



Environmental Consequences

INTRODUCTION

The potential environmental effects of the five land use/water use management alternatives on scenic resources, recreational use, natural resources, cultural resources, socioeconomic resources and land and water management are examined in this chapter. These effects provide a basis for comparing the advantages and disadvantages of the alternatives.

The impacts of the five management structure options are presented separately at the end of this chapter. The impacts of these options are related to land and water management and to costs, and are independent of the land use/water use management alternatives.

Because of the conceptual nature of the alternatives, their potential consequences can be addressed only in general terms. The conclusions presented here are based on the review of information provided by other agencies and the insights of the National Park Service and Minnesota and Wisconsin Department of Natural Resources staff who are familiar with the lower riverway. If and when specific developments or other actions are proposed as a result of this *Cooperative Management Plan*, the staff of the managing agencies would determine whether or not more detailed environmental documents need to be prepared, consistent with provisions of the National Environmental Policy Act and comparable state laws.

It is important to note that this analysis only applies to actions being proposed by the National Park Service and the Minnesota and Wisconsin Departments of Natural Resources. Many other governmental organizations and individuals own land

within the lower riverway boundary and take actions that affect the riverway's resources and users. Also, the consequences of the proposed state guidelines for land use and water-based recreational use regulations in appendixes A and B are *not* assessed — these proposed guidelines would be approved and implemented through the states' separate rule-making process.

Developments and actions are also being taken in the watershed, outside the lower riverway, which affect the river. The National Park Service and the Minnesota and Wisconsin Departments of Natural Resources have little or no control over many of these actions, although they would work with businesses, landowners, local governments, and others to minimize any impacts on the lower riverway. Consequently, this environmental impact statement does not assess the impacts of other organizations' actions in or outside the riverway, except briefly under the "Cumulative Effects" section.

To focus the discussion of the potential consequences of the alternatives, specific impact topics were identified. These topics were based on the riverway's outstandingly remarkable values, federal laws, regulations and orders, agency management policies, the planning team's knowledge of scarce or easily impacted resources, and issues and concerns expressed by the public and other agencies during scoping (see the issues section in the "Introduction" and the "Consultation and Coordination" chapters). Other topics were dismissed from further consideration. The rationale for dropping these topics is discussed below.

IMPACT TOPICS DISMISSED FROM FURTHER CONSIDERATION

Under NPS policies and the Council on Environmental Quality regulations, a number of impact topics must be assessed in environmental impact statements. However, in the case of the Lower St. Croix several of these topics are irrelevant and can be dismissed. Other topics were dismissed because they were not important for the lower riverway, or because the alternatives would not affect the topics, or the alternatives would not have discernible impacts on the topics.

Prime and Unique Agricultural Lands

As noted in the “Affected Environment,” there are prime and unique agricultural lands within the boundary of the lower riverway. However, none of the alternatives being considered would propose developments or other uses that would affect these lands. Thus, there is no need to assess the impacts of the alternatives on this topic.

Sacred Sites

There are no known sacred sites in the lower riverway.

Indian Trust Resources

All of the alternatives recognize the Chippewa Indian tribal treaty rights to hunt, fish, and gather resources on lands along the St. Croix north of Cedar Bend. Thus, Indian trust resources would not be affected.

Natural or Depletable Resource Requirements and Conservation Potential

Resource extraction activities are ongoing in the lower riverway but the alternatives are not proposing any such activities. Consequently, there is no need to assess resource requirements and conservation potential.

Energy Requirements and Conservation Potential

None of the alternatives would encourage a substantial increase in energy use or would propose new activities or major facilities in which energy conservation would need to be considered.

Mussels

The St. Croix River supports a highly diverse mussel population. Potential impacts to listed mussel species are discussed under the “threatened and endangered species” impact topic. Similar types of impacts to other mussel species would be expected. Management that benefits the federally listed Higgins eye pearly mussel should also effectively protect mussel communities in general because the Higgins eye is found throughout the riverway. (However, management that specifically benefits the winged maple leaf mussel might not benefit other mussel species in the rest of the riverway, since the winged maple leaf is found only in a small area.) A separate impact topic for mussels has not been included (see the threatened and endangered species impact topic).

Wetlands and Floodplains

No actions or new developments are being proposed by the management agencies in any of the alternatives that would adversely affect either wetlands or the lower St. Croix floodplain. (New access points could be permitted in one of the alternatives, but the NPS floodplain guidelines — Special Directive 93-4 — do not apply to this water-dependent development.) In addition, both states have regulations that cover new developments on floodplains.

Climate/Air Quality/Physiography/Topography/Geology

These resources were dismissed as impact topics because they would not be affected by actions or developments under any of the alternatives. The climate or overall physiography or topography of the riverway would not be altered. Air quality would continue to be monitored for air pollution impacts. Geologic resources are one of the three “outstandingly remarkable values” for which the riverway was designated. The record shows that the geologic resources of greatest interest to Congress at the time of designation are the basalt outcrops and evidence of the actions of glacial meltwater in the Dalles of the St. Croix. These features are contained within the two state parks in that portion of the riverway and will receive the same high level of protection under all alternatives.

Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportio-

tionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

For the purpose of fulfilling Executive Order 12898, in the context of NEPA, the alternatives addressed in this plan were assessed during the planning process. It was determined that none of these alternatives would result in significant direct or indirect negative or adverse effects on any minority or low-income population or community.

METHODOLOGY

The impacts on scenic, natural, and cultural resources, recreational use, and socioeconomic conditions were generated based on existing conditions, current regulations, and likely development trends. The action alternatives were compared to the no action alternative to determine the degree of impact. Experience and professional judgment also contributed to the analysis and evaluation as well as the park’s purpose, significance, and exceptional resources and values. In some cases, a major negative impact on one resource may prove to be a positive benefit to another.

The effects were evaluated with the following levels of impact in mind:

- Negligible — The impact is so slight as to be difficult to measure or perceive, and has no meaningful implications.
- Minor — The impact is small, not always obvious, but is detectable and measurable.
- Moderate — The impact is readily apparent.
- Major — The impact is severely adverse or exceptionally beneficial.

IMPACTS OF PREFERRED ALTERNATIVE

IMPACTS ON SCENIC RESOURCES

Analysis

Scenic resources in the riverway are protected primarily through land acquisition or through regulatory controls on land development. No significant land acquisition would occur in implementing the preferred alternative. The proposed five land management categories, compared to the current two categories, would provide additional scenic resource protection in rural areas with slightly less protection within municipalities (where scenic values have already been heavily altered). Under the no-action alternative, scenic values would continue to be protected by development standards designed to limit visual impacts. However, under the preferred alternative, the riverway managing agencies would require local governments to protect the historic character of municipalities, which would reduce potential impacts to scenic values in municipalities from new development. The no-action alternative would take no such special actions.

The following analysis evaluates scenic impacts created by the application of the five land management areas on each river segment.

The Dalles of the St. Croix to Rock Island: 3.5 miles. Scenic resources within the two state parks in this river segment would continue to be protected by state ownership (as they would be under the no-action alternative). No impact to scenic resources would occur because any future development would occur at existing

development nodes, and scenic and relatively undisturbed natural areas would be maintained. Private lands in Minnesota in the southern portion of this segment would be classified as conservation and would receive increased protection (i.e., more restrictive state land use regulations) as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would be less visible from the river. Consequently, they would have less impact on scenic resources than the no-action alternative.

Osceola Area (Rock Island to McLeod Slough): 10 miles. Osceola is classified as small town historic, which affords about the same level of scenic protection as the existing urban standard, which does not preclude new development visible from the river but limits the development's visibility and visual impacts. However, protection of historic character would be required, further reducing potential scenic impacts. Most of this segment would be classified as conservation and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would be less visible from the river. Consequently, they would have less impact on scenic resources than the no-action alternative.

Marine Area (McLeod Slough to Arcola Sandbar via Page's Slough): 8.5 miles. Marine on St. Croix itself is classified partly as rural residential and mostly as

small town historic, which affords about the same level of scenic protection as the existing urban standard. However, protection of historic character would be required in most the area, reducing potential scenic impacts. William O'Brien State Park would receive the same high level of scenic resource protection as compared to the no-action alternative. Most of the remainder of this segment in Minnesota would be classified as rural residential, providing a level of protection similar to the no-action alternative, which would further limit visibility of development and maintains the rural character in unincorporated areas. The Wisconsin side of the river would be classified conservation and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would be less visible from the river. Consequently, they would have less impact on scenic resources than the no-action alternative.

Rice Lake Flats (Dead Man's Slough to Arcola Sandbar via St. Croix Islands Wildlife Area): 2.5 miles. St. Croix Islands Wildlife Area would receive the same high level of scenic resource protection as compared to the no-action alternative, which would maintain the undisturbed natural appearance. The remainder of this segment would be classified conservation and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would be less visible from the river. Consequently, they would have less impact on scenic resources than the no-action alternative.

Arcola Gorge (Arcola Sandbar to Head of Lake St. Croix): 5 miles. The Minnesota side of the river in this segment would be classified as rural residential, which affords a level of protection very similar to the no-action alternative. The Wisconsin side of the river would mostly be classified as rural residential, which would afford a level of protection similar to the no-action alternative.

Urban Stillwater (Head of Lake St. Croix to Stillwater Downtown Courtesy Docks): 2 miles. The northern portion of this segment in Minnesota is not intensively developed; it would be classified as small town, which would give it a level of scenic protection similar to the current urban classification. The southern portion of this segment includes the heavily developed downtown Stillwater area; it would be classified as river town, which would provide slightly less scenic protection than the current urban classification. Considering the heavily developed nature of the area, however, impacts on scenic resources would be negligible. In addition, the preferred alternative would require protection of historic character that would reduce potential scenic impacts.

The Wisconsin side would be classified as rural residential, which would afford a level of protection similar to the no-action alternative.

South Stillwater-Bayport Area (Stillwater Downtown Courtesy Docks to Andersen Point): 3 miles. Most of this segment in Minnesota would be classified as river town, which provides slightly less scenic protection than the current urban classification. Considering the heavily developed nature of the area, however, impacts on scenic resources would be

negligible. In addition, the preferred alternative would require protection of historic character that would reduce potential scenic impacts. The Andersen Point area would be classified as small town, with the result that its level of scenic protection would be similar to the current urban classification. The Wisconsin side would be classified as rural residential, which affords a level of protection very similar to the no-action alternative.

Bayport-North Hudson Area (Andersen Point to Willow River Dam): 2 miles.

In Minnesota, the area between Andersen Point and the south limits of Bayport would be classified as small town, which would result in a level of scenic protection similar to the current urban classification. The southern portion of this segment in Minnesota would be classified as rural residential, which affords a level of protection similar to the no-action alternative. Most of the Wisconsin side would be classified as rural residential, which affords a level of protection similar to the no-action alternative. The southern portion of this segment in Wisconsin lies in North Hudson and would be classified as small town, which would result in a level of scenic protection similar to the current urban classification.

Urban Hudson (Willow River Dam to Interstate 94): 2 miles. The Minnesota side in this segment would be primarily classified as small town, which would result in a level of scenic protection similar to the current urban classification. The Wisconsin side north of Orange Street would be classified as small town, which would result in a level of scenic protection similar to the current urban classification. The area south of Orange Street would be

classified as river town, which would provide slightly less scenic protection than the current urban classification. Considering the heavily developed nature of the area, however, impacts on scenic resources would be negligible. In addition, the preferred alternative would require protection of historic character that would reduce potential scenic impacts.

Open Lake (Interstate 94 to Catfish Bar): 4.5 miles. The Minnesota side in this segment would be classified as small town, with the result that its level of scenic protection would be similar to the current urban classification. The southern portion of Hudson would be classified partly as river town and partly as small town. The remainder of this segment in Wisconsin would be classified as rural residential, which would afford a level of protection similar to the no-action alternative.

Catfish to Kinnickinnic (Catfish Bar to Kinnickinnic Narrows): 5 miles. In Minnesota, the old Afton village area would be classified as small town historic, and the residential area to the south would be classified as small town, with the result that its level of scenic protection would be similar to the current urban classification. The southern portion of Afton and the area south of Afton State Park, as well as all of the Wisconsin side, would be classified as rural residential, which would afford a level of protection similar to the no-action alternative. Afton State Park would receive the same high level of scenic resource protection as the no-action alternative.

Kinnickinnic Narrows: 0.5 miles. The Minnesota side of the river in this segment would be classified as rural residential, which affords a level of protection similar

to the no-action alternative. Kinnickinnic State Park in Wisconsin would receive the same high level of scenic resource protection as the no-action alternative.

Kinnickinnic to Prescott (Kinnickinnic Narrows to Mississippi Confluence at Prescott): 6 miles. Much of the Minnesota side of the river in this segment would be classified as rural residential, which affords a level of protection very similar to the no-action alternative. St. Croix Bluffs Regional Park would receive the same high level of scenic resource protection as compared to the no-action alternative. Carpenter Nature Center would be classified as conservation and would receive increased protection as compared to the rural classification under the no-action alternative. In Wisconsin, the area north of Prescott would be classified as rural residential, which would afford a level of protection similar to the no-action alternative. Prescott would be classified as river town, which provides slightly less scenic protection than the current urban classification. Considering the heavily developed nature of the area, however, impacts on scenic resources would be negligible.

In addition to the application of land management areas to segments of the riverway, encouraging the maintenance and restoration of the natural diversity and ecological integrity of significant plant communities on public and private lands would result in the visual landscape of the riverway becoming more representative of the native acuteness of the area. These voluntary provisions could have a long-term beneficial impact on the visual resources of the riverway by aiding in the perpetuation of a natural mosaic of indigenous vegetation. However, these impacts would be minor to negligible

because these actions would be voluntary, and most individuals would consider these areas as natural landscapes whether or not the vegetative mosaics included a diversity of significant plant communities.

A change in forest tax law programs in Wisconsin would be pursued, which would enable landowners within the riverway to develop a forest management plan that would allow vegetation to be removed in a manner that would protect the scenic quality of the river. This change in policy for Wisconsin would result in a long-term, minor beneficial impact on the scenic resources of the riverway by providing landowners with more flexibility to preserve these resources.

Continued adherence to NPS policies that perpetuate native plant communities would result in a long-term, minor, beneficial impact on the scenic resources of the riverway. Under the current management approach (no-action), allowed changes in the scale or character of bridge crossings and relocation of transmission lines to new crossing corridors could potentially have a major long-term effects on scenic resources. The preferred alternative would restrict numbers and scale and encourage multiple uses of river crossing corridors and structures (including the consolidation of utility crossings). Replacement of similar-scale bridges or of larger-scale bridges would be allowed as long as there would be no adverse effects on the riverway. Compared to the no-action alternative, the preferred alternative would avoid potentially major long-term impacts to scenic quality from construction of large-scale bridge crossings or relocation of transmission lines to highly scenic or largely undisturbed corridors.

Flexibility on the use of submarine crossings could allow for accommodation of infrastructure needs for the surrounding communities while minimizing impacts on the riverway. Provisions could include the relocation, expansion in size or the number of lines, or the addition of new crossings. These actions could result in negligible adverse impacts on scenic resources in the immediate vicinity because new crossings would only be permitted provided there were no visual impacts. Potential impacts from accommodation of the utility needs could be reduced.

Prohibiting clearcutting for inspections of pipeline rights-of-way and maintaining as much natural vegetation as possible along utility rights-of-way would result in minor beneficial impacts on scenic resources.

Conclusion

Overall, the preferred alternative would have a minor, positive impact on scenic resources. Also, potentially major long-term impacts from changes to river crossings would be avoided.

IMPACTS ON RECREATIONAL USE

Analysis

The primary goal of the preferred alternative with respect to boating recreation would be to preserve the existing diversity of surface water recreational experiences. Like the no-action alternative, overall boating use of the riverway would continue to grow slowly, if at all (existing use patterns show no clear increase in use since the mid-1980s). The diversity of boating op-

portunities would remain, with the exception of extremely high-speed boating activities. Boaters interested in that activity would be displaced to another resource. Impacts for each river segment are described below.

Backwaters from the Dalles of the St. Croix to north limits of Stillwater: 5 miles. The natural waters classification for this segment would be identical to the existing no-wake designation; the impact of the preferred alternative would be the same as the no-action alternative, which would be to maintain the quiet and little-used character of the recreational experience.

Dalles of the St. Croix to Rock Island: 3.5 miles. The quiet waters classification for this segment would be identical to the existing slow-speed zone designation. The impact of the preferred alternative would be the same as the no-action alternative, which would be to maintain the slow speeds, low noise levels, and the more social experience associated with relatively large numbers of canoers.

Rock Island to McLeod's Slough: 10 miles. The quiet waters classification for this segment would be identical to the existing slow-speed zone designation; the impact of the preferred alternative would be the same as the no-action alternative. Thus, recreational use would be similar to the preceding river segment, although less social interaction would likely occur below the landing at Osceola where many rental canoe trips would continue to end.

McLeod's Slough to Arcola Sandbar: 8.5 miles. The quiet waters classification for this segment would be identical to the

existing slow-speed zone designation; the impact of the preferred alternative would be the same as the no-action alternative. Opportunities would be maintained for a mixture of nonmotorized and slow-moving motorized craft.

Arcola Sandbar to north limits of

Stillwater: 5 miles. The moderate recreation classification for this segment would involve a speed limit and elimination of waterskiing. This is slightly different than the current rule, which involves no speed limit but a firm restriction on summer weekend waterskiing. Congestion in this narrow area has become a concern and the imposition of a speed limit would be considered a positive impact on congestion and shoreline erosion concerns.

Stillwater to Catfish Bar: 13.5 miles. The active social recreation classification for this segment would involve a speed limit; under the no-action alternative there would be no speed limit. The existing no-wake zones in the Hudson area would remain under the preferred alternative. There has been growing concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment. This would be eliminated under the preferred alternative, forcing boaters who want to travel at those speeds to use a different resource. The imposition of a speed limit in this area would be considered a minor positive impact on the environment.

Catfish Bar to Prescott: 11.5 miles. The active social recreation classification for this segment would involve a speed limit; under the no-action alternative there would be no speed limit. The no-wake zones in the Catfish Bar and Kinnickinnic State Park areas would remain under the prefer-

red alternative. There has been growing concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment; this would be eliminated under the preferred alternative, forcing boaters who want to travel at those speeds to use a different resource. The imposition of a speed limit in this area would be considered a minor positive impact on the environment.

Camping Experience. A camping management plan would be developed for boat-related camping north of Stillwater that would impose gradually increased restrictions on camping. This would result in fewer boat-in campsites than currently exist, enhancing privacy and reducing shoreline erosion and visual impacts from trampled vegetation and exposed soils. However the opportunity for more social camping would be reduced, which would displace some campers to another resource. At Hudson, campers without on-board toilets would be displaced. The outcome would be reduced shoreline erosion between the Arcola sandbar and Stillwater and reduced water quality problems there and at Hudson, but an increase in displaced recreational users.

Conclusion

Overall, the preferred alternative would provide minor, possibly negligible, positive impacts on recreational use. However, a few riverway users, those seeking to travel at high speeds and some island campers, would be displaced.

IMPACTS ON NATURAL RESOURCES

Water Quality

Analysis. Overall boating totals would not likely change under the preferred alternative, so water quality impacts from petroleum products or day-use boaters who don't use proper toilet facilities would be about the same as the no-action alternative. Additional restrictions on camping north of Stillwater and at Hudson would have a slight positive impact on water quality as compared to the no-action alternative. There would be a slight decrease in total residential development in areas not served by public sewer, leading to slightly less risk of water quality impacts from failed on-site waste treatment systems.

Possible bridge replacements could have short-term, adverse effects on water quality during construction, however, mitigation measures would likely minimize these impacts.

Conclusion. Water quality impacts from the discharge of motorboat petroleum products or day-use boaters who do not use proper toilet facilities would continue but would not likely increase because overall boating totals would not be expected to change. Additional restrictions on camping north of Stillwater and at Hudson would have a slight positive impact on water quality. Some short-term impacts also could occur during construction of bridge replacements.

From a riverwide perspective, it is expected that pollution due to the construction of development would be short term, while pollution due to users would be

transient and should have minor to negligible effects on pollutant levels.

Soils

Analysis. As under the no-action alternative, additional development could occur, including residential development in rural areas. Consequently, some soils would still be lost to development, although new soil disturbance would likely be reduced in the park, natural, and minimally disturbed management areas (43% of the lower riverway) where less development and more restrictive land use regulations would be employed.

