

**Draft  
Restoration Plan and Environmental Assessment  
for the  
Guttenberg, Iowa Train Derailment Site  
November 25, 2015**

**Iowa Department of Natural Resources  
and  
U.S. Department of the Interior  
Fish and Wildlife Service**

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## **Restoration Plan and Environmental Assessment Guttenberg, Iowa Train Derailment**

### **1.0 Introduction**

#### **1.1 Purpose**

The purpose of this assessment is to consider and evaluate various alternatives available to the action agencies to help restore the natural resources that were injured as a result of exposure to petroleum products and were destroyed from emergency response actions for the Guttenberg, Iowa train derailment in 2008. The oil products included diesel fuel and lubricating fluids. The oil products were discharged into Bluff Slough of Navigation Pool 11 for the Upper Mississippi River within the Upper Mississippi River National Wildlife and Fish Refuge.

The Comprehensive Environmental Compensation and Liability Act (CERCLA) (Title 42 United States Code Sections 9601 to 9675), Oil Pollution Act (Title 33 United States Code Section 2701 *et seq.*), Clean Water Act (Title 33 United States Code Section 1251 *et seq.*), and the Natural Resource Damage Assessment and Restoration (NRDAR) regulations (Title 43 Code of Federal Regulations Part 11) are laws and rules that direct the restoration of natural resources that have been injured by such a discharge of oil. According to the regulations, government Trustees for natural resources ensure that the public is fairly compensated for these kinds of injuries to natural resources.

The Trustees received a damages settlement payment from the responsible party for the environmental contamination from the discharge of oil products and destruction of natural resources from the emergency response actions. The Iowa Department of Natural Resources is representing the State Trustee. The U.S. Fish and Wildlife Service is representing the Federal Trustee. The injured natural resources included upland habitats, river shoreline habitats, river floodplain habitats, aquatic life including mussels, other invertebrates, amphibians, and fishes, aquatic dependent wildlife including migratory birds and mammals that depend on the river for shelter, food, and drinking water, and lost recreational use of the river.

The Trustees are now required to use the settlement money for restoration actions. The Trustees are obligated to develop and adopt a Restoration Plan before the restoration money can be used for a project, and that in doing so, there must be adequate public notice, opportunity for public comment, and consideration of available restoration alternatives. In addition, the Federal government must balance engineering and economic decisions with the environmental consequences of its actions according to the National Environmental Policy Act (NEPA). Therefore, this Restoration Plan was developed as an integrated Environmental Assessment under NEPA to facilitate public involvement and to be in compliance with agency environmental decision-making requirements.

#### **1.2 Needs**

There is the need to compensate the public for injuries from contamination in the river due to the discharge of petroleum products and for the destruction of natural resources as part of the emergency response. Furthermore, the Trustees are responsible for satisfying the requirements in the consent decree. The Trustees intend to use the available restoration funds in such a manner as to provide the maximum benefits as soon as possible. To accomplish this, the Trustee sought out partnership opportunities to leverage the settlement funds or to be part of existing, appropriate, and larger scale

restoration programs and projects. The Trustees wish to enhance the conservation benefits from their actions by positioning restoration projects next to existing larger scale programs and projects versus ending up with smaller isolated restoration projects on the landscape. The Iowa Natural Heritage Foundation's Driftless Area program and other environmental groups are also interested in land conservation and restoration in this part of Iowa. Partnerships will also be needed to monitor and help protect the restored natural resources on into the future.

### **1.3 Background**

On July 9, 2008, at approximately 4:00 a.m. Central Daylight Time, a train derailed about 4.6 miles south of the city of Guttenberg, Iowa. The derailment location, known as Bluff Slough, is along the west bank of a side channel for the Upper Mississippi River in Clayton County. A large boulder had fallen onto the railroad tracks from the rocky bluff above causing the derailment of four locomotives and four grain cars. One of the four locomotives slid down the railroad grade and was submerged in the river. Two of the other four locomotives slid down the railroad grade and were partially submerged in the river. The remaining locomotive remained on the railroad grade. The grain cars remained near the tracks or on the railroad grade.

Diesel fuel and other petroleum products from the locomotives discharged through openings and vents onto the shoreline grade and into the Upper Mississippi River. The emergency response activities included boom deployment to contain the discharged oil, use of pads to absorb the floating oil, removal of oiled vegetation, and re-railing of the locomotives and grain cars. Some of these oil products sank because they are heavier than water, and the lighter oils can also sink as they attach to sediment particles in the water column and settle out later.

There were significant response related impacts to natural resources resulting from the removal and re-railing of the locomotives. The large boulder on the railroad tracks was blasted into the river, and landed in a mussel bed. A rock ramp was constructed from the railroad grade out into the river on July 15, 2008. The rock ramp encroached into the river by about 3,240 square feet. The rock ramp filled over a mussel bed that contained state and federally listed endangered mussel species. The rock ramp was removed on October 30, 2008.

### **2.0 The Alternatives**

The Trustees considered the various types of restoration alternatives that are defined in the NRDAR regulations (Title 43 Code of Federal Regulations Part 11) for developing the Restoration Plan. Restoration is defined as an action or group of actions taken to either: 1) rehabilitate the injured natural resource if cleanup or remediation was sufficient to prevent future problems; 2) replace the injured natural resource by creating new resources or enhancing existing resources; or 3) acquisition of equivalent natural resources to those that were injured.

Two broad categories of restoration actions include in-kind and out-of-kind. In-kind means that the project focuses on the restoration of natural resources that are comparable to those that were lost. Out-of-kind means that the project focuses on restoration of natural resources that are different than those that were lost. Out-of-kind projects are usually considered if in-kind projects are not available or

feasible.

The Trustees prefer to locate the restoration action in the vicinity or same system of the natural resource loss. However, it is often necessary to locate restoration actions further away, but as close as possible, based on the restoration opportunities available.

### **2.1 Alternatives Eliminated from Analysis**

The Trustees did not consider the potential alternative for compensation of the injured terrestrial natural resources through rehabilitation of grassland habitats that have been impacted by invasive species. This alternative would contribute to the restoration of a dominant native habitat for Iowa. The Trustees did not locate any additional grassy openings for rehabilitation in the action area that could be part of a larger restoration program or activity. A grassy opening adjacent to the Turkey River Mounds State Preserve and near the train derailment site was adversely impacted by the emergency response as it was used for storage of response materials and heavy equipment. The impacted grassy opening was rehabilitated by the responsible party with assistance from the Iowa Department of Natural Resources. The rehabilitation methods included herbicide treatments to control weed species, sowing grassland seeds, and follow up care.

Other alternatives that were considered for the aquatic natural resources included the creation of rock riffle structures or other fish and mussel habitat in the Upper Mississippi River or in the tributary streams of the Upper Mississippi River. Riffle structures include gravel and cobble substrates that are used by fish for spawning and allow mussels to colonize because of the lack of sedimentation due to the higher flow over shallow rocky bars.

The creation of new gravelly substrate areas in the Upper Mississippi River may be feasible with the right partner to help with the costs to find, transport, and dump the materials in the river. Creation of new gravelly substrates in the Upper Mississippi River may be considered under other mussel restoration projects and was not further considered here due to the lack of available partners.

The creation of new gravelly substrate areas in the tributary streams of the Upper Mississippi River may be feasible in streams with good water quality to support a diverse assemblage of aquatic life including multiple species of mussels and their host fishes. Creation of new gravelly substrates in the tributary streams may be considered under other watershed restoration projects and was not further considered here due to the lack of available partners.

The construction of riffle structures, other fish and mussel habitat, and creation of new gravelly substrates will require Clean Water Act permits, Rivers and Harbors Act permits, and/or a more detailed cultural resource review which is beyond the scope of this Restoration Plan and Environmental Assessment given the alternatives carried forward for analysis.

### **2.2 The Alternatives Carried Forward for Analysis**

In our review for the Restoration Plan, we were able to identify and develop the following timely and appropriate alternatives to meet the restoration purpose and need to compensate the public for the past losses of terrestrial natural resources. The available alternatives included reforestation of floodplain habitats on public lands, acquisition and restoration of upland property, acquisition and restoration of floodplain property, reforestation of floodplain habitat on private lands, mussel stocking, shoreline habitat

restoration on public lands, shoreline habitat restoration on private lands, and the no action alternative.

### **2.2.1 Alternative A: Floodplain Reforestation on Public Lands (preferred alternative)**

Under the floodplain reforestation alternative (Alternative A), injuries to terrestrial natural resources would be compensated by planting trees in a former crop field in an area known as Turkey River Bottoms. The fee title for the real property that contains the crop field was previously acquired by the McGregor District of the Upper Mississippi River National Wildlife and Fish Refuge. Turkey River Bottoms is just downstream of the affected area and adjacent to the Turkey River Mounds State Preserve in Clayton, County. The objective for Alternative A is to help connect and defragment bottomland hardwood forest habitat along the Upper Mississippi River.

The reforestation strategy is to plant trees in the open fields. The target species include native species. The seeds for the nursery that will grow the trees will come from bottomland hardwood forests in the area. The exact choice of species will be based on review of historical timber sale records for this area. The open field area for afforestation is about 65 acres. The open field is now covered with invasive grass species. Staff from the Upper Mississippi River National Wildlife and Fish Refuge will provide maintenance to help ensure long term protection.

This alternative is also outlined and environmental effects analyzed in the Comprehensive Conservation Plan for the Upper Mississippi River National Wildlife and Fish Refuge (USFWS 2006). The alternative meets the purpose and the needs for the action. The implementation of this alternative would contribute to other larger scale reforestation and forest resource management along the Upper Mississippi River by State and Federal agencies. There are additional in-kind services available from the partners to help with the long term maintenance for Alternative A.

### **2.2.2 Alternative B: Acquisition and Restoration of Upland Property (preferred alternative)**

Under the upland acquisition and restoration alternative (Alternative B), injuries to terrestrial natural resources would be compensated by securing property adjacent to other public terrestrial habitat that is for sale from willing sellers and restoring ecological services and human uses. The objective for Alternative B is to help buffer sensitive upland habitats along the Upper Mississippi River from disturbances and stressors coming from adjacent areas.

There are two adjoining upland properties for sale in the vicinity of the affected area. The total acreage for the two properties is 11 acres. These properties are open areas and former crop fields being sold for residential lots. The properties border the Turkey River Mounds State Preserve. The Iowa Natural Heritage Foundation has acquired the properties and the environmental organization is willing to sell the properties to the Iowa Department of Natural Resources for inclusion into the Turkey River Mounds State Preserve.

The properties contain previously described and inventoried Native American effigies. The restoration strategy is to re-vegetate the properties with native cover by seeding and natural recovery in a manner that is consistent with protecting the effigies. The properties also provide a new access route for maintenance and a buffer zone from encroachments into the State Preserve.

This alternative is consistent with the Iowa State Wildlife Action Plan (IADNR 2005). The alternative meets the purpose and the needs for the action. The implementation of this alternative would contribute

to other larger scale heritage area management and preservation of rare species by State and Federal agencies. The Iowa Natural Heritage Foundation can assist with the realty transaction and provide technical expertise for restoration. There are additional in-kind services available from the Iowa Department of Natural Resources to conduct the restoration (site preparation, revegetation, and invasive species removal) and long term maintenance (mowing and prescribed burns) for Alternative B.

### **2.2.3 Alternative C: Acquisition and Restoration of Floodplain Property (secondary option)**

Under the floodplain acquisition and restoration alternative (Alternative C), injuries to terrestrial natural resources would be compensated by securing property adjacent to other public terrestrial habitat that is for sale from willing sellers and restoring ecological services and human uses. The objective for Alternative C is to help buffer sensitive floodplain habitats along the Upper Mississippi River from disturbances and stressors coming from adjacent areas.

The Trustees did not locate any additional floodplain properties for sale within the action area that could be part of a larger restoration program or activity at this time. Floodplain properties have been acquired within the action area in the past by the Trustee agencies. See Alternative A for a description of a floodplain property recently acquired by the U.S. Fish and Wildlife Service that will be restored with support from this Restoration Plan. There may be additional floodplain property in the Turkey River Bottoms for sale from willing sellers in the future. The Trustees would like to keep this option open for future actions. Future acquisition of Turkey River Bottom properties would undergo the same restoration plan as outlined for Alternative A.

### **2.2.4 Alternative D: Reforestation on Private Lands (not selected because of limited in-kind services for long-term maintenance)**

Under the floodplain reforestation alternative (Alternative D), injuries to terrestrial natural resources would be compensated by planting trees in a crop field within an area known as Turkey River Bottoms. The fee titles for the real properties for the crop fields are currently held by a private landowner. Turkey River Bottoms is just downstream of the affected area and adjacent to the Turkey River Mounds State Preserve in Clayton, County. The objective for Alternative D is to help connect and defragment bottomland hardwood forest habitat along the Upper Mississippi River.

The reforestation strategy is to plant trees in the open fields. The target species include native species. The seeds for the nursery that will grow the trees will come from bottomland hardwood forests in the area. The exact choice of species will be based on review of historical timber sale records for this area. The open field area for reforestation is about 9 acres. The open field is now covered with invasive grass species.

The alternative meets the purpose and the needs for the action. The implementation of this alternative would contribute to other larger scale reforestation and forest resource management along the Upper Mississippi River by State and Federal agencies. There are limited in-kind services available from the partners to help with the long term maintenance for Alternative D. The restoration project for Alternative D would remain in private ownership.

### 2.2.5 Alternative E: Mussel Stocking (preferred alternative)

Under the mussel stocking alternative (Alternative E), injuries to natural resources would be compensated by propagating and culturing mussels from area hatcheries. The objectives for Alternative E are to introduce immature mussels into the population to augment the numbers of young mussels and speed up the natural recovery of the Upper Mississippi River ecosystem.

The augmentation strategy would include multiple methods, multiple species and occur over multiple years at multiple locations. The brood stock for artificial propagation will be collected and returned afterwards from the same areas and river reaches as selected for the stocking. This approach will allow the Trustees to address many of the affected mussel species.

Introduced young mussels can augment existing mussel populations. There is a high mortality rate for the early life stages of freshwater mussels in the wild. Some of the young cultured mussels can be held in captivity for a few extra years to mitigate for the high natural mortality rates. This approach has to be balanced with risks of overwintering and diseases. In addition, the augmentation methods may include releases of free ranging or caged fish that have been inoculated with the larval stage of mussels. The fish will be certified as disease free.

Having workers stocking mussels at the existing mussel beds also allows the opportunity to clean zebra mussels off of the native mussels. The zebra mussels are attached to the native mussels by thin threads that are easily brushed away. The cleaned native mussels would be placed back from where they were removed for the cleaning.

The mussel species target list would include species that are naturally found in the area of the loss and are able to be propagated thus ensuring we would have good numbers of young available for restocking. The mussel species target list could also include species that are more difficult to propagate to allow for some benefits to rare species.

See Table 1. for a complete list of mussel species for the restocking effort. All of these mussel species and fish host species occur or historically occurred in the affected reaches of Upper Mississippi River Pool 11 (personal communication Scott Gritters of the Iowa Department of Natural Resources, and Cummings and Mayer 1992)

This alternative is desirable because it meets the purpose and the needs for the action. The implementation of this alternative would contribute to other larger scale mussel restoration projects by the State of Iowa and Federal agencies. There are a variety of partners for the preferred alternative (see Section 6 below). There is additional funding available to help do research on mussel propagation techniques while implementing the preferred alternative.

**Table 1. List of Mussels, ease of propagation and status for species known to occur in Pool 11 of the Mississippi River near Guttenberg, IA. Ease of propagation is based on life history knowledge and the availability of gravid females and suitable host fish in the immediate vicinity of the project.**

Scientific Name	Common Name	Ease of Propagation	Status
<i>Actinonaias ligamentina</i>	Mucket	Easy	---

<i>Amblema plicata</i>	Threeridge	Easy	---
<i>Arcidens confragosus</i>	Rock pocketbook	Difficult	---
<i>Ellipsaria lineolata</i>	Butterfly	Moderate	ST
<i>Elliptio dilatata</i>	Spike	Difficult	---
<i>Fusconaia flava</i>	Wabash pigtoe	Difficult	---
<i>Lampsilis cardium</i>	Plain pocketbook	Easy	---
<i>Lampsilis higginsii</i>	Higgins' eye	Easy	FE, SE
<i>Lampsilis siliquoidea</i>	Fatmucket	Easy	---
<i>Lampsilis teres</i>	Yellow sandshell	Moderate	SE
<i>Lasmigona complanata</i>	White heelsplitter	Moderate	---
<i>Leptodea fragilis</i>	Fragile papershell	Moderate	---
<i>Ligumia recta</i>	Black sandshell	Easy	---
<i>Megaloniaias nervosa</i>	Washboard	Easy	---
<i>Obliquaria reflexa</i>	Three-horned wartyback	Difficult	---
<i>Obovaria olivaria</i>	Hickorynut	Easy	---
<i>Pleurobema sintoxia</i>	Round pigtoe	Difficult	SE
<i>Potamilus alatus</i>	Pink heelsplitter	Moderate	---
<i>Pyganodon grandis</i>	Giant floater	Easy	---
<i>Quadrula metanevra</i>	Monkeyface	Difficult	---
<i>Quadrula nodulata</i>	Wartyback	Difficult	---
<i>Quadrula pustulosa</i>	Pimpleback	Difficult	---
<i>Quadrula quadrula</i>	Mapleleaf	Difficult	---
<i>Strophitus undulatus</i>	Creeper	Difficult	ST
<i>Toxolasma parvus</i>	Lilliput	Easy	---
<i>Truncilla donaciformes</i>	Fawnsfoot	Difficult	---
<i>Truncilla truncata</i>	Deertoe	Difficult	---
<i>Utterbackia imbecilis</i>	Paper pondshell	Easy	---

### 2.2.6 Alternative F: Shoreline Habitat Restoration Public Lands (preferred alternative)

Under the shoreline habitat restoration alternative (Alternative F), injuries to aquatic natural resources would be compensated by creating habitat on land that is owned by the McGregor District of the Upper Mississippi River National Wildlife and Fish Refuge or Turkey River Mounds State Preserve. Both of these areas are adjacent to the affected area. The objective for Alternative F is to provide habitat for fish that serve as host for native mussels as well as habitat for state threatened mudpuppies which suffered habitat loss as part of the spill. Mudpuppies also serve as a host for salamander mussels which are known to occur in Bluff Slough.

The restoration strategy is to create underwater cavities using rocks, rootwads, or artificial structures to provide hiding spots for resident fish and spawning substrate for mudpuppies. Staff from the Iowa Department of Natural Resources, Upper Mississippi River National Fish and Wildlife Refuge, and the Iowa/Illinois Ecological Services Field Office will provide monitoring to help ensure long term success and protection.

The implementation of this alternative would contribute to other larger scale resource management along the Upper Mississippi River by State and Federal agencies. There are additional in-kind services (long-term

monitoring and maintaining, and replacing structures as needed) available from the partners to help with the long term maintenance for Alternative F.

### **2.2.7 Alternative G: Shoreline Habitat Restoration Private Lands (not selected because of limited in-kind services for long term monitoring and maintenance)**

Under the shoreline habitat restoration alternative (Alternative G), injuries to aquatic natural resources would be compensated by creating habitat on land that is in private ownership along and upstream of Bluff Slough. The objective for Alternative G is to provide habitat for fish that serve as host for native mussels as well as habitat for state threatened mudpuppies that suffered habitat loss as part of the spill.

The restoration strategy is to create underwater cavities using rocks, rootwads, or artificial structures to provide hiding spots for resident fish and spawning substrate for mudpuppies. Staff from the Iowa Department of Natural Resources will provide monitoring to help ensure long term success and protection.

The implementation of this alternative would contribute to other larger scale resource management along the Upper Mississippi River by State and Federal agencies. There are additional in-kind services available from the partners to help with the long term maintenance for Alternative G. The restoration project from Alternative G would remain in private ownership.

### **2.2.8 Alternative H: No Action**

Under the no action alternative (Alternative H), the past natural resource losses would be uncompensated. Given sufficient time, natural processes should enable the affected natural resources to recover to conditions that existed prior to the release of hazardous substances. The natural recovery periods are expected to take decades. Without at least some monitoring it would be impossible to tell if some of the resources, especially mussels, will return to the baseline condition.

## **3.0 Affected Environment**

### **3.1 Alternative A: Floodplain Reforestation on Public Lands**

**Project Site:** The project site is located in Turkey River Bottoms of the Upper Mississippi River National Wildlife and Fish Refuge in an area between the confluence of the Turkey River and the Mississippi River in Clayton County, Iowa.

**Geological Resources:** The soil type at the project site is hydric poorly drained soils overlaid with sand deposits from flooding.

**Hydrology:** The project site is in the floodplain of the Turkey River.

**Cultural Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites

map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicate the potential for historic sites along the Iowa side of Mississippi River along Pool 11 (<http://digital.lib.uiowa.edu/maps/>).

**Habitat Resources:** The project site was prior converted river lowland and wetlands for row crop production of corn and soybean. There were not any native habitats on the property at time of acquisition with the vegetation cover being dominated by invasive reed canary grass (*Phalaris arundinacea*).

**Biological Resources:** There are not any federally listed or state listed endangered or threatened species at project site. The bald eagle (*Haliaeetus leucocephalus*) occurs in Clayton County, but there are no known nest trees at or immediately adjacent to the project site. The agricultural land use provided limited habitat for wildlife including for migratory birds. However, the newly created bottomland forest will support amphibians, reptiles, migrating birds, and mammals once the afforestation is completed.

**Surrounding Land Use:** Riverine, forest habitats, and crop field border the project site.

### 3.2 Alternative B: Acquisition and Restoration of Upland Property

**Project Site:** The project site is located on top of the bluff along the Upper Mississippi River and adjacent to the Turkey River Mounds State Preserve in Clayton County, Iowa.

**Geological Resources:** The soil type at the project site is upland loams overlaid on limestone bedrock.

**Hydrology:** Upland land cover.

**Cultural Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicate the potential for historic sites along the Iowa side of Mississippi River along Pool 11 (<http://digital.lib.uiowa.edu/maps/>).

**Habitat Resources:** The project site was prior cleared of some forest cover and was being converted to residential housing construction lots. The property was a mix of native habitats and cleared lands.

**Biological Resources:** There are not any federally listed or state listed endangered or threatened species at project site. The bald eagle occurs in Clayton County and there are no known nest trees at or immediately adjacent to the project site. The lands in question have not been surveyed but certainly many state endangered plant and potentially animal species reside on the state preserve property. The clearing for residential housing land use provided limited habitat for wildlife including for migratory birds. However, the newly created upland native habitat will support reptiles, migrating birds, and mammals once the restoration is completed.

**Surrounding Land Use:** Forest habitats and residential housing border the project site.

### **3.3 Alternative C: Acquisition and Restoration of Floodplain Property**

**Project Site:** The project site is located in Turkey River Bottoms in an area between the confluence of the Turkey River and the Upper Mississippi River in Clayton County, Iowa.

**Geological Resources:** The soil type at the project site is hydric poorly drained soils overlaid with sand deposits from flooding.

**Hydrology:** The project site is in the floodplain of the Turkey River.

**Cultural Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicate the potential for historic sites along the Iowa side of Mississippi River along Pool 11 (<http://digital.lib.uiowa.edu/maps/>).

**Habitat Resources:** The project site was prior converted river lowland and wetlands for row crop production of corn and soybean. There were not any native habitats on the property at time of acquisition with the site being dominated by invasive reed canary grass.

**Biological Resources:** There are not any federally listed or state listed endangered or threatened species at project site. The bald eagle occurs in Clayton County, but there are no known nest trees at or immediately adjacent to the project site. The agricultural land use provided limited habitat for wildlife including for migratory birds. However, the newly created bottomland forest will support amphibians, reptiles, migrating birds, and mammals once the afforestation is completed.

**Surrounding Land Use:** Riverine , forest habitats, and cropfield border the project site.

### **3.4 Alternative D: Floodplain Reforestation on Private Lands**

**Project Site:** The project site is located in Turkey River Bottoms in an area between the confluence of the Turkey River and the Upper Mississippi River in Clayton County, Iowa.

**Geological Resources:** The soil type at the project site is hydric poorly drained soils overlaid with sand deposits from flooding.

**Hydrology:** The project site is in the floodplain of the Turkey River.

**Cultural Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicates the potential for

historic sites along the Iowa side of Mississippi River along Pool 11 (<http://digital.lib.uiowa.edu/maps/>).

**Habitat Resources:** The project site was prior converted river lowland and wetlands for row crop production of corn and soybean. There were not any native habitats on the property at time of acquisition with the site being dominated by invasive reed canary grass.

**Biological Resources:** There are not any federally listed or state listed endangered or threatened species at project site. The bald eagle occurs in Clayton County, but there are no known nest trees at or immediately adjacent to the project site. The agricultural land use provided limited habitat for wildlife including for migratory birds. However, the newly created bottomland forest will support amphibians, reptiles, migrating birds, and mammals once the afforestation is completed.

**Surrounding Land Use:** Riverine , forest habitats, and cropland border the project site.

### 3.5 Alternative E: Mussel Stocking

**Project Site:** The project site is located in Bluff Slough, a backwater of pool 11 of the Upper Mississippi River National Fish and Wildlife Refuge in Clayton County, Iowa.

**Geological Resources:** The proposed project site is located in Bluff Slough of the Upper Mississippi River with underlying sands and gravels (fluvial deposition) that have been deposited more recently by riverine processes.

**Hydrology:** The project site is in a backwater of the Upper Mississippi River

**Cultural Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicate the potential for historic sites along the Iowa side of Mississippi River along Pool 11 (<http://digital.lib.uiowa.edu/maps/>).

**Habitat Resources:** The proposed project sites include coarse sand and gravel bar habitats. Gravelly bars are created in the river by hydraulic conditions that promote scouring of fine sands, silt, and clay sized sediment particles leaving behind the coarser sand and gravel materials. The gravel size particles are moved more slowly along the bottom by river currents.

**Biological Resources:** Gravelly bars support an assemblage of benthic macroinvertebrates including mussels, and fishes. Fish eating wildlife such as turtles, mammals, and birds forage over gravelly bars. Gravelly bars do not typically support major beds of aquatic plants. We reviewed the federally listed species database for Iowa maintained by the U.S. Fish and Wildlife Service. The review indicates that the federally listed endangered Higgins eye mussel and endangered spectacle case mussel could be found at proposed project sites.

**Surrounding Land Use:** Riverine and forest habitats surround the project site.

### 3.6 Alternative F: Shoreline Habitat Restoration Public Lands

**Project Site:** The project site is located in Bluff Slough, a backwater of pool 11 of the Upper Mississippi River National Fish and Wildlife Refuge in Clayton County, Iowa.

**Geological Resources:** The soil type at the project site is hydric poorly drained soils overlaid with sand deposits from flooding.

**Hydrology:** The project site is in the floodplain of the Upper Mississippi River.

**Cultural Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicate the potential for historic sites along the Iowa side of Mississippi River along Pool 11 (<http://digital.lib.uiowa.edu/maps/>).

**Habitat Resources:** The proposed project sites include coarse sand and gravel bar habitats. Gravelly bars are created in the river by hydraulic conditions that promote scouring of fine sands, silt, and clay sized sediment particles leaving behind the coarser sand and gravel materials. The gravel size particles are moved more slowly along the bottom by river currents.

**Biological Resources:** Gravelly bars support an assemblage of benthic macroinvertebrates including mussels, and fishes. Fish eating wildlife such as turtles, mammals, and birds forage over gravelly bars. Gravelly bars do not typically support major beds of aquatic plants. We reviewed the federally listed species database for Iowa maintained by the U.S. Fish and Wildlife Service. The review indicates that the federally listed endangered Higgins eye mussel and endangered spectacle case mussel could be found at proposed project sites.

**Surrounding Land Use:** Riverine and forest habitats surround the project site.

### 3.7 Alternative G: Shoreline Habitat Restoration Private Lands

**Project Site:** The project site is located in Bluff Slough, a backwater of pool 11 of the Upper Mississippi River in Clayton County, Iowa.

**Geological Resources:** The soil type at the project site is hydric poorly drained soils overlaid with sand deposits from flooding.

**Hydrology:** The project site is in the floodplain of the Upper Mississippi River.

**Cultural Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicate the potential for

historic sites along the Iowa side of Mississippi River along Pool 11 (<http://digital.lib.uiowa.edu/maps/>).

**Habitat Resources:** The proposed project sites include coarse sand and gravel bar habitats. Gravelly bars are created in the river by hydraulic conditions that promote scouring of fine sands, silt, and clay sized sediment particles leaving behind the coarser sand and gravel materials. The gravel size particles are moved more slowly along the bottom by river currents.

**Biological Resources:** Gravelly bars support an assemblage of benthic macroinvertebrates including mussels, and fishes. Fish eating wildlife such as turtles, mammals, and birds forage over gravelly bars. Gravelly bars do not typically support major beds of aquatic plants. We reviewed the federally listed species database for Iowa maintained by the U.S. