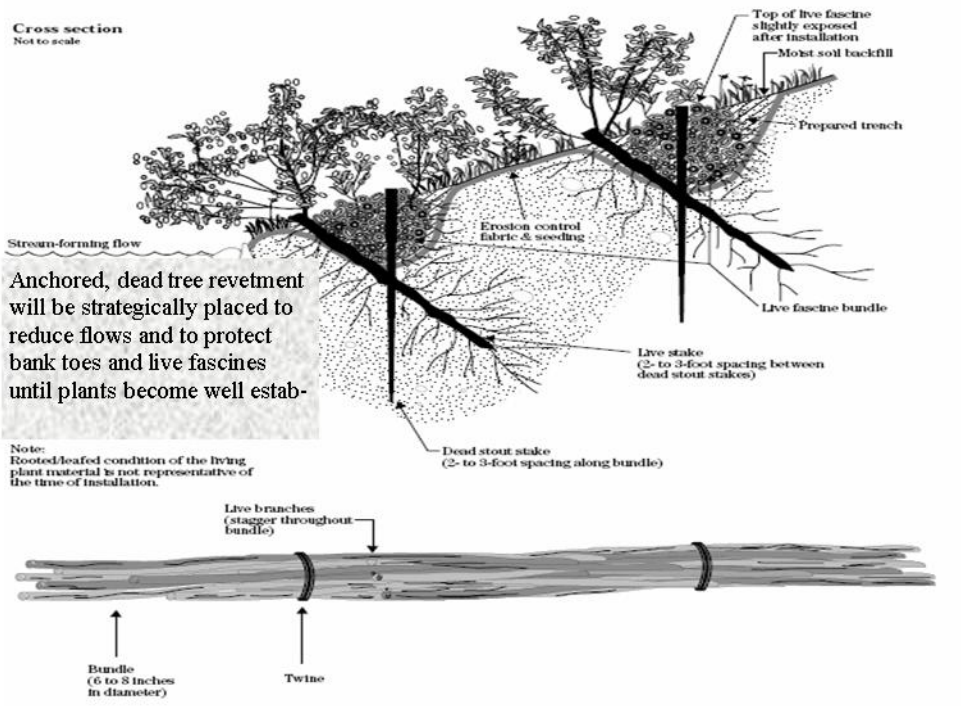
- Tag or Speckled Alder (Alnus rugosa originally, now A. incana, ssp. rugosa)– Plant as Live stakes or as rooted trees.
- Slender Willow (Salix petiolaris) – Excellent material for live fascines or stakes.
- Peach-Leaved Willow (Salix amygdaloides) - Excellent material for live fascines or stakes.
- White & Yellow Birch (Betula papyrifera & alleghaniensis) – Plant small trees along upper banks in gaps not currently filled with cedar or hardwoods.
- Silky Dogwood (Cornus amomum) - Plant as Live stakes or as rooted shrubs.
- Red Osier Dogwood (Cornus sericea) - Plant as Live stakes or as rooted shrubs.

Grass seed mulched with weed free straw

- Red Top (Agrostis gigantea)
- Northern Reedgrass (Calamagrostis stricta, spp. inexpansa)

- Fowl Mannagrass (Glyceria stricta)
- Cordgrass (Spartina pectinata)
- Litte Bluestem (Andropogon scoparius)

Note: These native species will be purchased from a Michigan supplier or gathered within the Lakeshore and spread in a mix. They should grow from waters edge to the upland portions of the banks thereby offering excellent stability.



Implementation Notes:
An excavator will remove the fill behind the seawalls until it starts hitting tree roots. Then crews will do hand digging and final shaping of the banks. Trenches will then be dug parallel to the river and live fascines will be placed in the trenches in areas where the banks are steeper. Those areas that can be angled at a gentler slope (i.e. no trees or roots above) will just have scattered live stakes/rooted trees planted along them. Everything will then be hand seeded, mulched with weed free straw and the straw will be punched into the soil using shovels. All steps of this portion of the project can be accomplished with the help of volunteer groups.