Shoreline erosion caused by boat wakes would be similar to the no-action alternative. The imposition of speed limits from the Arcola sandbar south would have a negligible impact on shoreline erosion caused by boat wakes. The area between the Arcola sandbar and Stillwater is the focus of much concern about wake-induced shoreline erosion, and a moderate speed limit there would likely do little to alter current impacts.

Shoreline erosion, soil compaction, and the formation of social trails from campers would be slightly reduced, as compared to the no-action alternative, by limitations and overall reductions in camping north of Stillwater. Localized bluff erosion from foot trails would be about the same as the no-action alternative.

Only a few areas would be affected by bridge and utility line replacements during the life of this plan. It is expected that mitigation measures would keep impacts localized and minor to moderate in magnitude. (Additional environmental docu-

mentation, with mitigation measures, would be required before these crossings would be approved.) Because bridge and utility line replacements would only be permitted in existing corridors, additional soil disturbance would be limited to areas that likely have already been altered.

If the Army Corps of Engineers needed to do some dredging at the Kinnickinnic Narrows, this alternative would reduce the amount of dredged material that would need to be removed and disposed. If the dredged material could be reused for other purposes, soil in the riverway or nearby would not be altered by the disposal of the material. (The 1997 *Channel Maintenance Management Plan* directs that dredged material from the Kinnickinnic Narrows be placed on the delta at Kinnickinnic State park for beach nourishment.)

Conclusion. Under the preferred alternative shoreline and bluff erosion would continue from recreational use but would be less. This would have negligible to minor long-term positive impacts on soils in localized areas, particularly on riverbanks and the islands. Additional soil loss and disturbance would be expected from new development on some private lands. However, the land use management area allocation would be beneficial, minimizing potential soil disturbance and loss on a large portion of the riverway. From an overall riverway perspective, compared to current conditions, the preferred alternative would likely have a negligible to minor positive impact.

Vegetation

Analysis. Special protection would provide maintenance and restoration of

significant plant communities on federal and state lands and would encourage private and local government landowners to maintain and restore these communities. This beneficial effect would help maintain the riverway's diverse plant communities.

As in all of the action alternatives, the Wisconsin Department of Natural Resources would pursue a rule amendment that would allow landowners to harvest trees in a manner that would protect the scenic quality of the river. Many landowners might alter vegetative cover on their land, but with agency oversight it is expected to have a minor positive effect on the riverway's vegetation.

Application of the land use management areas along the riverway would have a positive effect on the riverway's vegetation. Some vegetation would still be lost to new development, but in the park, natural, and minimally disturbed management areas (43% of the riverway) less vegetation would be lost because of new development.

Bridge and utility line replacements would have a minor effect during the life of this plan. Because bridge and utility line replacements would only be permitted in existing corridors, little additional vegetation would be lost or disturbed. Mitigation measures are expected to localize and keep impacts minor to moderate in magnitude. New submarine crossings could disturb and alter vegetation near riverbanks where the transmission lines/pipelines go underground. (Additional environmental documentation, with mitigation measures, would be required before these crossings would be approved.)

If the Army Corps of Engineers needed to do some dredging at the Kinnickinnic Narrows, this alternative would reduce the amount of dredged material that would need to be removed and disposed. If the dredged material could be reused for other purposes, vegetation in the riverway or nearby would not be altered by the disposal of the dredged material.

Motorboat use on the lower St. Croix is believed to be affecting shoreline vegetation, with boat wakes damaging plants, exposing root systems, and undercutting trees. This impact would likely continue similar to the no-action alternative. The imposition of moderate speed limits from the Arcola sandbar south would likely have a negligible positive impact on shoreline erosion.

Users would continue to trample vegetation in localized areas when they picnic on the shoreline and islands and camp on the islands south of Stillwater (i.e., the Hudson islands). Some users probably would continue to damage trees, stripping bark from birch trees, cutting saplings, and pulling down branches for firewood. Disturbance of soils also would increase the likelihood of exotic plants like spotted knapweed and purple loosestrife becoming established. With overall use levels not expected to increase greatly on the lower riverway, alteration and loss of vegetation would likely continue similar to the no-action alternative.

On the other hand, limiting camping in areas north of Stillwater to certain zones, possibly to designated campsites, also should reduce the loss of vegetation and encourage native plants to become re-established (although even with efforts to

prevent this impact, some trampling of vegetation would likely still occur due to day users and campers).

Conclusion. The preferred alternative would have both negative and beneficial effects on the riverway's vegetation. Vegetative communities would continue to be altered and lost due to the activities of users and new developments in the riverway. If new bridge replacements and/or utility crossings were built, there could be some minor impacts on vegetation. On the other hand, the application of the management areas in this alternative would have a beneficial effect, helping prevent the loss or disturbance of vegetation on a large portion of the lower riverway. Efforts to maintain and restore significant plant communities on public and private lands would also have a positive effect. Restrictions on camping would reduce impacts to vegetation. From a riverwide perspective, most of the riverway's vegetation would not be affected by users, new developments, or the management agencies. However, compared to the no action alternative, the preferred alternative would be expected to have a negligible to minor, long-term, positive impact on the riverway's vegetation.

Fish and Wildlife

Analysis. Impacts on wildlife would be similar to the no-action alternative. Most of the lower riverway management actions in this alternative would continue to promote the protection of fish and wildlife populations and habitats. No actions would be taken that would adversely affect areas known to be of special importance for breeding, nesting, foraging, or wintering.

However, rural home development would create patches that disrupt the movement of some wildlife, especially those most sensitive to human activity. There would be slightly less new rural home development under the preferred alternative as compared to the no-action alternative, but the differences in terms of wildlife impacts would not be measurable, especially considering much of the rural home development that could occur in the riverway has already been built.

Many of the lower riverway's wildlife populations and habitats have already been affected in varying degrees by recreational users and nearby developments. Some individual animals might be disturbed or temporarily displaced by the sounds of motorboats and groups floating down the river, but this is not expected to substantially affect the lower riverway's fish and wildlife populations.

Conclusion. Impacts on fish and wildlife populations would be expected to be negligible to minor.

Threatened and Endangered Species

Analysis. Implementation of the preferred alternative would not significantly change the number of recreational boats using the river as compared to the no-action alternative. The potential for recreational impacts is not expected to change with the continued use of appropriate mitigation (e.g., keeping people away from bald eagle nests). Efforts to maintain and restore the diversity and ecological integrity of significant plant communities should help protect species like the Karner blue butterfly. Therefore, this alternative would not likely adversely affect threatened and endangered species (with the possible exception of certain mussel species). A slight reduction in new rural home development could decrease the potential for impacts to some threatened and endangered species.

Also, since this alternative would promote the maintenance and restoration of the natural diversity and ecological integrity of plant communities on federal and state lands and encourage private landowners to do likewise, species like the Karner blue butterfly could benefit.

There is the potential that the federally listed Higgins' eye and winged mapleleaf mussels could be adversely affected in the following ways: People could inadvertently introduce zebra mussels into the lower riverway; zebra mussels could be scraped off by boats in shallow waters or by beached boats; boats could increase shoreline erosion and sediments in the water (which could affect filter-feeding mussels); waders and swimmers could unknowingly collect mussels and use them for fishing or other purposes, and poachers could adversely affect the mussels. Although these activities have occurred, or

are occurring, on the lower St. Croix, it is not known what the effect, if any, has been on the Higgins' eye and winged mapleleaf mussel populations. Recreational uses are likely "taking" individual mussels, which might be adversely affecting these species. (Pers com, R. Ferrin, NPS and Dan Hornbach, Biology Dept., Macalester College, 11/5/98). The National Park Service consulted with the U.S. Fish and Wildlife Service regarding incidental take, which might be occurring either now or in the future.

Recommended changes on the navigation channel between Taylors Falls and the Arcola sandbar and at the Kinnickinnic Narrows would avoid potential impacts to mussels.

Measures to minimize impacts and recovery of mussels would include the following measures. Recovery of the winged mapleleaf mussel would include preservation of the sole known remnant population in the lower St. Croix River. Recovery of the Higgins' eye mussel would include preservation of the current populations and its essential habitat, which would include one site on the lower St. Croix near Hudson, Wisconsin and another essential habitat area in the river near Franconia. The cooperative management plan identifies the following goals, strategies, or actions in support of the protection and recovery of these species: protection and improvement of water quality, development of a public information/education program that includes mussels, development of means to improve mussel information/ coordination among various agencies, organizations, etc., continued enforcement of regulations prohibiting harvesting or taking of mus-

sels, and implementation of the zebra mussel action plan (see "Management Directions Common to All Alternatives" section). The managing agencies would also implement their respective components of the U.S. Fish and Wildlife Service's recovery plans for the winged mapleleaf mussel and the Higgins' eye mussel. These components address a wide variety of tasks, including actions to minimize human disturbance and destruction to the federally listed mussels, such as quantification of the magnitude of potential threats (harvesting, swimming, wading, digging, small recreational watercraft, and commercial paddlewheel watercraft) and identification of specific geographic locations of greatest concern; posting of educational signs; conducting educational programs; and review of paddleboat operations to minimize boat operation impacts.

Conclusion. The uses, user levels, and developments in the preferred alternative would not likely adversely affect most federal and state listed species in the lower riverway (with adequate surveys, consultation with the U.S. Fish and Wildlife Service and state biologists, and the application of appropriate mitigation measures). There are indications that recreational activities already may be adversely affecting the federally endangered Higgins' eye and winged mapleleaf mussel population on the lower St. Croix. Formal consultations with the U.S. Fish and Wildlife Service was undertaken to determine what actions need to be taken to ensure the conservation of these species and their biological opinion is included in appendix D.

IMPACTS ON CULTURAL RESOURCES

Analysis

As under the no-action alternative, riverway management would ensure the protection of all significant cultural resources. These resources would be at low risk of adverse impacts resulting from recreational use or neglect, and restrictions on new development within the riverway would minimize impacts. Land uses, including new development, would be managed to maintain the river's visual qualities and the historic character of the river communities.

The preferred alternative would require local governments in the river town and small town historic districts to develop ordinances protecting historic structures and requiring new development to be consistent with the historic character of those communities. As a result, the preferred alternative would result in minor improvements in protection of cultural resources.

The development of specific management direction for historic resources and cultural landscapes would depend on the completion of the List of Classified Structures and the Cultural Landscape Inventory. Determinations of significance for the riverway's cultural resources, including cultural landscapes, would help guide appropriate management decisions. Management would work cooperatively with the Minnesota and Wisconsin State Historic Preservation Offices, local officials, and private preservation groups in developing protection strategies for those cultural resources adjacent to the river but outside the boundaries of the riverway. Effective preserva-

tion partnerships would help minimize impacts from new development.

The managing agencies would work closely with the Minnesota and Wisconsin state historic preservation offices, American Indian interests, and private landowners in developing preservation strategies for any cultural resources that could be affected by future development.

Conclusion

Similar to the no-action alternative, restricted development and maintaining the riverway's visual qualities would minimize impacts on archeological and historic resources. Additionally, the preferred alternative would result in minor improvements in protection of cultural resources in the river town and small town historic districts.

IMPACTS ON SOCIOECONOMIC ENVIRONMENT

Local Economy

Analysis. This alternative does not call for large expenditures by the Park Service or the states for the development of infrastructure, so there would be little direct economic impact. Application of the land management areas would not result in greatly different restrictions on new development for most areas within the riverway. Placement of most of the new land management categories would be similar to the existing incorporated and unincorporated classifications. Exceptions to this would be areas designated as minimally disturbed and natural where increased restrictions would likely occur

(although development could still occur) and in towns where some restrictions would be reduced (but with historic structure protection). Consequently, limited additional negligible to minor impacts on the long-term property tax base of the local communities due to restrictions on new development would occur. Existing positive effects on local economy from expenditures from tourists and other recreationists would continue, but would not be appreciably changed by the preferred alternative.

Conclusion. Positive impacts to the local economy would be negligible to minor compared to the no-action alternative.

Tourism

Analysis. Tourism in the St. Croix Valley is partially linked to the area's historic character. In that context, the preferred alternative's emphasis on historic structure protection and enhancement of the historic character of valley communities would have a minor positive impact on tourism. Boating-related tourism would not change, so impacts would be negligible.

Conclusion. There would be some negligible to minor positive effects on tourism.

Land Values

Analysis. Land values would not be impacted by the preferred alternative. Local property values have probably been and would likely continue to be bene-

ficially affected by the presence of the riverway as under the no-action alternative.

Conclusion. There would be no new impacts on land values.

Landownership/Landowners

Analysis. The preferred alternative proposes a modest increase in scenic easement acquisition by the two states; National Park Service acquisition is essentially complete and would not change. As a result, the preferred alternative would have negligible impact on land ownership.

In general, the preferred alternative could affect some landowners in a manner that would have a minor to moderate impact when compared to the no action alternative. For instance, preserving the scenic character of the riverway might mean that some landowners within the riverway's boundary might be constrained when they wanted to make certain improvements to their property.

There would be a minor to moderate beneficial impact for local landowners in some areas of the riverway due to a reduction in conflicts with recreational users, particularly in popular camping areas north of Stillwater. Local landowners would also likely benefit from a reduction in the periodic loud noise generated by higher boat speeds and reduced shoreline effects from wave action.

Conclusion. There would be negligible impacts on landownership. Some landowners would benefit from reduced restrictions on property improvements, although there would be constraints on new development

to maintain historic character. Some landowners would be negatively affected by restrictions on new development or improvements in areas outside of towns. There would also be minor to moderate benefits to landowners from a reduction in conflicts and shoreline erosion associated with recreational use in some areas of the riverway.

CUMULATIVE EFFECTS

The entire viewshed of the riverway as seen from the river would not be encompassed within the riverway boundaries, therefore, visual encroachments outside the boundary have the potential to impact the scenic resources of the riverway. In the federal zone the high bluffs, the rural character, the predominance of protected areas along this section of the river, and the fact that the viewshed outside the boundary would be less than the state-administered zone would mean that the concerns would not be as great here as in the state-administered zone. In this zone more of the viewshed would be outside the riverway boundary, the area would have a series of benches visible from the river, there would be less high bluff areas, more of the area would be incorporated, and its proximity to the Minneapolis/St. Paul area would likely mean greater growth. For those areas within the viewshed, yet outside the riverway boundary, local zoning standards would be the primary methods of controlling scenic impacts on the riverway. Mitigating methodologies, such as the encouragement of the preservation and maintenance of mature vegetation, planting of additional vegetative buffering, the protection of cultural resources, and the prohibition of the construction of any more extremely visible towers within the

viewshed, would be beneficial to the preservation of the riverway's scenic quality. Actions taken outside the riverway boundary could have negligible to major impacts on the scenic resources of the riverway, depending on the magnitude of change. Therefore, the cumulative effects of NPS/state actions on the scenic quality of the viewshed would be negligibly to moderately beneficial, depending on the magnitude of changes to the scenic resources outside the riverway boundary.

Land use changes in the riverway and watershed have had a cumulative effect on the riverway's water quality, flows, soils, vegetation, and wildlife in localized areas. As the region's population continued to grow, new development would likely occur near the riverway and in the communities along the river. Further habitat fragmentation of the surrounding watershed landscape would likely continue.

The entire historical distribution of winged mapleleaf mussel has been significantly altered by human development in the Mississippi River basin, such as damming, dredging, channelization, agricultural application of fertilizers, pesticides, and herbicides, and municipal and industrial waste discharges. These developments are probably responsible for widespread and precipitous decline in mussel communities in general, and the extirpation or extinction of several species, although few studies have addressed directly the specific impact of any one of these factors.

Impacts from continued recreational use within the riverway and managing agency actions would contribute incrementally to impacts from the sources noted above. Overall, the land use management area allocation and special plant community

protection would be beneficial, preventing loss of natural resources on a large portion of the riverway. This would be a positive, minor cumulative impact within the riverway and watershed.

None of the management actions are expected to add substantively to the cumulative effects on cultural resources. Growth and land use changes could affect cultural resources adjacent to or within the watershed of the riverway. The cumulative effects of the management actions would help mitigate the effects of population growth and development.

Many communities and counties in Minnesota and Wisconsin are in the process of revising their comprehensive plans and related ordinances. Some of these revised plans and ordinances may include land use and development provisions applicable to the river corridor that would go beyond guidance provided in this document. Therefore, in some areas, cumulative impacts of land management measures may have negligible to moderate additional effects on certain property owners as compared to current conditions.

The economic and population growth in the region is expected to continue. The relatively small number of jobs and expenditures on management of the riverway would only have a minor effect on the expected growth of the total economy of the region. Therefore, there would be no appreciable socioeconomic cumulative impacts from the implementation of this alternative occurring in conjunction with the region's expected overall population and economic growth.

RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed management area allocation, restrictions on island, shoreline, and boating use, along with the proposed inventory, monitoring, and research programs for the riverway would contribute to the long-term protection and preservation of resources and scenic character of the landscape. The maintenance and restoration of plant communities would also enhance long-term productivity of natural communities.

UNAVOIDABLE ADVERSE EFFECTS

Some minor adverse impacts to natural resources would occur. An adverse effect on some users, such as those seeking to boat at high speeds and some island campers, would also occur. To meet the scenic and resource protection purposes of the riverway, development restrictions on local landowners would be implemented. To meet the recreational purposes of the riverway, some conflicts between local landowners and recreational users would continue.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Some new residential and commercial development would likely continue to occur on private lands within the riverway boundary, particularly in the existing municipalities. Potentially, new river crossings might also occur. It is expected

that this new development would result in the long-term localized loss of vegetation, soils, and wildlife habitat.

Any action that led to the loss of individual federally listed mussel species or their habitat would contribute to the loss of the species as an ecological and genetic resource. It is possible that the preferred

alternative would contribute to their decline. However, it is expected that the implementation of actions outlined in the recovery plans for these species would avoid this situation and contribute to their conservation.

IMPACTS OF ALTERNATIVE A

IMPACTS ON SCENIC RESOURCES

Analysis

Scenic resources in the riverway are protected primarily through land acquisition or through regulatory controls on land development. No significant land acquisition would occur in implementing alternative A. The establishment of seven land management categories compared to two under the existing management program would provide additional scenic resource protection in rural areas, with slightly less protection within municipalities (where scenic values have already been heavily altered), as compared to the no-action alternative. Also under this alternative, the riverway managing agencies would require local governments to protect the historic character of municipalities, which would reduce potential impacts to scenic values in municipalities from new development. The no-action alternative would take no such special actions. Alternative A differs from the preferred alternative in that a greater portion of the riverway would be included in the river town, small town, and small town historic districts, essentially reducing scenic resource protection when considering the riverway as a whole.

The following analysis evaluates scenic impacts created by the application of the seven land management areas on each river segment.

The Dalles of the St. Croix to Rock Island: 3.5 miles. Scenic resources within the two state parks in this river segment would continue to be protected by state

ownership (as they would be under the no-action alternative). No impact to scenic resources would occur because any future development would occur at existing development nodes, and scenic and relatively undisturbed natural areas would be maintained. Private lands in Minnesota in the southern portion of this segment would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would be less visible from the river. Consequently, they would have less impact on scenic resources than the no-action alternative.

Osceola Area (Rock Island to McLeod Slough): 10 miles. Osceola itself is classified as small town historic, which affords about the same level of scenic protection as the existing urban standard, which does not preclude new development visible from the river but limits the development's visibility and visual impacts. However, protection of historic character would be required, further reducing potential scenic impacts. An area just north of Osceola would be classified as small town, providing for community growth along the riverway but allowing development that has more scenic impact than the existing rural classification. Most of this segment would be classified as natural, however, and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would be less visible from the river. Consequently, they would have

less impact on scenic resources than the no-action alternative.

Marine Area (McLeod Slough to Arcola Sandbar via Page’s Slough): 8.5 miles.

Marine on St. Croix itself is classified mostly as small town historic, which affords about the same level of scenic protection as the existing urban standard, but with additional protection of historic character. William O’Brien State Park would receive the same high level of scenic resource protection as compared to the no-action alternative. Most of the remainder of this segment in Minnesota would be classified as rural residential, which affords a level of protection similar to the no-action alternative, which further limits visibility of development and maintains the rural character in unincorporated areas. The Wisconsin side of the river would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would be less visible from the river. Consequently, they would have less impact on scenic resources than the no-action alternative.

Rice Lake Flats (Dead Man’s Slough to Arcola Sandbar via St. Croix Islands Wildlife Area): 2.5 miles.

St. Croix Islands Wildlife Area is owned by Wisconsin DNR and would receive the same high level of scenic resource protection as compared to the no-action alternative, which would maintain the undisturbed natural appearance. The remainder of this segment would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer

new structures and those structures would be less visible from the river. Consequently, they would have less impact on scenic resources than the no-action alternative.

Arcola Gorge (Arcola Sandbar to Head of Lake St. Croix): 5 miles.

The Minnesota side of the river in this segment would be classified as rural residential, which affords a level of protection very similar to the no-action alternative. The Wisconsin side of the river would be classified partly as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would be less visible from the river. Consequently, they would have less impact on scenic resources than the no-action alternative. About the southern half of this segment in Wisconsin would be classified as rural residential, which affords a level of protection similar to the no-action alternative.

Urban Stillwater (Head of Lake St. Croix to Stillwater Downtown Courtesy Docks): 2 miles.

The northern portion of this segment in Minnesota is not intensively developed; it would be classified as small town with the result that its level of scenic protection would be similar to the current urban classification. The central portion of this segment includes a relatively undeveloped area north of downtown Stillwater; it would be classified as river town, which provides slightly less scenic protection than the current urban classification and would accommodate downtown growth, while reducing scenic protection. The southern portion of this segment includes the heavily developed downtown Stillwater area; it would be classified as river town, which provides

slightly less scenic protection than the current urban classification. Considering the heavily developed nature of the area, however, impacts on scenic resources would be negligible. In addition, alternative A would require protection of historic character that would reduce potential scenic impacts.

The Wisconsin side would be classified partly as rural residential, which would afford a level of protection similar to the no-action alternative, and partly as small town, which would provide significantly less scenic protection than the rural classification in the no-action alternative.

South Stillwater-Bayport Area (Stillwater Downtown Courtesy Docks to Andersen Point): 3 miles. Most of this segment in Minnesota would be classified as river town, which would provide slightly less scenic protection than the current urban classification. Considering the heavily developed nature of the area, however, impacts on scenic resources would be negligible. In addition, alternative A would require protection of historic character that would reduce potential scenic impacts. The Andersen Point area would be classified as small town, with the result that its level of scenic protection would be similar to the current urban classification. The Wisconsin side would be classified as rural residential, which would afford a level of protection similar to the no-action alternative.

Bayport-North Hudson Area (Andersen Point to Willow River Dam): 2 miles. In Minnesota, this area would be classified as small town, with a level of scenic protection similar to the current urban classification in a part of the area, but significantly

less than the southern portion of this segment, which is classified as rural residential under the no-action alternative. Most of the Wisconsin side would be classified as rural residential, which would afford a level of protection similar to the no-action alternative. The southern portion of this segment in Wisconsin lies in North Hudson and would be classified as small town, with a level of scenic protection similar to the current urban classification.

Urban Hudson (Willow River Dam to Interstate 94): 2 miles. The Minnesota side in this segment would be classified as small town, with the result that its level of scenic protection would be similar to the current urban classification. The Wisconsin side would be classified as river town, which would provide slightly less scenic protection than the current urban classification. Considering the heavily developed nature of the area, however, impacts on scenic resources would be negligible. In addition, alternative A would require protection of historic character that would reduce potential scenic impacts.

Open Lake (Interstate 94 to Catfish Bar): 4.5 miles. The Minnesota side in this segment would be classified as small town, with the result that its level of scenic protection would be similar to the current urban classification. The southern portion of Hudson would also be classified as small town as would the St. Croix Cove area, which would be rural under the no-action alternative. The level of scenic resource protection in the St. Croix Cove area would be reduced. The remainder of this segment in Wisconsin would be classified as rural residential, which affords a level of protection similar to the no-action alternative.

Catfish to Kinnickinnic (Catfish Bar to Kinnickinnic Narrows): 5 miles. In Minnesota the old Afton village area would be classified as small town historic, with the result that its level of scenic protection would be similar to the current urban classification, but with additional protection of historic character. The southern portion of Afton and the area south of Afton State Park, as well as all of the Wisconsin side, would be classified as rural residential, which affords a level of protection similar to the no-action alternative. Afton State Park would receive the same high level of scenic resource protection as compared to the no-action alternative.

Kinnickinnic Narrows: 0.5 miles. The Minnesota side of the river in this segment would be classified as rural residential, which affords a level of protection similar to the no-action alternative. Kinnickinnic State Park in Wisconsin would receive the same high level of scenic resource protection as compared to the no-action alternative.

Kinnickinnic to Prescott (Kinnickinnic Narrows to Mississippi Confluence at Prescott): 6 miles. Much of the Minnesota side of the river in this segment would be classified as rural residential, which affords a level of protection very similar to the no-action alternative. St. Croix Bluffs Regional Park would receive the same high level of scenic resource protection as provided under the no-action alternative. Carpenter Nature Center would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. In Wisconsin, most of the area north of Prescott would be classified as rural residential, which affords a level of protection similar

to the no-action alternative. An area north of Prescott would be classified as small town to allow urban growth; this would result in significantly less scenic resource protection for that area than the current rural classification. Prescott would be classified as river town, which provides slightly less scenic protection than the current urban classification. Considering the heavily developed nature of the area, however, impacts on scenic resources would be negligible.

Provisions for vegetative management would be similar to the preferred alternative, except there would be no emphasis on voluntary actions or efforts to restore the natural diversity or ecological integrity of significant plant communities on private or state or local government lands. Also under this alternative more development could be expected; therefore, more plant communities would likely be affected. These actions would have an adverse impact on visual resources because there would be less of the natural mosaic of vegetation that is indigenous to the riverway. These impacts would be minor to moderate (depending on the amount of development) and long term because it could take years to restore vegetative patterns.

An amendment to the Wisconsin-managed forest law (Chapter NR 118) would be pursued, which would result in a long-term, minor, beneficial impact for the scenic resources of the riverway by providing landowners with more flexibility to preserve these resources.

Continued adherence to NPS policies that perpetuate native plant communities would result in a long-term, minor, beneficial impact to the scenic resources.

Alternative A would restrict the overall number and encourage multiple uses of existing river crossing corridors and structures. However, because this alternative allows for changes in the scale and character of or the relocation of road and railroad bridges, utility lines, and submarine lines, there could be negligible to major impacts on the scenic resources of the riverway, depending on the magnitude of the change. Allowance of new additional submarine crossings could result in minor to negligible adverse impacts on scenic resources in the immediate vicinity depending on the extent and duration of ground disturbance and vegetation removal during installation. By prohibiting clear-cutting for inspections of pipeline rights-of-way, there would be minor beneficial impacts to scenic resources.

Conclusion

Overall, alternative A would have a minor, negative impact on scenic resources compared to the no-action alternative. Also, potentially major long-term impacts from changes to river crossings could still occur.

IMPACTS ON RECREATIONAL USE

Analysis

Alternative A would allow recreational boating use levels to increase as long as resource impacts and safety concerns did not reach unacceptable levels. This increased use could alter the recreational experience, such as creating more crowded conditions at peak use times. Providing for a larger number of users would take

precedence over maintaining a variety of recreational opportunities. The existing diversity of boating opportunities would be reduced somewhat. Some boaters would be displaced to other resources. These impacts are evaluated for the following river segments.

Backwaters from the Dalles of the St. Croix to William O'Brien State Park: 16 miles. The natural classification for this segment would be identical to the existing no-wake designation; the impact of alternative A would be the same as the no-action alternative, which would be to maintain the quiet and little-used character of the recreational experience.

Backwaters from William O'Brien State Park to Arcola Sandbar: 6 miles. The natural classification for this segment would be identical to the existing no-wake designation; the impact of alternative A would be the same as the no-action alternative, which would be to maintain the quiet and little-used character of the recreational experience.

Backwaters from Arcola Sandbar to north limits of Stillwater: 5 miles. The quiet waters classification for this segment would permit slow-speed boating, compared to the existing no-wake designation; the impact of alternative A would be to allow moderately faster boating than the no-action alternative.

Dalles of the St. Croix to Rock Island: 3.5 miles. The quiet waters classification for this segment would be identical to the existing slow speed zone designation. The impact of alternative A would be the same as the no-action alternative, which would be to maintain the slow speeds, low noise

levels, and the more social experience associated with relatively large numbers of canoers.

Rock Island to McLeod's Slough: 10 miles. The quiet waters classification for this segment would be identical to the existing slow-speed zone designation; the impact of alternative A would be the same as the no-action alternative. Thus, recreational use would be similar to the preceding river segment, although less social interaction would likely occur below the landing at Osceola where many rental canoe trips would continue to end.

McLeod's Slough to Arcola Sandbar: 8.5 miles. The quiet waters classification for this segment would be identical to the existing slow speed zone designation; the impact of alternative A would be the same as the no-action alternative. Opportunities would be maintained for a mixture of nonmotorized and slow-moving motorized craft.

Arcola Sandbar to north limits of Stillwater: 5 miles. The active social recreation classification for this segment would be similar to the current rule for this segment, which involves no speed limit but a restriction on summer weekend waterskiing. Congestion which has become a concern in this narrow area would likely continue.

Stillwater to Catfish Bar: 13.5 miles. The active social recreation classification for this segment would allow extremely high-speed boating to continue, although speed limits might be set in certain areas. The existing no-wake zones in the Hudson area would remain under alternative A.

The concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment would continue.

Catfish Bar to Prescott: 11.5 miles. The active social recreation classification for this segment would allow extremely high-speed boating to continue, although speed limits might be set in certain areas. The existing no-wake zones in the Catfish Bar and Kinnickinnic State Park areas would remain under alternative A. The concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment would continue.

Camping Experience. Camping would continue to be allowed with little or no restriction in the same way as the no-action alternative.

Conclusion

Overall, alternative A would be similar to the no-action alternative. Congestion problems would likely continue, primarily in the narrow section of river between Arcola sandbar and Stillwater, in the Hudson Narrows, and the Prescott Narrows. Extremely high-speed boating would continue, and associated safety and noise concerns would therefore continue. Increased use could alter the recreational experience, such as creating more crowded conditions at peak use times.

IMPACTS ON NATURAL RESOURCES

Water Quality

Analysis. Overall boating totals are expected to increase under alternative A, so water quality impacts from petroleum products or day-use boaters who do not use proper toilet facilities would increase slightly as compared to the no-action alternative. Unrestricted camping north of Stillwater and at Hudson would have a slight negative impact on water quality as compared to the no-action alternative. There would be a modest increase in total residential development in areas not served by public sewer, leading to slightly greater risk of water quality impacts from failed on-site waste treatment systems.

Under alternative A there could be some bridge relocations. These projects could have short-term, adverse effects on water quality, such as increased sedimentation due to the installation of new bridge piers, although mitigation measures would likely minimize the impacts. (More detailed environmental documents would be prepared before these projects would be approved.)

Conclusion. With increased use levels, the potential for pollution due to user activities would increase as compared to the no-action alternative. There could be localized increases in impacts to water quality in heavily used areas where users are picnicking, camping, and boating, particularly near the islands. Some short-term impacts also could occur if bridges were relocated.

From a riverwide perspective, it is expected that pollution caused by potential devel-

opments would be short term. Pollution created by increased use would be transient and should have minimal effects on nutrient loads and on pollutant levels. Compared to current conditions, alternative A would be expected to result in a negligible to minor, long-term negative impact on the riverway's overall water quality.

Soils

Analysis. As under the no-action alternative, additional development could occur, including residential development in rural areas. Consequently, some soils would still be lost to development, although new soil disturbance would likely be reduced in the park and natural management areas (42% of the lower riverway) where less development and more restrictive land use regulations would be employed.

With increasing boating use, shoreline erosion caused by boat wakes would be slightly increased as compared to the no-action alternative. The area between the Arcola sandbar and Stillwater would continue to be the focus of much concern about wake-induced shoreline erosion.

Shoreline erosion, soil compaction, and the formation of social trails from campers would also slightly increase, as compared to the no-action alternative, due to relatively unrestricted camping outside the two prohibited camping areas. Bluff erosion from foot trails would be about the same as the no-action alternative.

Some bridge relocations could occur. Any bridge relocations would disturb additional soils along the riverbanks. However, with mitigation measures, it is expected that

impacts from these developments would be localized and minor to moderate in magnitude. (As indicated under the preferred alternative, additional environmental documentation, with mitigation measures, would be required before these crossings would be approved.)

If the Army Corps of Engineers needed to do some dredging at the Kinnickinnic Narrows, this alternative would reduce the amount of dredged material that would need to be removed and disposed. If the dredged material could be reused for other purposes, soil in the riverway or nearby would not be altered by the disposal of the material. (The 1997 *Channel Maintenance Management Plan* directs that dredged material from the Kinnickinnic Narrows be placed on the delta at Kinnickinnic State park for beach nourishment.)

Conclusion. Under alternative A, shoreline erosion would continue or accelerate as river use increased. This would have minor, additional negative, long-term impacts on soils in localized areas on riverbanks and the islands. There would also be the potential for soil loss and disturbance due to new developments on private lands and from bridge relocations. From an overall perspective, compared to current conditions, alternative A probably would have a long-term, minor, negative impact on the soils in the lower riverway.

Vegetation

Analysis. Alternative A would share many of the same beneficial and negative impacts described under the preferred alternative. The alternatives would have the same beneficial effects in minimizing the loss of vegetation due to new develop-

ment in the park and natural zones (42% of the riverway in alternative A); however, more vegetation could be lost due to new development in some other areas in alternative A, particularly adjacent to the municipalities. Both alternatives would have a minor positive effect on plant communities if the Wisconsin Department of Natural Resources proposed amendment to the state land use standards within the riverway was adopted. If dredging occurred between Stillwater and Prescott, alternative A would reduce the amount of vegetation that would be lost due to the deposition of dredged material.

Under alternative A bridge and utility line relocations would result in the loss or alteration of vegetation in localized areas. With mitigation measures, it is expected that these impacts would be minor to moderate in magnitude.

Alternative A would have the same type of impacts as the preferred alternative due to motorboat use and use of the shoreline and islands, but the impacts would likely be greater in alternative A due to increased user numbers. With increased motorboat use, boat wakes would continue or accelerate damage to plants along the shoreline and islands, particularly in heavily used stretches and/or stretches where boats are going at higher speeds.

In addition, more users would adversely affect vegetation in areas where they picnic and camp on the shoreline and islands, with vegetation being trampled, harvested, and cut for firewood. Disturbance of soils also would increase the likelihood of exotic plants like spotted knapweed and purple loosestrife becoming established. With use expected to increase on the lower riverway, and only limited restrictions on

the use of most islands and shoreline, vegetation in more areas would likely be altered or lost.

Conclusion. Alternative A would have both negative and beneficial effects on the riverway's vegetation. Vegetative communities would continue to be altered and lost due to the activities of users and new developments in the riverway. With increased use levels, this impact would be expected to increase and more areas would be affected, particularly in heavily used areas on the islands and the shoreline, resulting in increases in localized, long-term impacts. Some minor to moderate vegetation loss also would occur if bridges and utility lines were relocated and/or submarine crossings were built. On the other hand, the land use management area allocation would have a beneficial effect, helping ensure the protection of vegetation on a large portion of the lower riverway. Efforts to maintain significant plant communities also would have a positive effect on the riverway vegetation. From an overall perspective, most of the riverway's vegetation would not be affected by users, new developments, or the management agencies. However, with increased use levels and new developments vegetation still would be lost or altered. Compared to the current situation, alternative A would be expected to result in an overall minor, long-term, adverse impact on the riverway's vegetation.

Fish and Wildlife

Analysis. Impacts on wildlife would not be significantly different for alternative A than the no-action alternative. Most of the

lower riverway management actions in this alternative would continue to promote the protection of fish and wildlife populations and habitats. No actions would be taken that would adversely affect areas known to be of special importance for breeding, nesting, foraging, or wintering.

However, rural home development creates patches that disrupt the movement of some wildlife, especially those most sensitive to human activity. There would be slightly more new rural home development under Alternative A as compared to the no-action alternative, but the differences in terms of wildlife impacts are likely not measurable, especially considering much of the rural home development that could occur in the riverway has already been built.

Many of the lower riverway's wildlife populations and habitats have already been affected in varying degrees by recreational users and nearby developments. Some individual animals might be disturbed or temporarily displaced by the sounds of more motorboats and groups floating down the river, but this is not expected to substantially affect the lower riverway's fish and wildlife populations. Fishing would increase because of expanded use, but with careful monitoring and enforcement of the states' regulations, there should be no adverse effects on the fisheries.

Conclusion. Impacts on fish and wildlife populations would be expected to be negligible to minor.

Threatened and Endangered Species

Analysis. Implementation of alternative A would allow an increase in the number of recreational boats using the river as compared to the no-action alternative, so the potential to impact threatened and endangered species could increase slightly. It is not anticipated that increased use levels under alternative A would result in adverse impacts on listed species or their habitats with the continued use of appropriate mitigation. A slight increase in new rural home development could also increase the potential for impacts on some threatened and endangered species.

The potential adverse effects on the federally listed Higgins' eye and winged mapleleaf mussels would be the same as described under the preferred alternative. Although these activities have occurred or might be occurring on the lower St. Croix, the effects on the Higgins' eye and winged mapleleaf mussel populations are unknown — recreational uses are likely "taking" individual mussels, which could be adversely affecting these species. Additional use might or might not exacerbate this possible impact.

The following goals, strategies, or actions would support the protection and recovery of these species: protection and improvement of water quality, development of a public information/education program that includes mussels, development of means to improve mussel information/coordination among various agencies, organizations, etc., continued enforcement of regulations prohibiting harvesting or taking of mussels, and implementation of the zebra mussel action plan (see "Management Directions Common to All Alternatives"

section). The managing agencies would also implement their respective components of the U.S. Fish and Wildlife's recovery plans for the winged mapleleaf mussel and the Higgins' eye mussel. These components address a wide variety of tasks, including actions to minimize human disturbance and destruction to the federally listed mussels, such as quantification of the magnitude of potential treats (harvesting, swimming, wading, digging, small recreational watercraft, and commercial paddlewheel watercraft) and identification of specific geographic locations of greatest concern; posting of educational signs; conduction of educational programs; and review of paddleboat operations to minimize boat operation impacts.

Conclusion. The uses, use levels, and developments under alternative A would not likely adversely affect most federal and state listed species in the lower riverway (with adequate surveys, consultation with the U.S. Fish and Wildlife Service and state biologists, and the application of appropriate mitigation measures). Recreational activities already might be adversely affecting the federally endangered Higgins' eye and winged mapleleaf mussel populations on the lower St. Croix. Increased use levels near Hudson and in the Interstate Park area (where the mussels primarily occur) would be expected in the future, which might increase the potential for impacts. Formal consultations need to be initiated with the U.S. Fish and Wildlife Service to determine what actions need to be taken to ensure the conservation of these species.

IMPACTS ON CULTURAL RESOURCES

Analysis

The impacts on cultural resources under this alternative would be similar to those under the preferred alternative. Limited new development could be built within existing towns and communities. As in the preferred alternative, municipal governments would be encouraged to preserve the historic character of their communities by adopting and enforcing historic preservation ordinances and architectural standards that would require new development to be compatible with the design elements of the historic community. Management would work to maintain visual characteristics, thus helping to ensure the preservation of any significant historic structures identified as eligible for listing on the National Register of Historic Places.

Limited new development would be allowed outside the municipalities in relatively undeveloped rural portions of the riverway. Some of this new development might be visible from the riverway, which could pose potential impacts on cultural landscapes. However, new development would be consistent with the riverway's rural and natural character. The completion of the cultural landscape inventory would help ensure that new development in outlying areas was appropriate and consistent with the riverway's rural and natural character, thereby minimizing impacts on significant cultural or historic landscapes. Archeological resources could be at a slightly higher risk as a result of new development in previously undeveloped areas.

Conclusion

The impacts on cultural resources under this alternative would be similar to those under the preferred alternative. Limited development would be allowed outside municipalities in relatively undeveloped rural portions of the riverway. Municipal governments would be encouraged to preserve the historic character of their communities by adopting and enforcing historic preservation and architectural standards that would require new development to be compatible with the design elements of the historic community. Archeological resources may be at a slightly higher risk because of new development in previously undeveloped areas.

IMPACTS ON SOCIOECONOMIC ENVIRONMENT

Local Economy

Analysis. This alternative does not call for large expenditures by the Park Service or the states for the development of infrastructure, so there would be little direct economic impact. Existing positive effects on local economy from expenditures from tourists and other recreationists would continue. Increased riverway use would result in more people accessing the riverway and perhaps encourage additional commercial activity along the riverway. Alternative A would also allow some growth in urban areas, with the conversion of some existing rural landscapes. Consequently, limited additional impacts on the long-term property tax base of the local

communities due to the increased potential for new development would occur.

Conclusion. Positive impacts to the local economy would be negligible to minor compared to the no-action alternative.

Tourism

Analysis. Tourism in the St. Croix Valley is partially linked to the area's historic character. In that context, alternative A's emphasis on historic structure protection and enhancement of the historic character of valley communities would have a minor positive impact on tourism. Boating-related tourism would increase slightly.

Conclusion. There would be some minor positive effects on tourism.

Land Values

Analysis. Land values would not be impacted by the alternative A. Local property values have probably been and would likely continue to be beneficially affected by the presence of the riverway as described under the no-action alternative.

Conclusion. There would be no new impacts on land values.

Landownership/Landowners

Analysis. Alternative A proposes a modest increase in scenic easement acquisition by the two states; National Park Service acquisition is essentially complete and would not change. As a result, this alterna-

tive would have negligible impact on landownership.

In general, alternative A could affect some landowners in a manner that would have a minor to moderate impact when compared to the no-action alternative. For instance, preserving the scenic character of the riverway might mean that some landowners within the riverway's boundary might be constrained when they wanted to make certain improvements to their property. However, expansion of urban areas would allow some landowners more flexibility in developing their property.

Conclusion. There would be negligible impacts on landownership. Some landowners would benefit from reduced restrictions on property improvements in and near towns, although there would be constraints on new development to maintain historic character. Some landowners would be negatively affected by restrictions on new development or improvements in some areas outside of towns. There would also be minor to moderate benefits to landowners from a reduction in conflicts and shoreline erosion associated with recreational use in some areas of the riverway.

CUMULATIVE EFFECTS

The entire viewshed of the riverway as seen from the river would not be encompassed within the riverway boundaries, therefore, visual encroachments outside the boundary have the potential to impact the scenic resources of the riverway. In the federal zone, the high bluffs, rural character, predominance of protected areas along this section of the river, the primarily

unincorporated zoning, and the fact that the viewshed outside the boundary would be less than the state-administered zone would mean that the concerns would not be as great here as in the state-administered zone. In this zone more of the viewshed would be outside the riverway boundary, the area would have a series of benches visible from the river, there would be less high bluff areas, more of the area would be incorporated, and its proximity to the Minneapolis/St. Paul area would likely mean greater growth. For those areas within the viewshed, yet outside the riverway boundary, local zoning standards would be the primary methods of controlling scenic impacts to the riverway. Mitigating methodologies such as the encouragement of the preservation and maintenance of mature vegetation, planting of additional vegetative buffering, the protection of cultural resources, and the prohibition of the construction of any more extremely visible towers within the viewshed would be beneficial to the preservation of the riverway's scenic quality. Actions taken outside the riverway boundary could have negligible to major impacts on the scenic resources of the riverway, depending on the magnitude of change. Therefore, the cumulative effects of NPS/state actions on the scenic quality of the viewshed would be negligibly to moderately beneficial, depending on the magnitude of changes to the scenic resources outside the riverway boundary.

Impacts from increased recreational use within the riverway and managing agency actions would contribute incrementally to impacts from land use changes and population growth in the watershed and larger region. Overall, the land use management

allocation would contribute to a minor positive cumulative impact within the riverway and watershed.

None of the management actions are expected to add substantively to the cumulative effects on cultural resources. Growth and land use changes could affect cultural resources adjacent to or within the viewshed of the riverway. The cumulative effects of the management actions would help mitigate the effects of population growth and development.

Many communities and counties in Minnesota and Wisconsin are in the process of revising their comprehensive plans and related ordinances. Some of these revised plans and ordinances might include land use and development provisions applicable to the river corridor that would go beyond guidance provided in this document. Therefore, in some areas, cumulative impacts of land management measures might have negligible to moderate additional effects on certain property owners as compared to current conditions.

The economic and population growth in the region is expected to continue. The relatively small number of jobs and expenditures on management of the riverway would only have a minor effect on the expected growth of the total economy of the region. Therefore, there would be no appreciable socioeconomic cumulative impacts from implementation of this alternative occurring in conjunction with the region's expected overall population and economy of the region.

RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed management area allocation, restrictions on island, shoreline, and boating use, along with the proposed inventory, monitoring, and research programs for the riverway, would contribute to the long-term protection and preservation of resources and scenic character of the landscape. Maintenance of plant communities would also enhance long-term productivity of natural communities.

UNAVOIDABLE ADVERSE EFFECTS

Some minor adverse impacts to natural resources would occur. This alternative, would place the fewest restrictions on recreational use. In order to meet the scenic and resource protection purposes of the riverway development, restrictions on local landowners would implemented. To meet the recreational purposes of the riverway, some conflicts between local landowners

and recreational users would continue and likely increase.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Some new residential and commercial development would likely continue on private lands within the riverway boundary. Potentially, new river crossings might also occur. It is expected that this new development would result in the long-term localized loss of vegetation, soils, and wildlife habitat.

Any action that led to the loss of individual, federally listed mussel species or their habitat would contribute to the loss of the species as an ecological and genetic resource. It is possible that this alternative would contribute to their decline. However, it is expected that the implementation of actions outlined in the recovery plans for these species would avoid this situation and contribute to their conservation.

IMPACTS OF ALTERNATIVE B

IMPACTS ON SCENIC RESOURCES

Analysis

Scenic resources in the riverway are protected primarily through land acquisition or through regulatory controls on land development. No significant land acquisition would occur in implementing alternative B. The establishment of seven land management categories compared to two under the existing management program would provide additional scenic resource protection, as compared to the no-action alternative. However, under this alternative, more restrictions would be imposed to avoid additional rural development that would be visible from the river. The riverway managing agencies would also require local governments to protect the historic character of municipalities, which would reduce potential impacts to scenic values in municipalities from new development.

The following analysis evaluates scenic impact associated with the application of the land management areas on each river segment.

The Dalles of the St. Croix to Rock Island: 3.5 miles. Scenic resources within the two state parks in this river segment would continue to be protected by state ownership (as they would be under the no-action alternative). No impact to scenic resources would occur because any future development would occur at existing development nodes, and scenic and relatively undisturbed natural areas would be maintained. Private lands in Minnesota

in the southern portion of this segment would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources.

Osceola Area (Rock Island to McLeod Slough): 10 miles. Osceola itself is classified as small town that would afford an increased level of scenic protection compared to the existing urban standard to minimize new development visible from the river. Most of this segment would be classified as natural, however, and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources.

Marine Area (McLeod Slough to Arcola Sandbar via Page's Slough): 8.5 miles.

Marine on St. Croix itself is classified as small town historic, which would afford an increased level of scenic protection compared to the existing urban standard. Additional restrictions would be placed on development to minimize new development visible from the river and also to protect historic character. William O'Brien State Park would receive the same high level of scenic resource protection as

compared to the no-action alternative. Most of the remainder of this segment in Minnesota would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative. The Wisconsin side of the river would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources.

Rice Lake Flats (Dead Man's Slough to Arcola Sandbar via St. Croix Islands Wildlife Area): 2.5 miles. St. Croix Islands Wildlife Area is owned by Wisconsin DNR and would receive the same high level of scenic resource protection as compared to the no-action alternative, which would maintain the undisturbed natural appearance. The remainder of this segment would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources.

Arcola Gorge (Arcola Sandbar to Head of Lake St. Croix): 5 miles. The Minnesota side of the river in this segment would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative. The Wisconsin side of the river would mostly be classified as natural and would receive increased protection

as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources. A small portion of the southern part of this segment in Wisconsin would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative.

Urban Stillwater (Head of Lake St. Croix to Stillwater Downtown Courtesy Docks): 2 miles. The northern portion of this segment in Minnesota is not intensively developed; it would be classified as small town with the result that its level of scenic protection would be increased compared to the current urban classification. The southern portion of this segment includes the heavily developed downtown Stillwater area; it would be classified as river town, and additional restrictions would be placed on development to minimize new development visible from the river and also to protect historic character. This would provide slightly more scenic protection than the current urban classification, which would reduce potential scenic impacts.

The Wisconsin side would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative.

South Stillwater-Bayport Area (Stillwater Downtown Courtesy Docks to Andersen Point): 3 miles. Most of this segment in Minnesota would be classified as river town, and additional restrictions

would be placed on development to minimize new development visible from the river and also to protect historic character. This would provide slightly more scenic protection than the current urban classification, which would reduce potential scenic impacts. The Andersen Point area would be classified as small town, with its level of scenic protection increased compared to the current urban classification. The Wisconsin side would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative.

Bayport-North Hudson Area (Andersen Point to Willow River Dam): 2 miles. In Minnesota, the area between Andersen Point and the south limits of Bayport would be classified as small town, with the result that its level of scenic protection would be increased compared to the current urban classification. The southern portion of this segment in Minnesota would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative. Most of the Wisconsin side would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative. The southern portion of this segment in Wisconsin lies in North Hudson and would be classified as small town, with the result that its level of scenic protection would be increased compared to the current urban classification.

Urban Hudson (Willow River Dam to Interstate 94): 2 miles. The Minnesota side in this segment would be primarily classified as small town, with its level of

scenic protection increased compared to the current urban classification. The Wisconsin side would be classified as river town, and additional restrictions would be placed on development to minimize new development visible from the river and also to protect historic character. This would provide slightly more scenic protection than the current urban classification, which would reduce potential scenic impacts.

Open Lake (Interstate 94 to Catfish Bar): 4.5 miles. The Minnesota side in this segment would be classified as small town, with the result that its level of scenic protection would be increased compared to the current urban classification. The southern portion of Hudson would also be classified as small town. The remainder of this segment in Wisconsin would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative.

Catfish to Kinnickinnic (Catfish Bar to Kinnickinnic Narrows): 5 miles. In Minnesota, the old Afton village area would be classified as small town historic, with its level of scenic protection increased compared to the current urban classification, with additional restrictions on development to minimize new development visible from the river and also to protect historic character. The southern portion of Afton and the area south of Afton State Park, as well as all of the Wisconsin side, would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative. Afton State Park would receive the same high level of

scenic resource protection as compared to the no-action alternative.

Kinnickinnic Narrows: 0.5 miles. The Minnesota side of the river in this segment would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative. Kinnickinnic State Park in Wisconsin would receive the same high level of scenic resource protection as compared to the no-action alternative.

Kinnickinnic to Prescott (Kinnickinnic Narrows to Mississippi Confluence at Prescott): 6 miles. Much of the Minnesota side of the river in this segment would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative. St. Croix Bluffs Regional Park would receive the same high level of scenic resource protection as compared to the no-action alternative. Carpenter Nature Center would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. In Wisconsin, the area north of Prescott would be classified as rural residential and would receive increased protection as compared to the rural classification under the no-action alternative. Prescott would be classified as river town, which would provide slightly more scenic protection than the current urban classification.

By encouraging the maintenance of significant plant communities on both public and private lands through voluntary actions, education, and awareness-building, these resources would remain part of the visual landscape of the riverway. These voluntary provisions could have a long-

term beneficial impact on the visual resources of the riverway by preserving existing parcels of indigenous vegetation. However, these impacts would be minor to negligible because these actions would be voluntary, and most individuals would consider these areas as natural landscapes whether or not the vegetative mosaics included a diversity of significant plant communities.

An amendment to the Wisconsin-managed forest law (Chapter NR 118) would be pursued, which would result in a long-term minor beneficial impact for the scenic resources of the riverway by providing landowners with more flexibility to preserve these resources.

Continued adherence to NPS policies that perpetuate native plant communities would result in a long-term, minor, beneficial impact to the scenic resources. Because minimal changes would be permitted in the number, type, scale, or characteristics of the river crossings (including the restriction of road, railroad, and overhead lines to existing corridors), there could be little noticeable change in the overhead visual intrusions on the riverway. Even though no increases would be allowed in the size or number of lines in existing submarine crossings, overhead utility lines could be relocated to existing submarine crossings. This latter action could reduce the amount of overhead visual intrusions on the riverway landscape. Otherwise, there would be negligible change to the visual resources of the riverway related to river crossings. Compared to the no-action alternative, the alternative B would avoid potentially major long-term impacts to scenic quality from construction of large-scale bridge crossings or relocation of

transmission lines to highly scenic or largely undisturbed corridors.

Conclusion

Overall, alternative B would have a moderate, positive impact on scenic resources compared to the no-action alternative. Also, potentially major, long-term impacts from changes to river crossings would be avoided.

IMPACTS ON RECREATIONAL USE

Analysis

The primary goal of alternative B with respect to boating recreation would be to allow modest growth in total boating and to minimize user conflicts through increased regulation. The existing diversity of boating opportunities would remain, with the exception of extremely high-speed boating activities. Boaters interested in that activity would be displaced to another resource. These impacts are evaluated for each river segment.

Backwaters from the Dalles of the St. Croix to William O'Brien State Park: 16 miles. The natural waters classification for this segment would be identical to the existing no-wake designation; the impact of alternative B would be the same as the no-action alternative, which would be to maintain the quiet and little-used character of the recreational experience.

Backwaters from William O'Brien State Park to Arcola Sandbar: 6 miles. The natural classification for this segment would be identical to the existing no-wake designation; the impact of alternative B

would be the same as the no-action alternative.

Backwaters from Arcola Sandbar to north limits of Stillwater: 5 miles. The natural waters classification for this segment would be identical to the existing no-wake designation; the impact of alternative B would be the same as the no-action alternative, which would be to maintain the quiet and little-used character of the recreational experience.

Dalles of the St. Croix to Rock Island: 3.5 miles. The quiet waters classification for this segment would be identical to the existing slow speed zone designation. The impact of Alternative B would be the same as the no-action alternative, which would be to maintain the slow speeds, low noise levels, and the more social experience associated with relatively large numbers of canoers.

Rock Island to McLeod's Slough: 10 miles. The quiet waters classification for this segment would be identical to the existing slow-speed zone designation; the impact of alternative B would be the same as the no-action alternative. Thus, recreational use would be similar to the preceding river segment, although less social interaction would likely occur below the landing at Osceola where many rental canoe trips would continue to end.

McLeod's Slough to Arcola Sandbar: 8.5 miles. The quiet waters classification for this segment would be identical to the existing slow-speed zone designation; the impact of alternative B would be the same as the no-action alternative. Opportunities would be maintained for a mixture of

nonmotorized and slow-moving motorized craft.

Arcola Sandbar to north limits of Stillwater: 5 miles. The moderate recreation classification for this segment would involve a speed limit and a possible restriction on waterskiing. This is slightly different than the current rule, which involves no speed limit but a firm restriction on summer weekend waterskiing. Congestion in this narrow area has become a concern and the imposition of a speed limit would be considered a positive impact on congestion and shoreline erosion concerns.

Stillwater to Catfish Bar: 13.5 miles. The active social recreation classification for this segment would allow extremely high-speed boating to continue, although speed limits might be set in certain areas. The existing no-wake zones in the Hudson area would remain under alternative B. The concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment would continue.

Catfish Bar to Prescott: 11.5 miles. The moderate recreation classification for this segment would involve a speed limit and a possible restriction on waterskiing; under the no-action alternative there would be no speed limit. The existing no-wake zones in the Catfish Bar and Kinnickinnic State Park areas would remain under alternative B. There has been growing concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment; which would be eliminated under alternative B, forcing boaters who want to travel at those speeds to use a different resource. The imposition of a speed limit in this area

would be considered a minor positive impact on the environment.

Camping Experience. A camping management plan would be developed for boat-related camping north of Stillwater that would impose gradually increased restrictions on camping. This would result in fewer boat-in campsites than currently exist, enhancing privacy and reducing shoreline erosion problems, but reducing the opportunity for more social camping situations and reducing the overall number of camping occasions, displacing some campers to another resource. At Hudson, campers without on-board toilets would be displaced. The outcome would be reduced shoreline erosion between the Arcola sandbar and Stillwater and reduced water quality problems there and at Hudson, but an increase in displaced recreational users.

Conclusion

Overall, alternative B would provide minor, possibly negligible, positive impacts on recreational use. Some people might be negatively impacted by the additional regulation. Also, a few riverway users, those seeking to travel at high speeds and some island campers, would be displaced from part of the riverway.

IMPACTS ON NATURAL RESOURCES

Water Quality

Analysis. Overall boating totals are expected to increase slightly under alternative B, therefore, water quality impacts from petroleum products or day-use boaters who do not use proper toilet facilities would be

slightly higher than the no-action alternative. Additional restrictions on camping north of Stillwater and at Hudson would have a slight positive impact on water quality as compared to the no-action alternative. There would be a slight decrease in total residential development in areas not served by public sewer, leading to slightly less risk of water quality impacts from failed on-site waste treatment systems (as compared to the no-action alternative).

Under alternative B there could be some bridge and utility line replacements, which could have short term adverse effects on water quality, such as increased sedimentation due to the installation of new bridge piers. Mitigation measures would likely minimize these impacts. (More detailed environmental documents would be prepared before a bridge replacement would be approved.)

Conclusion. With slightly increased use levels, the potential for pollution due to user activities would be slightly higher. Additional restrictions on camping north of Stillwater and at Hudson would have a slight positive impact on water quality. Some short-term impacts also could occur if bridges or transmission lines are replaced. From a riverwide perspective, it is expected that pollution due to construction of potential developments would be short term, while pollution due to increased users would be transient and should have minor to negligible effects on pollutant levels.

Soils

Analysis. As under the no-action alternative, additional development could occur,

including residential development in rural areas. Consequently, some soils would still be lost to development, although new soil disturbance would likely be reduced in the park and natural management areas (43% of the lower riverway) where less development and more restrictive land use regulations would be employed.

Slower boat speed limits in some areas would, to some extent, reduce the amount of shoreline erosion that occurs as a result of boat wakes. The area between the Arcola sandbar and Stillwater is the focus of much concern about wake-induced shoreline erosion, and a moderate speed limit there would likely do little to alter current impacts. With increasing boating use, shoreline erosion caused by boat wakes would be slightly increased as compared to the no-action alternative.

Shoreline erosion, soil compaction, and the formation of social trails from campers would be slightly reduced, as compared to the no-action alternative, by limitations and overall reductions in camping north of Stillwater. Localized bluff erosion from foot trails would be about the same as the no-action alternative.

There could be some bridge and utility line replacements under alternative B, although only a few areas would likely be affected during the life of this plan. Since these replacements would only be permitted in existing corridors, additional soil disturbance would be limited to areas that likely have already been altered. (Additional environmental documentation, with mitigation measures, would be required before these crossings would be approved.) Potential soil disturbance that could occur

from new submarine crossings would be prevented.

If the Army Corps of Engineers needed to do some dredging at the Kinnickinnic Narrows, this alternative would reduce the amount of dredged material that would need to be removed and disposed. If the dredged material could be reused for other purposes, soil in the riverway or nearby would not be altered by the disposal of the material. (The 1997 *Channel Maintenance Management Plan* directs that dredged material from the Kinnickinnic Narrows be placed on the delta at Kinnickinnic State park for beach nourishment.)

Conclusion. Under alternative B, shoreline erosion would continue or slightly accelerate as river use increased. This would have minor negative, long-term impacts on soils in localized areas on riverbanks and the islands. However, the actions proposed for managing the islands and public shoreline north of Stillwater would be expected to have a positive effect, reducing erosion and soil compaction. There would also be the potential for soil loss and disturbance due to new developments on private lands and from bridge relocations. However, the land use management areas would prevent potential soil disturbance and loss on a large portion of the lower riverway. From an overall perspective, compared to current conditions alternative B probably would have a long-term, negligible to minor, positive impact.

Vegetation

Analysis. Alternative B would share many of the same beneficial and negative impacts described under the preferred alternative. The alternative would have a bene-

ficial effect in minimizing the loss of vegetation due to new development in the park and natural zones (43% of the riverway in alternative B). Alternative B also would have a minor positive effect on plant communities if the Wisconsin Department of Natural Resources proposed amendment to the state land use standards within the riverway is adopted.

Both alternative B and the preferred alternative would have the same effects on vegetation due to bridge/utility line replacements and dredging. Very little additional vegetation would be lost or disturbed due to bridge and utility line replacements, and this disturbance probably would be limited to areas that already have been altered. If dredging occurred between Stillwater and Prescott, alternative B would reduce the amount of vegetation that would be lost due to the deposition of dredged material. However, unlike the previous action alternatives, alternative B would not allow additional submarine crossings. This would prevent potential impacts on vegetation due to the construction of new pipelines near the riverbanks.

Alternative B would have the same type of impacts as the preferred alternative due to motorboat use. Boat wakes are believed to be affecting vegetation along the shoreline and islands, and this impact would continue, particularly in heavily used stretches and/or stretches that high-speed boats use. Imposition of moderate speed limits from Arcola sandbar to Stillwater and below Catfish Bar would have a negligible positive impact on shoreline erosion.

Users would continue to trample vegetation in localized areas when they picnic on the shoreline and islands and camp on the

islands south of Stillwater (i.e., the Hudson islands). Some users probably would continue to damage trees, stripping bark from birch trees, cutting saplings, and pulling down branches for firewood. Disturbance of soils also would increase the likelihood of exotic plants like spotted knapweed and purple loosestrife becoming established. However, alternative B should have a beneficial effect on the islands and public shorelines north of Stillwater, reducing the loss of vegetation, due to increased restrictions on camping. Limiting camping in areas to designated sites would be expected to reduce the extent of vegetation disturbance and encourage native plants to become reestablished (although day users still could trample vegetation and introduce exotics).

Conclusion. Like the other action alternatives, alternative B would have both negative and beneficial effects on the riverway's vegetation. Vegetative communities would continue to be altered and lost due to the activities of users and new developments in the riverway. Some minor vegetation loss also would occur if bridge or transmission line replacements were built. On the other hand, the land management area allocation would have a beneficial effect, helping ensure the protection of vegetation on a large portion of the lower riverway. Efforts to maintain significant plant communities as well as restrictions on camping would also have a positive effect on the riverway vegetation.

From an overall perspective, most of the riverway's vegetation would not be affected by users, new developments, or the managing agencies. Compared to the current situation, alternative B would be expected to have a negligible to minor,

long-term, positive impact on the riverway's vegetation.

Fish and Wildlife

Analysis. Impacts on wildlife would not be significantly different for alternative B than the no-action alternative. Most of the lower riverway management actions in this alternative would continue to promote the protection of fish and wildlife populations and habitats. No actions would be taken that would adversely affect areas known to be of special importance for breeding, nesting, foraging, or wintering.

Rural home development creates patches that disrupt the movement of some wildlife, especially those most sensitive to human activity. There would be slightly less new rural home development under alternative B as compared to the no-action alternative, but the differences in terms of wildlife impacts are likely not measurable, especially considering much of the rural home development that could occur in the riverway has already been built.

Many of the lower riverway's wildlife populations and habitats have already been affected in varying degrees by recreational users and nearby developments. Some individual animals might be disturbed or temporarily displaced by the sounds of more motorboats and groups floating down the river, but this is not expected to substantially affect the lower riverway's fish and wildlife populations.

Conclusion. Impacts on fish and wildlife populations would be expected to be negligible to minor.

Threatened and Endangered Species

Analysis. Implementation of alternative B would not significantly change the number of recreational boats using the river as compared to the no-action alternative. The potential for recreational impacts is not expected to change with the continued use of appropriate mitigation (e.g., keeping people away from bald eagle nests). This alternative would maintain the diversity of native plant communities on federal and state lands, and encourage private landowners to do likewise, which should help protect species like the Karner blue butterfly. A slight reduction in new rural home development could decrease the potential for impacts to some threatened and endangered species. Therefore, this alternative would not likely adversely affect threatened and endangered species (with the possible exception of certain mussel species).

Like all of the action alternatives, there is the potential in alternative B that the federally listed Higgins' eye and winged mapleleaf mussels could be adversely affected. However, it is not known what effect these activities are having on the Higgins' eye and winged mapleleaf mussel populations — recreational uses are likely "taking" individual mussels, which may be adversely affecting these species.

The following goals, strategies, or actions would support the protection and recovery of these species: protection and improvement of water quality, development of a public information/education program that includes mussels, development of means to improve mussel information/coordination among various agencies, organizations, etc., continued enforcement of regulations prohibiting harvesting or taking of mus-

sels, and implementation of the zebra mussel response plan (see “Management Directions Common to All Alternatives” section). The managing agencies would also implement their respective components of the U.S. Fish and Wildlife’s recovery plans for the winged mapleleaf mussel and the Higgins’ eye mussel. These components address a wide variety of tasks, including actions to minimize human disturbance and destruction to the federally listed mussels, such as quantification of the magnitude of potential threats like harvesting, swimming, wading, digging, and small recreational watercraft and identification of specific geographic locations of greatest concern; posting of educational signs; presenting educational programs; and review of paddleboat operations to minimize boat operation impacts.

Conclusion. The expected uses, user numbers, and developments under alternative B are not likely to adversely affect most federal and state listed species in the lower riverway (with adequate surveys, consultation with the U.S. Fish and Wildlife Service and state biologists, and the application of appropriate mitigation measures). Recreational activities already might be adversely affecting the federally endangered Higgins’ eye and winged mapleleaf mussel on the lower St. Croix. Formal consultations would need to be initiated with the U.S. Fish and Wildlife Service to determine what actions need to be taken to ensure the conservation of these species.

IMPACTS ON CULTURAL RESOURCES

Analysis

This alternative would focus on maintaining the current (1997) visual qualities of the riverway . There would be less potential for new development under this alternative than under alternative A. Maintaining the landscape’s visual qualities would pose no adverse impacts for the cultural resources in the riverway.

Alternative B would require local governments in the river town and small town historic districts to develop ordinances protecting historic structures and requiring new development to be consistent with the historic character of those communities. As a result, alternative B would result in minor improvements in protection of cultural resources.

Archeological resources would be at a lower risk due to increased restrictions in areas within the riverway. Any increased use of public shoreline should pose no impacts on these resources, since these areas were previously disturbed. Minor restrictions placed on camping would be used to protect sensitive archeological sites.

The number, significance, and condition of the riverway’s cultural landscapes currently is unknown. However, this alternative would pose no adverse impacts on any significant cultural or historic landscapes that may later be identified in the riverway. Maintaining the riverway’s visual qualities by restricting development would minimize impacts on the riverway’s cultural landscapes. The completion of the cultural

landscape inventory would enhance future planning efforts to protect these resources.

Conclusion

Cultural resources would be at minimal risk under this alternative because of the emphasis on maintaining the riverway's visual qualities. Additionally, this alternative would result in minor improvements in protection of cultural resources in the river town and small town historic districts. Archeological resources would face minimal risks due to restrictions on development within those portions of the riverway that would be visible from the riverway. Restriction on development would help safeguard any significant cultural landscapes that might be identified in the cultural landscape inventory.

IMPACTS ON SOCIOECONOMIC ENVIRONMENT

Local Economy

Analysis. There would be little direct economic impact because no additional large expenditures by the states or by the Park Service are proposed. Application of the land management areas would not result in greatly different restrictions on new development for most areas within the riverway. Placement of the new land management categories would be similar to the existing incorporated and unincorporated classifications. Exceptions to this would be areas designated as natural where increased restrictions would likely occur (although development could still occur) and in towns where some restrictions would be reduced (but with historic structure protection). Consequently, limited additional

negligible to minor impacts on the long-term property tax base of the local communities due to restrictions on new development would occur. Existing positive effects on the local economy from expenditures from tourists and other recreationists would continue, but would not be appreciably changed.

Conclusion. Positive impacts to the local economy would be negligible to minor compared to the no-action alternative.

Tourism

Analysis. Tourism in the St. Croix Valley is partially linked to the area's historic character. In that context, alternative B's emphasis on historic structure protection and enhancement of the historic character of valley communities would have a minor positive impact on tourism. Boating-related tourism would increase slightly.

Conclusion. There would be some negligible to minor positive effects on tourism.

Land Values

Analysis. Land values would not be impacted by the preferred alternative. Local property values have probably been and would likely continue to be beneficially affected by the presence of the riverway as under the no-action alternative.

Conclusion. There would be no new impacts on land values.

Landownership/Landowners

Analysis. Alternative B proposes a modest increase in scenic easement acquisition by

the two states; National Park Service acquisition is essentially complete and would not change. As a result alternative B would have negligible impact on landownership.

In general under alternative B, land use regulations would be slightly more restrictive than under the no-action alternative, considering much of the rural home development that could occur has already been built. Thus, alternative B could affect some landowners in a manner that would have a minor to moderate impact on flexibility in developing their property when compared to the no-action alternative.

There would be a minor to moderate beneficial impact for local landowners in some areas of the riverway due to a reduction in conflicts with recreational users, particularly in popular camping areas north of Stillwater. Local landowners would also likely benefit from a reduction in the periodic loud noise generated by higher boat speeds and some minimal reduced shoreline effects from wave action.

Conclusion. There would be negligible impacts on landownership. Some landowners would benefit from reduced restrictions on property improvements, although there would be constraints on new development to maintain historic character. Some landowners would be negatively affected by restrictions on new development or improvements in areas outside of towns. There would also be minor to moderate benefits to landowners from a reduction in conflicts and shoreline erosion associated with recreational use in some areas of the riverway.

CUMULATIVE EFFECTS

The entire viewshed of the riverway as seen from the river would not be encompassed within the riverway boundaries, therefore, visual encroachments outside the boundary have the potential to impact the scenic resources of the riverway. In the federal zone, the high bluffs, rural character, predominance of protected areas along this section of the river, the primarily unincorporated zoning, and the fact that the viewshed outside the boundary would be less than the state-administered zone would mean that the concerns would not be as great here as in the state-administered zone. In this zone more of the viewshed would be outside the riverway boundary, the area would have a series of benches visible from the river, there would be less high bluff areas, more of the area would be incorporated, and its proximity to the Minneapolis/St. Paul area would mean greater growth.

For those areas within the viewshed, yet outside the riverway boundary, local zoning standards would be the primary methods of controlling scenic impacts to the riverway. Mitigating methodologies such as the encouragement of the preservation and maintenance of mature vegetation, planting of additional vegetative buffering, the protection of cultural resources, and the prohibition of the construction of any more extremely visible towers within the viewshed would be beneficial to the preservation of the riverway's scenic quality. Actions taken outside the riverway boundary could have negligible to major impacts on the scenic resources of the riverway, depending on the magnitude of change. Therefore, the cumulative effects of NPS/state actions on

the scenic quality of the viewshed would be negligibly to moderately beneficial, depending on the magnitude of changes to the scenic resources outside the riverway boundary.

As under the previous alternatives, impacts from recreational use within the riverway and managing agency actions would contribute incrementally to impacts from land use changes and population growth in the watershed and larger region. Overall, the land use management allocation would contribute to a minor positive cumulative impact within the riverway and watershed.

None of the management actions are expected to add substantively to the cumulative effects on cultural resources. Growth and land use changes could affect cultural resources adjacent to or within the viewshed of the riverway. The cumulative effects of the management actions would help mitigate the effects of population growth and development.

Many communities and counties in Minnesota and Wisconsin are in the process of revising their comprehensive plans and related ordinances. Some of these revised plans and ordinances may include land use and development provisions applicable to the river corridor that would go beyond guidance provided in this document.

The economic and population growth in the region is expected to continue. The relatively small number of jobs and expenditures on management of the riverway would only have a minor effect on the expected growth of the total economy of the region. Therefore, there would be no appreciable socioeconomic cumulative impacts from implementation of this alternative occurring in conjunction with

the region's expected overall population and economy of the region.

RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed management area allocation, restrictions on island, shoreline, and boating use, along with the proposed inventory, monitoring, and research programs for the riverway, would contribute to the long-term protection and preservation of resources and scenic character of the landscape. The maintenance of plant communities would also enhance long-term productivity of natural communities.

UNAVOIDABLE ADVERSE EFFECTS

Some minor to locally moderate adverse impacts to natural resources would occur. In the process of resolving conflicts among different uses or reducing resource impacts, restrictions would be placed on particular uses, having an adverse effect on some users. In order to meet the scenic and resource protection purposes of the riverway development restrictions on local landowner would implemented. To meet the recreational purposes of the riverway, some conflicts between local landowners and recreational users would continue.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Some new residential and commercial development would likely continue to occur on private lands within the riverway

boundary. Potentially, new river crossings may also occur. It is expected that this new development would result in the long-term localized loss of vegetation, soils, and wildlife habitat.

Any action that led to the loss of individual federally listed mussel species or their habitat would contribute to the loss of the

species as an ecological and genetic resource. It is possible that this alternative would contribute to their decline. However, it is expected that the implementation of actions outlined in the recovery plans for these species would avoid this situation and contribute to their conservation.

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IMPACTS OF ALTERNATIVE C

IMPACTS ON SCENIC RESOURCES

Scenic resources would be affected under alternative C in exactly the same fashion as alternative B. Overall, alternative C would have a moderate positive impact on scenic resources compared to the no-action alternative. Also, potentially major long-term impacts from changes to river crossings would be avoided.

IMPACTS ON RECREATIONAL USE

Analysis

The primary goal of alternative C with respect to boating recreation is to freeze the amount of total boating in the riverway at current levels and to minimize user conflicts through boating regulations. Impacts are evaluated for each river segment.

Backwaters from the Dalles of the St. Croix to William O'Brien State Park: 16 miles. The natural waters classification for this segment would be identical to the existing no-wake designation. The impact of alternative C would be the same as the no-action alternative, which would be to maintain the quiet and little-used character of the recreational experience.

Backwaters from William O'Brien State Park to Arcola Sandbar: 6 miles. The natural waters classification for this segment would be identical to the existing no-wake designation; the impact of alternative C would be the same as the no-action alternative.

Backwaters from Arcola Sandbar to north limits of Stillwater: 5 miles. The natural waters classification for this segment would be identical to the existing no-wake designation; the impact of alternative C would be the same as the no-action alternative.

Dalles of the St. Croix to Rock Island: 3.5 miles. The quiet waters classification for this segment would be identical to the existing slow speed zone designation. The impact of alternative C would be the same as the no-action alternative, which would be to maintain the slow speeds, low noise levels, and the more social experience associated with relatively large numbers of canoers.

Rock Island to McLeod's Slough: 10 miles. The quiet waters classification for this segment would be identical to the existing slow speed zone designation. The impact of Alternative C would be the same as the no-action alternative.

McLeod's Slough to Arcola Sandbar: 8.5 miles. The quiet waters classification for this segment would be identical to the existing slow speed zone designation; the impact of alternative C would be the same as the no-action alternative.

Arcola Sandbar to north limits of Stillwater: 5 miles. The moderate recreation classification for this segment would involve a speed limit and a possible restriction on waterskiing. This is slightly different than the current rule, which involves no speed limit but a firm restriction on summer weekend waterskiing. Congestion in this narrow area has become a concern and the imposition of a speed limit

would be considered a positive impact on congestion and shoreline erosion concerns.

Stillwater to Catfish Bar: 13.5 miles. The active social recreation classification for this segment would allow extremely high-speed boating to continue, although speed limits might be set in certain areas. The existing no-wake zones in the Hudson area would remain under alternative C. The concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment would continue.

Catfish Bar to Prescott: 11.5 miles. The active social recreation classification for this segment would allow extremely high-speed boating to continue, although speed limits might be set in certain areas. The existing no-wake zones in the Catfish Bar and Kinnickinnic State Park areas would remain under alternative C. The concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment would continue.

Camping Experience. A camping management plan would be developed for boat-related camping north of Stillwater that would impose gradually increased restrictions on camping. This would result in fewer boat-in campsites than currently exist, enhancing privacy and reducing shoreline erosion problems. However, the opportunity for more social camping and overall number of camping occasions would be reduced, displacing some campers to another resource. At Hudson, campers without on-board toilets would be displaced. The outcome would be reduced shoreline erosion between the Arcola

Sandbar and Stillwater and reduced water quality problems there and at Hudson, but an increase in displaced recreational users.

Conclusion

Overall, alternative C would have minor positive impacts on recreational use. The existing diversity of boating opportunities would remain, however, safety concerns would continue where extremely high-speed boating activities occurred occasionally south of Stillwater.

IMPACTS ON NATURAL RESOURCES

Water Quality

Analysis. Slower boat speed limits would, to some extent, reduce the amount of shoreline erosion that occurs as a result of boat wakes. The area between the Arcola sandbar and Stillwater is the focus of much concern about wake-induced shoreline erosion, and the proposed moderate speed limit there would likely do little to alter current impacts.

Overall boating totals are expected to remain unchanged under alternative C, so water quality impacts from petroleum products or day-use boaters who do not use proper toilet facilities would be less than the no-action alternative. Additional restrictions on camping north of Stillwater and at Hudson would have a slight positive impact on water quality as compared to the no-action alternative. There would be a slight decrease in total residential development in areas not served by public sewer,

leading to slightly less risk of water quality impacts from failed on-site waste treatment systems (as compared to the no-action alternative).

River crossings would be affected the same way under alternative C as described under alternative B. There could be some bridge and utility line replacements, which could have short term adverse effects on water quality, although mitigation measures should minimize these impacts. (More detailed environmental documents would be prepared before a bridge or a utility line replacement would be approved.)

Conclusion. With use levels being frozen, the potential for pollution due to user activities would remain the same as now. Additional restrictions on camping north of Stillwater and at Hudson would have a slight positive impact on water quality. Some short-term impacts could be caused by bridges or utility line replacements. From a riverwide perspective, it is expected that pollution due to construction of potential developments would be short term, while pollution due to users would be diluted and dispersed. Compared to current conditions, alternative C would likely have a minor, positive, long-term impact on the riverway's overall water quality.

Soils

Analysis. As under the no-action alternative, additional development could occur, including residential development in rural areas. Consequently, some soils would still be lost to development, although new soil disturbance would likely be reduced in the park and natural management areas (43% of the lower riverway) where less develop-

ment and more restrictive land use regulations would be employed.

Shoreline erosion caused by boat wakes would be similar to the no-action alternative. The imposition of speed limits from the Arcola sandbar south would have a negligible impact on shoreline erosion caused by boat wakes.

Shoreline erosion, soil compaction, and the formation of social trails from campers would be slightly reduced, as compared to the no-action alternative, by limitations and overall reductions in camping north of Stillwater. Localized bluff erosion from foot trails would be about the same as the no-action alternative.

Only a few areas would be affected by bridge and utility line replacements during the life of this plan. It is expected that mitigation measures would keep impacts localized and minor to moderate in magnitude. (Additional environmental documentation, with mitigation measures, would be required before these crossings would be approved.) Because bridge and utility line replacements would only be permitted in existing corridors, additional soil disturbance would be limited to areas that likely have already been altered.

If the Army Corps of Engineers needed to do some dredging at the Kinnickinnic Narrows, this alternative would reduce the amount of dredged material that would need to be removed and disposed. If the dredged material could be reused for other purposes, soil in the riverway or nearby would not be altered by the disposal of the material. (The 1997 *Channel Maintenance Management Plan* directs that dredged material from the Kinnickinnic Narrows be

placed on the delta at Kinnickinnic State park for beach nourishment.)

Conclusion. With a freeze on use levels, alternative C would have a lower potential for impacts on soils than the previous alternatives. Shoreline and bluff erosion would continue from recreational use, but would be less in areas used by campers. This would have negligible to minor long-term positive impacts on soils in localized areas, particularly on riverbanks and the islands. Additional soil loss and disturbance would be expected from new development on some private lands. However, the land use management area allocation would be beneficial, minimizing potential soil disturbance and loss on a large portion of the riverway. From an overall riverway perspective, compared to current conditions, alternative C would likely have a negligible to minor positive impact.

Vegetation

Analysis. Alternative C would have the same beneficial and negative impacts described under alternative B. The alternative would have a beneficial effect in minimizing the loss of vegetation due to new development in the park and natural zones (43% of the riverway in alternative B). Alternative C also would have a minor positive effect on plant communities if the Wisconsin Department of Natural Resources proposed amendment to the state land use standards within the riverway is adopted.

Both alternative C and the preferred alternative would have the same effects on vegetation due to bridge/utility line replacements and dredging. Little addi-

tional vegetation would be lost or disturbed due to bridge and utility line replacements, and this disturbance probably would be limited to areas that already have been altered. If dredging occurred between Stillwater and Prescott, alternative C would reduce the amount of vegetation that would be lost due to the deposition of dredged material. However, unlike the previous action alternatives, alternative C would not allow additional submarine crossings. This would prevent potential impacts on vegetation due to the construction of new pipelines near the riverbanks.

Alternative C would have the same type of impacts as the preferred alternative due to motorboat use. Boat wakes are believed to be affecting vegetation along the shoreline and islands, and this impact would continue, particularly in heavily used stretches and/or stretches that high-speed boats use. Imposition of moderate speed limits from Arcola sandbar south would have negligible positive impact on shoreline erosion.

Users would continue to trample vegetation in localized areas when they picnic on the shoreline and islands and camp on the islands south of Stillwater (i.e., the Hudson islands). Some users probably would continue to damage trees, stripping bark from birch trees, cutting saplings, and pulling down branches for firewood. Disturbance of soils also would increase the likelihood of exotic plants like spotted knapweed and purple loosestrife becoming established. However, alternative C should have a beneficial effect on the islands and public shorelines north of Stillwater, reducing the loss of vegetation, due to increased restrictions on camping. Limiting camping in areas to designated sites would be expected

to reduce the extent of vegetation disturbance and encourage native plants to become reestablished (although day users still could trample vegetation and introduce exotics).

Conclusion. Like the other action alternatives, alternative C would have both negative and beneficial effects on the riverway's vegetation. Vegetative communities would continue to be altered and lost due to the activities of users and new developments in the riverway. Some minor vegetation loss also would occur if bridge or transmission line replacements were built. On the other hand, the land management area allocation would have a beneficial effect, helping ensure the protection of vegetation on a large portion of the lower riverway. Efforts to maintain significant plant communities as well as restrictions on camping would also have a positive effect on the riverway vegetation.

From an overall perspective, most of the riverway's vegetation would not be affected by users, new developments, or the management agencies. Compared to the current situation, alternative C would be expected to have a negligible to minor, long-term, positive impact on the riverway's vegetation.

Fish and Wildlife

Analysis. Impacts on wildlife would not be significantly different for Alternative C than the no-action alternative. Most of the lower riverway management actions in this alternative would continue to promote the protection of fish and wildlife populations and habitats. No actions would be taken that would adversely affect areas known to

be of special importance for breeding, nesting, foraging, or wintering.

Rural home development creates patches that disrupt the movement of some wildlife, especially those most sensitive to human activity. There would be slightly less new rural home development under Alternative C as compared to the no-action alternative, but the differences in wildlife impacts would not likely be measurable, especially considering much of the rural home development that could occur in the riverway has already been built.

Many of the lower riverway's wildlife populations and habitats have already been affected in varying degrees by recreational users and nearby developments. Some individual animals might be disturbed or temporarily displaced by the sounds of more motorboats and groups floating down the river, but this is not expected to substantially affect the lower riverway's fish and wildlife populations.

Conclusion. Impacts on fish and wildlife populations would be expected to be negligible to minor.

Threatened and Endangered Species

Analysis. The potential for recreational impacts is not expected to change with the freeze in use levels and continued use of mitigation as necessary. This alternative would maintain the diversity of plant communities on federal and state lands, and encourage private landowners to do likewise, which could benefit species like the Karner blue butterfly. A slight reduction in new rural home development could decrease the potential for impacts to some threatened and endangered species.

Overall, this alternative would not likely adversely affect threatened and endangered species (with the possible exception of certain mussel species).

There is the potential in alternative C that the federally listed Higgins' eye and winged mapleleaf mussels could be adversely affected as described in the previous alternatives. However, it is not known how the Higgins' eye and winged mapleleaf mussel populations would be affected — recreational uses would likely "take" individual mussels, which may be adversely affecting these species. It is not known if freezing use at current levels would affect this.

The same goals, strategies, or actions to support protection and recovery of these species described in alternative B would be applied under alternative C (see "Management Directions Common to All Alternatives" section). The managing agencies would also implement their respective components of the U.S. Fish and Wildlife's recovery plans for the winged mapleleaf mussel and the Higgins' eye mussel. These components address a wide variety of tasks, including actions to minimize human disturbance and destruction to the federally listed mussels, such as quantification of the magnitude of potential treats (harvesting, swimming, wading, digging, small recreational watercraft, and commercial paddlewheel watercraft) and identification of specific geographic locations of greatest concern; posting of educational signs; conduction of educational programs; and review of paddleboat operations to minimize boat operation impacts.

Conclusion. The expected uses, user numbers, and developments under alterna-

tive C are not likely to adversely affect most federal and state listed species in the lower riverway (with adequate surveys, consultation with the U.S. Fish and Wildlife Service and state biologists, and the application of appropriate mitigation measures). With regard to the federally endangered Higgins' eye and winged mapleleaf mussel populations, there are indications that recreational activities already may be adversely affecting the populations on the lower St. Croix. In particular, existing use levels near Hudson and in the Interstate Park area (where the mussels primarily occur) may be affecting these populations. Freezing existing use levels may not change the impacts that are occurring. Thus, formal consultations would still need to be initiated with the U.S. Fish and Wildlife Service to determine what actions need to be taken to ensure the conservation of the two mussel species.

IMPACTS ON CULTURAL RESOURCES

Analysis

This alternative would focus on maintaining the current visual qualities of the riverway. Maintaining the landscape's visual qualities would pose no adverse impacts for the cultural resources in the riverway. Alternative C would require local governments in the river town and small town historic districts to develop ordinances protecting historic structures and requiring new development to be consistent with the historic character of those communities. As a result, alternative

C would result in minor improvements in protection of cultural resources.

Archeological resources would be at a lower risk due to increased restrictions on areas within the portion of the riverway that is visible from the river. Minor restrictions placed on camping would be used to protect sensitive archeological sites.

The number, significance, and condition of the riverway's cultural landscapes currently is unknown. However, this alternative would pose no adverse impacts on any significant cultural or historic landscapes that may later be identified in the riverway. Maintaining the riverway's visual qualities by restricting development would minimize impacts on the riverway's cultural landscapes. The completion of the cultural landscape inventory would enhance future planning efforts to protect these resources.

Conclusion. Cultural resources would be at minimal risk under this alternative because of the emphasis on maintaining the riverway's 1997 visual qualities. Additionally, this alternative would result in minor improvements in protection of cultural resources in the river town and small town historic districts. Archeological resources would face minimal risks due to restrictions on development. Restriction on development would help safeguard any significant cultural landscapes that might be identified in the cultural landscape inventory.

IMPACTS ON SOCIOECONOMIC ENVIRONMENT

Local Economy

Analysis. There would be little direct economic impact because no additional large expenditures by the states or by the Park Service is proposed. Application of the land management areas would not result in greatly different restrictions on new development for most areas within the riverway. Placement of the new land management categories would be similar to the existing incorporated and unincorporated classifications. Exceptions to this would be areas designated as natural where increased restrictions would likely occur (although development could still occur) and in towns where some restrictions would be reduced (but with historic structure protection). Consequently, limited additional negligible to minor impacts on the long-term property tax base of the local communities due to restrictions on new development would occur. Existing positive effects on local economy from expenditures from tourists and other recreationists would continue, but would not be appreciably changed.

Conclusion. Positive impacts to the local economy would be negligible to minor compared to the no-action alternative.

Tourism

Analysis. Tourism in the St. Croix Valley is partially linked to the area's historic character. In that context, alternative C's emphasis on historic structure protection and enhancement of the historic character of valley communities would have a minor positive impact on tourism. Boating-related

tourism would not be permitted to increase, possibly offsetting the minor positive impact noted above.

Conclusion. There would be some negligible to minor positive effects on tourism, that may possibly be offset by precluding any increase in boating-related tourism.

Land Values

Analysis. Land values would not be impacted by Alternative C. Local property values have probably been and would likely continue to be beneficially affected by the presence of the riverway as under the no-action alternative.

Conclusion. There would be no new impacts on land values.

Landownership/Landowners

Analysis. Alternative C proposes a modest increase in scenic easement acquisition by the two states; National Park Service acquisition is essentially complete and would not change. As a result, alternative C would have negligible impact on land ownership.

In general under alternative C, land use regulations would be slightly more restrictive in rural areas than under the no-action alternative, considering much of the rural home development that could occur has already been built. Thus, alternative C could affect some landowners in a manner that would have a minor to moderate impact on flexibility in developing their

property when compared to the no action alternative.

There would be a minor to moderate beneficial impact for local landowners in some areas of the riverway due to a reduction in conflicts with recreational users and some shoreline erosion, particularly in popular camping areas north of Stillwater.

Conclusion. There would be negligible impacts on landownership. Some landowners would benefit from reduced restrictions on property improvements, although there would be constraints on new development to maintain historic character. Some landowners would be negatively affected by restrictions on new development or improvements in areas outside of towns. There would also be minor to moderate benefits to landowners from a reduction in conflicts and some shoreline erosion associated with recreational use in some areas of the riverway.

CUMULATIVE EFFECTS

The entire viewshed of the riverway as seen from the river would not be encompassed within the riverway boundaries, therefore, visual encroachments outside the boundary have the potential to impact the scenic resources of the riverway. In the federal zone, the high bluffs, the rural character, the predominance of protected areas along this section of the river, the primarily unincorporated zoning, and the fact that the viewshed outside the boundary would be less than the state-administered zone would mean that the concerns would not be as great here as in the state-

administered zone. In this zone more of the viewshed would be outside the riverway boundary, the area would have a series of benches visible from the river, there would be less high bluff areas, more of the area would be incorporated, and its proximity to the Minneapolis/St. Paul area would mean greater growth. For those areas within the viewshed, yet outside of the riverway boundary, local zoning standards would be the primary methods of controlling scenic impacts to the riverway. Mitigating methodologies such as the encouragement of the preservation and maintenance of mature vegetation, planting of additional vegetative buffering, the protection of cultural resources, and the prohibition of the construction of any more extremely visible towers within the viewshed would be beneficial to the preservation of the riverway's scenic quality. Actions taken outside the riverway boundary could have negligible to major impacts on the scenic resources of the riverway, depending on the magnitude of change. Therefore, the cumulative effects of NPS/state actions on the scenic quality of the viewshed would be negligibly to moderately beneficial, depending on the magnitude of changes to the scenic resources outside the riverway boundary.

As described under the preferred alternative, impacts from recreational use within the riverway and managing agency actions would contribute incrementally to impacts from land use changes and population growth in the watershed and region. Overall, the land use management allocation and special native plant community protection would contribute to a minor to moderate positive cumulative impact within the riverway and watershed.

None of the management actions are expected to add substantively to the cumulative effects on cultural resources. Growth and land use changes could affect cultural resources adjacent to or within the viewshed of the riverway. The cumulative effects of the management actions would help mitigate the effects of population growth and development.

Many communities and counties in Minnesota and Wisconsin are in the process of revising their comprehensive plans and related ordinances. Some of these revised plans and ordinances may include land use and development provisions applicable to the river corridor that would go beyond guidance provided in this document.

The economic and population growth in the region is expected to continue. The relatively small number of jobs and expenditures on management of the riverway would only have a minor effect on the expected growth of the total economy of the region. Therefore, there would be no appreciable socioeconomic cumulative impacts from implementation of this alternative occurring in conjunction with the region's expected overall population and economy of the region.

RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed management area allocation, restrictions on island, shoreline, and boating use, along with the proposed inventory, monitoring, and research programs for the riverway would contribute to the long-term protection and preservation of resources and scenic

character of the landscape. The maintenance and restoration of native plant communities would also enhance long-term productivity of natural communities.

UNAVOIDABLE ADVERSE EFFECTS

Some minor to locally moderate adverse impacts to natural resources would occur. In the process of resolving conflicts among different uses or reducing resource impacts, restrictions would be placed on particular uses, having an adverse effect on some users. To meet the scenic and resource protection purposes of the riverway development restrictions on local landowner would implemented. To meet the recreational purposes of the riverway, some conflicts between local landowners and recreational users would continue.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Some new residential and commercial development would likely continue to

occur on private lands within the riverway boundary, particularly in the existing municipalities. Potentially, new river crossing and navigation channel maintenance may also occur. It is expected that this new development would result in the long-term localized loss of vegetation, soils, and wildlife habitat.

Any action that led to the loss of individual federally listed mussel species or their habitat would contribute to the loss of the species as an ecological and genetic resource. It is possible that this alternative would contribute to their decline. However, it is expected that the implementation of actions outlined in the recovery plans for these species would avoid this situation and contribute to their conservation.

IMPACTS OF ALTERNATIVE D

IMPACTS ON SCENIC RESOURCES

Analysis

Scenic resources in the riverway are protected primarily through land acquisition or through regulatory controls on land development. No significant land acquisition would occur in implementing alternative D. The establishment of seven land management categories compared to two under the existing management program would provide additional scenic resource protection. More restrictions would be imposed to avoid additional development that would be visible from the river.

Alternative D would restrict development outside municipalities more aggressively than other alternatives. Also, as under the previous alternatives, the riverway managing agencies would require local governments to protect the historic character of municipalities, which would reduce potential impacts to scenic values in municipalities from new development.

The following analysis evaluates scenic impacts created by the application of the seven land management areas on each river segment.

The Dalles of the St. Croix to Rock Island: 3.5 miles. Scenic resources within the two state parks in this river segment would continue to be protected by state ownership (as they would be under the no-action alternative). No impact to scenic resources would occur because any future development would occur at existing development nodes, and scenic and relatively undisturbed natural areas would be maintained. Private lands in Minnesota in the southern portion of this segment

would be classified as minimally disturbed and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources.

Osceola Area (Rock Island to McLeod Slough): 10 miles. Osceola itself is classified as small town, which would afford an increase level of scenic protection compared to the existing urban standard to minimize new development visible from the river. Most of this segment would be classified as minimally disturbed, however, and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources.

Marine Area (McLeod Slough to Arcola Sandbar via Page's Slough): 8.5 miles. Marine on St. Croix itself is classified as small town historic, which afford an increased level of scenic protection compared to the existing urban standard. Additional restrictions would be placed on development to minimize it being visible from the river and also to protect historic character. William O'Brien State Park would receive the same high level of scenic resource protection as compared to the no-action alternative. Most of the remainder of this segment in Minnesota would be classified as rural residential and

would receive increased protection as compared to the rural classification under the no-action alternative. The Wisconsin side of the river would be classified as minimally disturbed and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources.

Rice Lake Flats (Dead Man's Slough to Arcola Sandbar via St. Croix Islands Wildlife Area): 2.5 miles. St. Croix Islands Wildlife Area is owned by Wisconsin DNR and would receive the same high level of scenic resource protection as compared to the no-action alternative, which would maintain the undisturbed natural appearance. The remainder of this segment would be classified as minimally disturbed and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but there would be fewer new structures and those structures would not be visible from the river. Consequently, they would have no impact on scenic resources.

Arcola Gorge (Arcola Sandbar to Head of Lake St. Croix): 5 miles. The Minnesota side of the river in this segment would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would have no impact on scenic resources. The Wisconsin side of the river would mostly be

classified as minimally disturbed and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would have no impact on scenic resources. A small portion of the southern part of this segment in Wisconsin would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would have no impact on scenic resources.

Urban Stillwater (Head of Lake St. Croix to Stillwater Downtown Courtesy Docks): 2 miles. The northern portion of this segment in Minnesota is not intensively developed; it would be classified as small town with the result that its level of scenic protection would be increased compared to the current urban classification. The central portion just north of downtown would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would have no impact on scenic resources. The southern portion of this segment includes the heavily developed downtown Stillwater area; it would be classified as river town, and additional restrictions would be placed to minimize new development being visible from the river. In addition, this alternative would require protection of historic character that would reduce potential scenic impacts.

The Wisconsin side would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative.

Additional development could still occur, but new structures would have no impact on scenic resources.

South Stillwater-Bayport Area (Stillwater Downtown Courtesy Docks to Andersen Point): 3 miles. Most of this segment in Minnesota would be classified as river town and additional restrictions would be placed to minimize new development being visible from the river. In addition, this alternative would require protection of historic character that would reduce potential scenic impacts. The Andersen Point area would be classified as small town, with the result that its level of scenic protection would be increased compared to the current urban classification. The Wisconsin side would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would have less impact on scenic resources than the no-action alternative.

Bayport-North Hudson Area (Andersen Point to Willow River Dam): 2 miles. In Minnesota, the area between Andersen Point and the south limits of Bayport would be classified as small town, with the result that its level of scenic protection would be increased compared to the current urban classification. The southern portion of this segment in Minnesota would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would not impact scenic resources. Most of the Wisconsin side would be classified as natural and would receive increased protection as compared to the rural classification

under the no-action alternative. Additional development could still occur, but new structures would have not impact scenic resources. The southern portion of this segment in Wisconsin lies in North Hudson and would be classified as small town, with the result that its level of scenic protection would be increased compared to the current urban classification.

Urban Hudson (Willow River Dam to Interstate 94): 2 miles. The Minnesota side in this segment would be primarily classified as small town, with the level of scenic protection increased compared to the current urban classification. The Wisconsin side would be classified as river town and additional restrictions would be placed to minimize new development being visible from the river. In addition, this alternative would require protection of historic character that would reduce potential scenic impacts.

Open Lake (Interstate 94 to Catfish Bar): 4.5 miles. The Minnesota side in this segment would be classified as small town, with the result that its level of scenic protection would be increased compared to the current urban classification. The southern portion of Hudson would also be classified as small town. The remainder of this segment in Wisconsin would be classified as rural residential, which affords an increased level of protection compared to the rural classification under the no-action alternative.

Catfish to Kinnickinnic (Catfish Bar to Kinnickinnic Narrows): 5 miles. In Minnesota the old Afton village area would be classified as small town historic, with the result that its level of scenic protection would be increased compared to the current urban classification. The

southern portion of Afton would be classified as rural residential and would receive an increased level of protection compared to the rural classification under the no-action alternative. Afton State Park would receive the same high level of scenic resource protection as compared to the no-action alternative. The area south of Afton State Park in Minnesota and all of the Wisconsin side in this segment would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would have no impact on scenic resources.

Kinnickinnic Narrows: 0.5 miles. The Minnesota side of the river in this segment would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would have no impact on scenic resources. Kinnickinnic State Park in Wisconsin would receive the same high level of scenic resource protection as compared to the no-action alternative.

Kinnickinnic to Prescott (Kinnickinnic Narrows to Mississippi Confluence at Prescott): 6 miles. Much of the Minnesota side of the river in this segment would be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. Additional development could still occur, but new structures would have no impact on scenic resources. St. Croix Bluffs Regional Park would receive the same high level of scenic resource protection as compared to the no-action alternative. Carpenter Nature Center would

be classified as natural and would receive increased protection as compared to the rural classification under the no-action alternative. There would be small areas north and south of Carpenter Nature Center that would be classified as rural residential, which affords an increased level of protection compared to the no-action alternative. In Wisconsin, the area north of Prescott would be classified as rural residential, which affords an increased level of protection compared to the no-action alternative. Prescott would be classified as river town and additional restrictions would be placed to minimize new development being visible from the river. In addition, this alternative would require protection of historic character that would reduce potential scenic impacts.

By encouraging the maintenance and restoration of natural diversity and ecological integrity of plant communities through a variety of actions, the visual landscape of the riverway would become more representative of the native ecotones of the area. These provisions would have a long-term beneficial impact on the visual resources of the riverway by preserving and enhancing indigenous vegetation. However, these impacts would be minor to negligible because these actions would be voluntary, and most individuals would consider these areas as a natural landscapes whether the vegetative mosaics included a diversity of significant plant communities or not.

An amendment to the Wisconsin managed forest law (Chapter NR 118) would be pursued which would result in a long term minor beneficial impact for the scenic resources of the riverway by providing

landowners with more flexibility to preserve these resources.

Continued adherence to NPS policies which perpetuate native plant communities would result in a long term minor beneficial impact to the scenic resources.

This alternative would result in the least impacts to scenic resources related to river crossings because its goal is to reduce the visual impacts of structures that cross the riverway. By encouraging a reduction in the utility lines, restricting road, railroad bridges, utility lines, and submarine lines to existing corridors, and not allowing any change in scale or character of road and railroad crossings, the visual landscape of the river corridor could eventually have less visual encroachments over the river corridor than currently exist. Compared to the no-action alternative, alternative D would avoid potentially major long-term impacts to scenic quality from construction of large-scale bridge crossings or relocation of utility lines to highly scenic or largely undisturbed corridors.

Flexibility on the use of existing submarine crossings to allow for the replacement of an existing overhead transmission lines could reduce the amount of overhead visual intrusions upon the riverway landscape, however, ground disturbance and vegetation removal during installation could result in minor to negligible adverse impact to scenic resources in the immediate vicinity.

Conclusion. This alternative would result in the somewhat greater beneficial impacts to scenic resources of all the alternatives because it would put slightly more of the land within the management areas that would be most restrictive to development.

Also, its goal would be to reduce the visual impacts of structures that cross the riverway, possibly resulting in less visual encroachments over the river corridor than currently exist. Like the preferred alternative, it encourages the maintenance and restoration of plant communities on both public and private lands. Overall, alternative D would have a moderate, positive impact on scenic resources compared to the no-action alternative.

IMPACTS ON RECREATIONAL USE

Analysis

The primary goal of alternative D with respect to boating recreation is to reduce total recreational use and to enhance opportunities for quieter, slower, more passive boating recreational experiences. Impacts are evaluated for each river segment.

Backwaters from the Dalles of the St. Croix to William O'Brien State Park: 16 miles. Under alternative D, this segment would be classified silent boating and internal combustion motors could not be used. This would slightly enhance the exceptionally quiet and little-used character of the recreational experience in this segment compared to the current no-wake rule. While motorboats cannot navigate this segment during normal river levels, they are occasionally found in the area during high water periods. Consequently, restrictions on use of motors would slightly decrease the flexibility of movement for some motorized watercraft but would ensure locations for boaters seeking areas free from encounters with noisier motorized watercraft.

Backwaters from William O'Brien State Park to Arcola Sandbar: 6 miles. The natural waters classification for this segment would be identical to the existing no-wake designation. The impact of alternative D would be the same as the no-action alternative, which would maintain the quiet little-used character of the recreational experience.

Backwaters from Arcola Sandbar to north limits of Stillwater: 5 miles. The quiet waters classification for this segment would permit slow-speed boating, compared to the existing no-wake designation; the impact of alternative D would be to allow moderately faster boating than the no-action alternative.

Dalles of the St. Croix to Rock Island: 3.5 miles. The quiet waters classification for this segment would be identical to the existing slow-speed zone designation. The impact of alternative D would be the same as the no-action alternative, which would be to maintain the slow speeds, low noise levels, and the more social experience associated with relatively large numbers of canoers.

Rock Island to McLeod's Slough: 10 miles. The natural waters classification for this segment would provide for a no-wake designation, which is more restrictive than the existing slow speed zone designation; the impact of alternative D would be a reduction in boat speed in this area compared to the no-action alternative.

McLeod's Slough to Arcola Sandbar: 8.5 miles. The quiet waters classification for this segment would be identical to the existing slow speed zone designation; the impact of alternative D would be the same

as the no-action alternative. Opportunities would be maintained for a mixture of non-motorized and slow-moving motorized craft.

Arcola Sandbar to north limits of Stillwater: 5 miles. The quiet waters classification for this segment would result in a slow speed designation; under the no-action alternative there would be no speed limit, but there would be a restriction on weekend waterskiing. Congestion in this narrow area has become a concern and the imposition of a slow speed designation would be considered a positive impact on congestion and shoreline erosion concerns.

Stillwater to Catfish Bar: 13.5 miles. The moderate recreation classification for this segment would involve a speed limit and a possible restriction on waterskiing; under the no-action alternative there would be no speed limit. The existing no-wake zones in the Hudson area would remain under alternative D. There has been growing concern about safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment; that would be eliminated under alternative D, forcing boaters who want to travel at those speeds to use a different resource. The imposition of a speed limit in this area would be considered a minor positive impact on the environment.

Catfish Bar to Prescott: 11.5 miles. The moderate recreation classification for this segment would involve a speed limit and a possible restriction on waterskiing; under the no-action alternative there would be no speed limit. The existing no-wake zones in the Catfish Bar and Kinnickinnic State Park areas would remain under alternative D. There has been growing concern about

safety factors surrounding extremely high-speed boating (80 mph and greater) that occasionally occurs in this segment. This would be eliminated under alternative D, forcing boaters who want to travel at those speeds to use a different resource. The imposition of a speed limit in this area would be considered a minor positive impact on the environment.

Camping Experience. A camping management plan would be developed for boat-related camping north of Stillwater that would impose gradually increased restrictions on camping. This would result in fewer boat-in campsites than currently exist, enhancing privacy and reducing shoreline erosion problems, but reducing the opportunity for more social camping situations and reducing the overall number of camping occasions, displacing some campers to another resource. At Hudson, campers without on-board toilets would be displaced. The outcome would be reduced shoreline erosion between the Arcola sandbar and Stillwater and reduced water quality problems there and at Hudson, but an increase in displaced recreational users.

Conclusion

Overall boating use of the riverway would be reduced under Alternative D, while additional water surface use regulations would be imposed to preserve slower recreational uses and to reduce boat speeds in significant sections of the river. The existing diversity of boating opportunities would be reduced. Overall, alternative D would provide minor positive impacts on slower recreational uses, while reducing recreational boating diversity.

IMPACTS ON NATURAL RESOURCES

Water Quality

Analysis. Overall boating totals are expected to decrease slightly under alternative D, so water quality impacts from petroleum products or day-use boaters who do not use proper toilet facilities would be slightly lower than the no-action alternative. Additional restrictions on camping north of Stillwater and at Hudson would have a slight positive impact on water quality as compared to the no-action alternative. There would be a slight decrease in total residential development in areas not served by public sewer, leading to slightly less risk of water quality impacts from failed on-site waste treatment systems (as compared to the no-action alternative).

With regard to river crossings, the impacts of alternative D would be identical with alternatives B and C. There could be some bridge and utility line replacements, which could have short term adverse effects on water quality; however, mitigation measures should minimize these impacts. (More detailed environmental documents would be prepared before a bridge or a transmission line replacement would be approved.)

Conclusion. With use levels being lowered, the potential for pollution due to user activities should decrease. Some short-term impacts could occur if bridges or utility lines were replaced. From a riverwide perspective, it is expected that pollution due to construction of potential developments would be short term, while pollution due to users would be diluted and dispersed. Overall, alternative D would be expected to have a minor to moderate,

positive, long-term impact on the riverway's overall water quality compared to current conditions.

Soils

Analysis. As under the no-action alternative, additional development could occur, including residential development in rural areas. Consequently, some soils would still be lost to development, although new soil disturbance would likely be reduced in the park, minimally disturbed, and natural management areas (58% of the lower riverway) where less development and more restrictive land use regulations would be employed.

With motorboat use levels and speeds being decreased, the potential for soils being eroded along the river's banks and islands should be reduced. Some riverbanks would continue to be undercut and some erosion due to motorboat wakes would continue, but the magnitude of this impact would be the lowest of all the alternatives being considered.

Shoreline erosion, soil compaction, and the formation of social trails from campers would be slightly reduced as compared to the no-action alternative by limitations and overall reductions in camping. Localized bluff erosion from foot trails would be about the same as the no-action alternative.

Alternative D would have the same effects as alternatives B and C with regard to river crossings. There could be some bridge and utility line replacements under this alternative, but any soil disturbance would be limited to areas in existing corridors that likely have already been altered. (Addi-

tional environmental documentation, with mitigation measures, would be required before these crossings would be approved.) Alternative D also would prevent soil disturbance that could be caused by new submarine crossings.

If the Army Corps of Engineers needed to do some dredging at the Kinnickinnic Narrows, this alternative would reduce the amount of dredged material that would need to be removed and disposed. If the dredged material could be reused for other purposes, soil in the riverway or nearby would not be altered by the disposal of the material. (The 1997 *Channel Maintenance Management Plan* directs that dredged material from the Kinnickinnic Narrows be placed on the delta at Kinnickinnic State park for beach nourishment.)

Conclusion. Shoreline erosion caused by boat wakes would be moderately less than the no-action alternative. Soil erosion and compaction from campers should also be reduced in localized areas, particularly on riverbanks and the islands. There is the potential for soil loss and disturbance due to new developments on private lands and from bridge replacements. However, the management area allocation would help minimize potential soil disturbance and loss on a large portion of the lower riverway. From an overall perspective, compared to present conditions, alternative D would have a minor to moderate, positive effect on the soils in the lower riverway.

Vegetation

Analysis. The alternative would have a beneficial effect in minimizing the loss of vegetation due to new development in the minimally disturbed, park and natural land management areas (58% of the riverway). Alternative D also would have a minor positive effect on plant communities if the Wisconsin Department of Natural Resources proposed amendment to the state land use standards within the riverway is adopted.

Very little additional vegetation would be lost or disturbed due to bridge and utility line replacements, and this disturbance would be limited to areas that already have been altered. If dredging occurred at the Kinnickinnic Narrows, alternative D would reduce the amount of vegetation that would be lost due to the deposition of dredged material. Alternative D also would not allow additional submarine crossings, which would prevent potential impacts on vegetation.

Some vegetation would continue to be affected in areas where users picnic or camp on the shoreline and islands, with vegetation being trampled, harvested, and cut for firewood. Any disturbance of soils also would increase the likelihood of exotic plants like spotted knapweed and purple loosestrife becoming established.

However, with a reduction in use levels, impacts from motorboat use and use of the shoreline and islands would be reduced.

Conclusion. Some vegetative communities would continue to be altered and lost due to the activities of users and new developments in the riverway. But with use levels being decreased, potential future impacts

would be reduced. The land management areas also would have a beneficial effect, helping ensure the protection of vegetation on a large portion of the lower riverway. Some minor vegetation loss also would occur if bridge or transmission line replacements were built. Efforts to maintain and restore significant plant communities on public and private lands also would have a positive effect on the riverway vegetation. From an overall perspective, most of the riverway's vegetation would not be affected by users, new developments, or the management agencies, and efforts would be made to restore native plant communities. Thus, compared to current conditions, alternative D would be expected to have a moderate, beneficial, long-term impact on the riverway's vegetation.

Fish and Wildlife

Analysis. Impacts on wildlife would not be significantly different for alternative D than the no-action alternative. Most of the lower riverway management actions in this alternative would continue to promote the protection of fish and wildlife populations and habitats. No actions would be taken that would adversely affect areas known to be of special importance for breeding, nesting, foraging, or wintering.

Rural home development creates patches that disrupt the movement of some wildlife, especially those most sensitive to human activity. There would be slightly less new rural home development under alternative D as compared to the no-action alternative, but the differences in terms of wildlife impacts would likely not be measurable, especially considering much of the rural home development that could occur in the riverway has already been built.

Many of the lower riverway's wildlife populations and habitats have already been affected in varying degrees by recreational users and nearby developments. Some individual animals might be disturbed or temporarily displaced by the sounds of more motorboats and groups floating down the river, but this is not expected to substantially affect the lower riverway's fish and wildlife populations.

Conclusion. Impacts on fish and wildlife populations would be expected to be negligible to minor.

Threatened and Endangered Species

Analysis. Reductions in use levels would not be expected to affect listed species and their habitats. Alternative D would maintain and restore significant plant communities on federal and state lands, and encourage private landowners to do likewise, which could benefit species like the Karner blue butterfly. A slight reduction in new rural home development could decrease the potential for impacts to some threatened and endangered species.

Like all of the alternatives, there is the potential in alternative D that the federally listed Higgins' eye and winged mapleleaf mussels could be adversely affected in the following ways: People could inadvertently introduce zebra mussels into the lower riverway; mussels could be scraped off boats in shallow waters or by beached boats; boats could increase shoreline erosion and sediments in the water (which could affect filter-feeding mussels); waders and swimmers could unknowingly collect mussels and use them for fishing or other purposes, and poachers could adversely

affect the mussels. These activities have occurred, or are occurring, on the lower St. Croix. Although alternative D would decrease use levels, it is not known how much of an impact this would have on the Higgins' eye and winged mapleleaf mussel populations — even with lower use levels, recreational users may continue to “take” individual mussels, which may adversely affect these species.

The following goals, strategies, or actions support the protection and recovery of these species: protection and improvement of water quality, development of a public information/education program that includes mussels, development of means to improve mussel information/coordination among various agencies, organizations, etc., continued enforcement of regulations prohibiting harvesting or taking of mussels, and implementation of the zebra mussel action plan (see “Management Directions Common to All Alternatives” section). The managing agencies would also implement their respective components of the U.S. Fish and Wildlife's recovery plans for the winged mapleleaf mussel and the Higgins' eye mussel. These components address a wide variety of tasks. The tasks include actions to minimize human disturbance and destruction to the federally listed mussels, such as quantification of the magnitude of potential threats (harvesting, swimming, wading, and small recreational watercraft) and identification of specific geographic locations of greatest concern; posting of educational signs; presentation of educational programs; and review of paddleboat operations to minimize boat operation impacts.

Conclusion. The expected uses, user numbers, and developments under alternative D would not likely adversely affect most federal and state listed species in the lower riverway (assuming adequate surveys, consultation with the U.S. Fish and Wildlife Service and state biologists, and the application of appropriate mitigation measures). Recreational activities could adversely affect the federally endangered Higgins' eye and winged mapleleaf mussel populations on the lower St. Croix. In particular, even with reductions in user numbers, boaters near Hudson and in the Interstate Park area (where the mussels primarily occur) might affect these populations. Formal consultations would still need to be initiated with the U.S. Fish and Wildlife Service to determine what other actions need to be taken to ensure the conservation of the two mussel species.

IMPACTS ON CULTURAL RESOURCES

Analysis

Archeological resources and any cultural landscapes in the riverway that might be identified in the future would face no adverse impacts under this alternative, due to greater restrictions on new development. Minor restrictions placed on camping would be used to protect sensitive archeological sites. Alternative D would require local governments in the river town and small town historic districts to develop ordinances protecting historic structures and requiring new development to be consistent with the historic character of those communities. As a result, alternative D would result in minor improvements in protection of cultural resources.

Conclusion

Cultural resources would be at minimal risk under this alternative. Additionally, this alternative would result in minor improvements in protection of cultural resources in the river town and small town historic districts. Archeological resources would face minimal risks due to restrictions on development. Restriction on development would help safeguard any significant cultural landscapes that might be identified in the cultural landscape inventory.

IMPACTS ON SOCIOECONOMIC ENVIRONMENT

Local Economy

Analysis. There would be little direct economic impact because no additional large expenditures by the states or by the Park Service is proposed. Application of the land management areas would not result in greatly different restrictions on new development for most areas within the riverway. Exceptions to this would be areas designated as natural and minimally disturbed where increased restrictions would likely occur (although development could still occur) and in towns where some restrictions would be reduced (but with historic structure protection). Consequently, limited additional negligible to minor impacts on the long-term property tax base of the local communities due to restrictions on new development would occur. Existing positive effects on local economy from expenditures from tourists and other recreationists would continue but would not be appreciably changed. An exception to that would be the loss of

economic activity associated with marinas that would be purchased and closed.

Conclusion. Impacts to the local economy would be negligible to minor compared to the no-action alternative.

Tourism

Analysis. Tourism in the St. Croix Valley is partially linked to the area's historic character. In that context, alternative D's emphasis on historic structure protection and enhancement of the historic character of valley communities would have a minor positive impact on tourism. Boating-related tourism would decrease slightly.

Conclusion. There would be some negligible to minor positive effects on tourism that might possibly be offset by a decrease in boating-related tourism.

Land Values

Analysis. Land values would not be impacted by alternative D. Local property values have probably been and would likely continue to be beneficially affected by the presence of the riverway as under the no-action alternative.

Conclusion. There would be no new impacts on land values.

Landownership/Landowners

Analysis. Alternative D proposes a modest increase in scenic easement acquisition by the two states; National Park Service acquisition is essentially complete and

would not change. As a result, the alternative D would have negligible impact on landownership.

In general under alternative D, land use regulations would be slightly more restrictive than under the no-action alternative, considering much of the rural home development that could occur has already been built. Thus alternative D could affect some landowners in a manner that would have a minor to moderate impact on flexibility in developing their property when compared to the no-action alternative.

There would be a minor to moderate beneficial impact for local landowners in some areas of the riverway due to a reduction in conflicts with recreational users, particularly in popular camping areas north of Stillwater. Local landowners would also likely benefit from a reduction in the periodic loud noise generated by higher boat speeds and reduced shoreline effects from wave action.

Conclusion. There would be negligible impacts on landownership. Some landowners would benefit from reduced restrictions on property improvements, although there would be constraints on new development to maintain historic character. Some landowners would be negatively affected by restrictions on new development or improvements in areas outside of towns. There would also be minor to moderate benefits to landowners from a reduction in conflicts and shoreline erosion associated with recreational use in some areas of the riverway.

CUMULATIVE EFFECTS

The entire viewshed of the riverway as seen from the river would not be encompassed within the riverway boundaries, therefore, visual encroachments outside the boundary have the potential to impact the scenic resources of the riverway. In the federal zone, the high bluffs, the rural character, the predominance of protected areas along this section of the river, the primarily unincorporated zoning, and the fact that the viewshed outside the boundary would be less than the state-administered zone would mean that the concerns would not be as great here as in the state-administered zone. In this zone more of the viewshed would be outside the riverway boundary, the area would have a series of benches visible from the river, there would be less high bluff areas, more of the area would be incorporated, and its proximity to the Minneapolis/St. Paul area would likely mean greater growth.

For those areas within the viewshed, yet outside of the riverway boundary, local zoning standards would be the primary methods of controlling scenic impacts to the riverway. Mitigating methodologies such as the encouragement of the preservation and maintenance of mature vegetation, planting of additional vegetative buffering, the protection of cultural resources, and the prohibition of the construction of any more extremely visible towers within the viewshed would be beneficial to the preservation of the riverway's scenic quality. Actions taken outside the riverway boundary could have negligible to major impacts on the scenic resources of the riverway, depending on the magnitude of change. Therefore, the cumulative effects of NPS/state actions on

the scenic quality of the viewshed would be negligibly to moderately beneficial, depending on the magnitude of changes to the scenic resources outside the riverway boundary.

Overall the land use management allocation, special plant community protection, and restoration efforts would contribute to a minor to moderate positive cumulative impact within the riverway and watershed.

None of the management actions would be expected to add substantively to the cumulative effects on cultural resources. Growth and land use changes could affect cultural resources adjacent to or within the viewshed of the riverway. The cumulative effects of the management actions would help mitigate the effects of population growth and development.

Many communities and counties in Minnesota and Wisconsin are in the process of revising their comprehensive plans and related ordinances. Some of these revised plans and ordinances might include land use and development provisions applicable to the river corridor that would go beyond guidance provided in this document.

The economic and population growth in the region is expected to continue. The relatively small number of jobs and expenditures on management of the riverway would only have a minor effect on the expected growth of the total economy of the region. Therefore, there would be no appreciable socioeconomic cumulative impacts from implementation of this alternative occurring in conjunction with the region's expected overall population and economy of the region.

RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed management area allocation, restrictions on island, shoreline, and boating use, along with the proposed inventory, monitoring, and research programs for the riverway, would contribute to the long-term protection and preservation of resources and scenic character of the landscape. The maintenance and restoration of plant communities would also enhance long-term productivity of natural communities.

UNAVOIDABLE ADVERSE EFFECTS

In the process of resolving conflicts among different uses or reducing resource impacts, restrictions would be placed on particular uses, having an adverse effect on some users. In order to meet the scenic and resource protection purposes of the riverway development restrictions on local landowner would implemented. To meet the recreational purposes of the riverway,

some conflicts between local landowners and recreational users would continue.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Some new residential and commercial development would likely continue to occur on private lands within the riverway boundary, particularly in the existing municipalities. Potentially, new river crossings may also occur. It is expected that this new development would result in the long-term localized loss of vegetation, soils, and wildlife habitat.

Any action that led to the loss of individual federally listed mussel species or their habitat would contribute to the loss of the species as an ecological and genetic resource. It is possible that this alternative would contribute to their decline. However, it is expected that the implementation of actions outlined in the recovery plans for these species would avoid this situation and contribute to their conservation.

IMPACTS OF ALTERNATIVE E (NO ACTION)

IMPACT ON SCENIC RESOURCES

Analysis

The use of current state and local zoning standards to limit development in urban and rural areas would ensure that future development was comparable to development that has occurred in the valley in the last 20 years. Additional development would continue, although structure size and placement would be limited to reduce visual impact.

Additional development in urban areas would result in a negligible to minor addition of visible structures. However, the character of some communities could change. The impact on scenic resources could be minor to major depending on the magnitude of change. In rural areas, considering that much of the rural home development that could occur in the riverway has already been built, expected additional development would likely have negligible to minor impacts on scenic resources.

The state of Wisconsin could elect, independent of this planning process, to amend the Wisconsin-managed forest law (chapter NR118). The consequences of this action would be considered as part of the state's established rule-making process, which would result in a long-term minor beneficial impact for scenic resources by providing landowners with more flexibility to preserve these resources.

Continued adherence to NPS policies that perpetuate native plant communities would result in a long-term minor beneficial impact to the scenic resources. (Please see

the "Impacts on Natural Resources" section for additional impacts related to vegetation management.)

Restriction of the numbers and types of road and railroad bridge crossings would prevent additional visual encroachments over the river corridor. Road and railroad bridges, however, could change in scale and character. These impacts would have to be determined on a case-by-case basis and could be negligible to major, based on the magnitude and visibility of the change.

Restriction of the number, scale, or character of utility lines would also prevent additional visual encroachments over the river corridor. Utility lines, however, could be replaced or relocated provided that the existing structures were removed. These scenic impacts would have to be determined on a case-by-case basis, and their impacts could also be negligible to major, based on the magnitude of change.

Submarine corridors could change in size or the number of lines with negligible to minor adverse impacts to scenic resources in the immediate vicinity. The degree of change would depend on the extent and duration of ground disturbance and vegetation removal during installation.

Conclusion

Additional development would continue to occur, although structure size and placement would be limited to reduce visual impact. The character of some communities could change, resulting in minor to major impacts on scenic resources, depending on the magnitude of

change. In unincorporated areas limited development would continue to be allowed and could be visible from the riverway. Road and railroad bridges could change in scale and character, and utility lines could be replaced or relocated. These actions would have a minor to major, adverse, long-term impact on the scenic resources of the riverway, depending on the magnitude of the change.

IMPACTS ON RECREATIONAL USE

Analysis

Water surface use regulations would remain in place to preserve the existing diversity of surface water recreational experiences. Overall boating use of the riverway would continue to grow slowly, if at all (existing use patterns show no clear increase in use since the mid-1980s). The existing diversity of boating opportunities would remain. Congestion problems would likely continue, primarily in the narrow section of river between the Arcola sandbar and Stillwater, in the Hudson Narrows, the Catfish Bar area, the Kinnickinnic Narrows, and the Prescott Narrows. Extremely high-speed boating would continue to be unregulated, and associated safety and noise concerns would continue in areas south of Stillwater.

There would continue to be limited regulation of camping in the riverway. The social nature of the camping experience north of Stillwater and at Hudson would not change.

Conclusion. The recreational experiences and opportunities provided by the riverway would not change. Riverway users would

continue to be negatively affected to a minor to moderate extent by congested conditions or safety issues in some areas of the riverway.

IMPACTS ON NATURAL RESOURCES

Water Quality

Analysis. Water quality impacts from petroleum products or day-use boaters who do not use proper toilet facilities would continue, as would impacts from camping north of Stillwater and at Hudson. There would continue to be some new residential development in areas not served by public sewer, leading to a slight risk of water quality impacts from failed on-site waste treatment systems.

Under alternative E there could be some bridge and utility line replacements that could have short-term adverse effects on water quality, such as increased sedimentation due to the installation of new bridge piers. Mitigation measures would likely minimize these impacts. (More detailed environmental documents would be prepared before a bridge or utility line replacement would be approved.)

Conclusion. Pollution due to user activities would continue on the lower St. Croix. From a riverwide perspective, however, it is expected that pollution due to construction of developments would be short term, while pollution due to users would be transient and should have minor to negligible effects on pollutant levels.

Soils

Analysis. Under alternative E, additional development could occur. Consequently, some soils would be lost or disturbed by development. The area between the Arcola sandbar and Stillwater is the focus of much concern about wake-induced shoreline erosion; new regulations would not be imposed to address this problem. Shoreline erosion caused by boat wakes would continue to occur. Shoreline erosion from campers and bluff erosion from foot trails would also continue.

There could be some bridge and utility line replacements under alternative E, although only a few areas would likely be affected during the life of this plan. Since these replacements would only be permitted in existing corridors, additional soil disturbance would be limited to areas that likely have already been altered.

Conclusion. Under alternative E, shoreline and bluff erosion would continue from recreational use. This would have minor to moderate, negative, long-term impacts on soils in localized areas, particularly along the riverbanks and the islands. Some soil also would be lost or disturbed due to new developments in the lower riverway. From an overall perspective, the impact of alternative E would likely be minor compared to existing conditions.

Vegetation

Analysis. In this alternative no special protection would be afforded significant plant communities on non-NPS lands. This would likely result in the gradual perpetuation and expansion of closed canopy forest communities — desirable native plant

species/communities, such as oak savanna communities, would likely be crowded out by invasive exotic species or more tolerant closed canopy plant species.

Motorboat use on the lower St. Croix is believed to be affecting shoreline vegetation, with boat wakes damaging plants, exposing root systems, and undercutting trees. With continued motorboat use, this impact would likely continue, particularly in heavily used stretches and/or stretches where there would be high-speed boats. In addition, users would continue to affect vegetation in localized areas; when they picnic and camp on the shoreline and islands, users deliberately and inadvertently trample plants. Some users probably would continue to damage trees, stripping bark from birch trees, cutting saplings, and pulling down branches for firewood. Disturbance of soils would increase the likelihood of exotic plants like spotted knapweed and purple loosestrife becoming established. With use not expected to increase greatly on the lower riverway, and no additional management of use on the islands and shoreline, degradation of vegetation would likely continue and result in minor to moderate, localized impacts. However, the prohibition of camping in three NPS areas north of Stillwater would likely result in a moderate beneficial effect, with plants becoming re-established in those areas.

Some new residential and commercial development would likely continue on private lands within the riverway boundary. It is expected that this new development would result in additional vegetation being lost or altered.

Conclusion. Under alternative E significant vegetative communities would con-

tinue to be altered and lost due to the activities of users and new developments in the riverway, primarily in heavily used areas on the islands and the shoreline, resulting in minor to moderate, long-term impacts. From a riverwide perspective, most of the riverway's vegetation would not be affected by users or the management agencies.

Fish and Wildlife

Analysis. Most of the lower riverway management actions in this alternative would continue to promote the protection of fish and wildlife populations and habitats. No actions would be taken that would adversely affect areas known to be of special importance for breeding, nesting, foraging, or wintering. Rural home development creates patches that disrupt the movement of some wildlife, especially those most sensitive to human activity. There would be some new rural home development under alternative E, but wildlife impacts are likely not measurable considering that much of the rural home development that could occur in the riverway has already been built.

Many of the lower riverway's wildlife populations and habitats have already been affected in varying degrees by recreational users and nearby developments. Some individual animals might be disturbed or temporarily displaced by the sounds of more motorboats and groups floating down the river, but this is not expected to substantially affect the lower riverway's fish and wildlife populations.

Conclusion. Impacts on fish and wildlife populations would be expected to be negligible to minor.

Threatened and Endangered Species

Analysis. Continued and possibly slightly higher recreational use and limited new rural home development would have the potential to affect some species that are sensitive to human disturbance, or areas that provide habitat for listed species could be altered. But with appropriate mitigation (e.g., keeping people away from nesting eagle nests) such impacts are not anticipated.

Although no Karner blue butterflies have been recorded in the lower riverway, butterflies might use open savanna areas along the river. This habitat has historically been declining along the riverway. Under the no-action alternative, there would be no additional management on public lands to prevent savannas from succeeding to closed canopy forests, and private landowners would not be encouraged to maintain savannas. Thus, there is the potential that this alternative might indirectly adversely affect the habitat of the Karner blue butterfly.

As described in the action alternatives, there is the potential that the federally listed Higgins' eye and winged mapleleaf mussels could be adversely affected, however, it is not known what effect these activities are having on the Higgins' eye and winged mapleleaf mussel populations. Recreational uses are likely "taking" individual mussels, which might be adversely affecting these species.

Measures to minimize impacts and recovery of mussels would include the following measures. Recovery of the winged mapleleaf mussel would include preservation of the sole known remnant population in the lower St. Croix River. Recovery of the Higgins' eye mussel includes preservation of the current populations and its essential habitat, which includes one site on the lower St. Croix near Hudson, Wisconsin. The *Cooperative Management Plan* identifies the following goals, strategies, or actions in support of the protection and recovery of these species: protection and improvement of water quality, development of a public information/education program that includes mussels, development of means to improve mussel information/coordination among various agencies, organizations, etc., continued enforcement of regulations prohibiting harvesting or taking of mussels, and implementation of the zebra mussel action plan (see "Management Directions Common to All Alternatives" section). The managing agencies would also implement their respective components of the U.S. Fish and Wildlife Service's recovery plans for the winged mapleleaf mussel and the Higgins' eye mussel. These components address a wide variety of tasks, including actions to minimize human disturbance and destruction to the federally listed mussels, such as harvesting, swimming, wading, digging, small recreational watercraft, and commercial paddlewheel watercraft; identification of specific geographic locations of greatest concern; posting of educational signs; conduction of educational programs; and review of paddleboat operations to minimize boat operation impacts.

Conclusion. It is believed that current users and use levels are not adversely affecting

most federal and state listed species in the lower riverway, and there is no indication that these uses would adversely affect the populations in the future (assuming surveys, consultation with the U.S. Fish and Wildlife Service and state biologists, and the application of appropriate mitigation measures).

Alternative E potentially could adversely affect the Karner blue butterfly's habitat indirectly. Recreational activities could adversely affect the federally endangered Higgins' eye and winged mapleleaf mussel populations. Formal consultations would be initiated with the U.S. Fish and Wildlife Service to determine actions needed to ensure the conservation of these species.

IMPACTS ON CULTURAL RESOURCES

Analysis

Cultural resources would be at a slightly higher risk under this alternative. There would be greater potential for new residential and commercial development along the riverway. Increased development and more opportunities for camping could pose an increased risk for archeological resources.

This alternative would provide for no special actions to address the historic character of the riverway's communities. Increased development could pose some impacts on historic structures, districts, and other significant resources along the riverway.

Potential impacts on any cultural or historic landscapes include the following: allow new development that would be

visible from the river; take no steps to protect the historic character of the riverway's communities; allow changes in the scale and character of railroad bridges and other bridges that would replace existing structures; and allow increases in the size and number of utility lines within existing corridors. All of these actions could pose adverse impacts on any significant cultural landscapes.

Conclusion. Cultural resources would face slightly higher risks because of the greater potential for new residential and commercial development along the riverway. Increased development and more opportunities for camping could pose greater risks of adverse impacts to archeological resources.

IMPACTS ON SOCIOECONOMIC ENVIRONMENT

Local Economy

Analysis. The no action alternative would not change the manner in which the riverway is currently being managed. Current management conditions would continue. As a result, there would be no change in the regional short- or long-term social or economic conditions related to the riverway. Existing positive effects on the local economy from expenditures from tourists and other recreationists would continue.

Conclusion. Overall effects on the regional social or economic conditions would be negligible compared to existing conditions.

Tourism

Analysis. Tourism in the St. Croix Valley is partially linked to the area's historic character. In that context, alternative E's lack of emphasis on historic structure protection and enhancement of the historic character of valley communities would not enhance tourism. The loss of historic community character could have a minor negative impact on some tourism. Boating-related tourism would increase slightly or stay the same, so impacts would be negligible.

Conclusion. There could be some minor, negative impacts on tourism.

Land Values

Analysis. Land use values would not be affected. Local property values have probably been and would likely continue to be beneficially affected by the presence of the riverway.

Landownership/Landowners

Analysis. Alternative E proposes no land acquisition by the two states; National Park Service acquisition is essentially complete and would not change. As a result, alternative E would have negligible impacts on landownership.

Landowners would still be constrained by existing restrictions on new development and land. Existing conflicts between local landowners and recreational users, particularly in the vicinity of popular camping areas north of Stillwater, and from high speed boat use would likely continue.

Shoreline erosion associated with recreational use would also continue.

Conclusion. There would be negligible impacts on landownership. Some landowners would continue to be affected by restrictions on development. Existing conflicts between local landowners and recreational users would likely continue in some areas of the riverway.

CUMULATIVE EFFECTS

The entire viewshed of the riverway as seen from the river would not be encompassed within the riverway boundaries, therefore, visual encroachments outside the boundary have the potential to impact the scenic resources of the riverway.

In the federal zone, the high bluffs, rural character, predominance of protected areas along this section of the river (primarily unincorporated zoning), and the fact that the viewshed outside the boundary would be less than the state-administered zone would mean that the concerns would not be as great here as in the state-administered zone. In this zone more of the viewshed would be outside the riverway boundary, the area would have a series of benches visible from the river, there would be less high bluff areas, more of the area would be incorporated, and its proximity to the Minneapolis/St. Paul area would likely mean greater growth. For those areas within the viewshed, yet outside the riverway boundary, local zoning standards would be the primary methods of controlling scenic impacts to the riverway.

Mitigating methodologies such as the encouragement of the preservation and maintenance of mature vegetation, planting

of additional vegetative buffering, the protection of cultural resources, and the prohibition of the construction of any more extremely visible towers within the viewshed would be beneficial to the preservation of the riverway's scenic quality. Actions taken outside the riverway boundary could have negligible to major impacts on the scenic resources of the riverway, depending on the magnitude of change. Therefore, the cumulative effects of NPS/state actions on the scenic quality of the viewshed would be negligibly to moderately beneficial, depending on the magnitude of changes to the scenic resources outside the riverway boundary.

Land use changes in the riverway and watershed have had a cumulative effect on the riverway's water quality, flows, soils, vegetation, and wildlife in localized areas. As the region's population continued to grow, new development would be likely near the riverway and in the communities along the river. Further habitat fragmentation of the surrounding watershed landscape would likely continue.

The entire historical distribution of the winged mapleleaf mussel has been significantly altered by human development in the Mississippi River basin, such as damming, dredging, application of fertilizers, pesticides, and herbicides, and municipal and industrial waste discharges. These developments are probably responsible for widespread and precipitous decline in mussel communities, and the extirpation or extinction of several species, although few studies have addressed directly the specific impact of any one of these factors (USFWS 1997). Impacts from continued recreational use and managing agency actions would contribute incrementally to impacts noted above.

None of the management actions are expected to add substantively to the cumulative effects on cultural resources. Growth and land use changes could affect cultural resources adjacent to or within the viewshed of the riverway. The cumulative effects of the management actions would help mitigate the effects of population growth and development, however, actions could be less effective under the no-action.

The economic and population growth in the region is expected to continue. The relatively small number of jobs and expenditures on management of the riverway would only have a minor effect on the expected growth of the total economy of the region. Therefore, there would be no appreciable socioeconomic cumulative impacts from implementation of this alternative occurring in conjunction with the region's expected overall population and economy of the region.

RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Existing development standards, proposed inventory, monitoring, and research programs, along with some restrictions on recreational use within the riverway would contribute to the long-term protection and preservation of resources and scenic character of the landscape.

UNAVOIDABLE ADVERSE EFFECTS

Some minor to locally moderate adverse impacts to natural resources would occur. In the process of resolving conflicts among

different uses or reducing resource impacts, restrictions would be placed on particular uses, having an adverse effect on some users. To meet the scenic and resource protection purposes of the riverway, development restrictions on local landowners would be implemented. To meet the recreational purposes of the riverway, some conflicts between local landowners and recreational users would continue and likely increase.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Some new residential and commercial development would likely continue on private lands within the riverway boundary. Potentially, new river crossing and navigation channel maintenance could also occur. It is expected that this new development would result in the long-term localized loss of vegetation, soils, and wildlife habitat.

Any action that led to the loss of individual federally listed mussel species or their habitat would contribute to the loss of the species as an ecological and genetic resource. It is possible that this alternative would contribute to their decline. However, it is expected that the implementation of actions outlined in the recovery plans for these species would avoid this situation and contribute to their conservation.

IMPACTS OF MANAGEMENT STRUCTURE OPTIONS

PREFERRED OPTION

This option would involve the least cost, but some minor adjustments would be made from the current management approach. The Lower St. Croix Partnership Team would provide access to the decision-making process for citizens and local interest groups. Staff services to the partnership team would be provided by the Minnesota and Wisconsin Departments of Natural Resources.

The states would retain “certification/objection/veto” authority over ordinance adoptions, amendments, and variances, but not over conditional use permits or subdivisions. On-water law enforcement would remain the same.

OPTION 1: MINOR ADJUSTMENT

This option would be more expensive to implement than the preferred option but significantly less costly than options 2 or 3. The role of the Minnesota-Wisconsin Boundary Area Commission would be reduced in this option. The Lower St. Croix Planning Task Force would provide access to the decision-making process for citizens and local interest groups. State agency veto authority over local land use decisions would not change. On-water law enforcement would remain the same.

OPTION 2: JOINT POWERS BOARD

This option and option 3 would be the most expensive to implement. The role of the Minnesota-Wisconsin Boundary Area Commission would be reduced, but the Lower St. Croix Management Commission

would have a larger and more independent role and would have great local representation. The joint powers board would provide greater access to the decision-making process for local governments. The joint powers board, rather than state agencies, would have veto authority over local land-use decisions. Creation of the joint powers board and the St. Croix water patrol would require action by both state legislatures and the Congress, a significant undertaking. A new on-water law enforcement agency (the St. Croix water patrol) would be created, significantly raising the cost of this option.

OPTION 3: RIVERWAY BOARD

Options 2 and 3 would be the most expensive to implement. The roles of the Minnesota-Wisconsin Boundary Area Commission and the Lower St. Croix Management Commission would be the same as described under option 2. The riverway board would directly implement local zoning in riverway communities, supplanting local decision-making. As indicated under option 2, creation of a riverway board and the St. Croix water patrol would require action by both state legislatures and Congress undertaking. Creation of a new on-water law enforcement agency (St. Croix water patrol) would significantly raise the cost of this option.

OPTION 4: NO ACTION

The riverway would continue to be managed as it has been in the past. Costs would be the same as they are now.

COMPLIANCE

In implementing the cooperative management plan for the Lower St. Croix National Scenic Riverway, the National Park Service and the states of Minnesota and Wisconsin would comply with all applicable federal, state, and local regulations, statutes, laws, and executive orders, such as the Endangered Species Act, Clean Water Act, and National Historic Preservation Act. Several of the key federal and state statutes and regulations that affect management of the lower riverway are summarized below.

WILD AND SCENIC RIVERS ACT (82 STAT. 906) AS AMENDED

As a designated wild and scenic riverway, the National Park Service and the states of Wisconsin and Minnesota will comply with all provisions of the Wild and Scenic Rivers Act. If any water resource projects, including bridges, are proposed that might affect the lower riverway, the National Park Service is required to conduct an evaluation under section 7 of the act.

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA)

This act sets forth the federal policy to preserve important historic, cultural, and natural aspects of our national heritage. It requires federal agencies to use a systematic, interdisciplinary, approach that integrates natural and social sciences in planning and decision making that may impact the human environment.

The Lower St. Croix National Scenic Riverway *Cooperative Management Plan / Environmental Impact Statement* was prepared pursuant to this act and its implementing regulations and guidelines. Implementation of this plan will require ongoing adherence to the National Environmental Policy Act. Additional documentation may need to be prepared in the future if NPS facilities are moved or altered, or other actions are taken to manage visitor use.

WISCONSIN ENVIRONMENTAL POLICY ACT OF 1971 (WEPA)

Wisconsin has an Environmental Policy Act (WEPA), approved by the legislature in 1971 as Wisconsin Stats. 1.11, which is largely patterned after NEPA in purpose, content, and process. The Wisconsin Department of Natural Resources (WDNR), as a Lower St. Croix Riverway management partner and whose future management activities will be guided by the cooperative management plan, is required to satisfy WEPA requirements. Wis. Admin. Code NR 150 contains applicable substantive and procedural requirements to comply with WEPA for all WDNR actions, including management plans (NR 150.03 (6)(a)(6)(a)) such as the cooperative management plan. To avoid duplication, NR 150 allows WDNR to adopt an environmental review document of another agency provided it meets the minimum requirements of WEPA. By cooperating with NPS in development of the cooperative management plan and design of the public review process, WDNR has been assured that WEPA requirements are being satisfied.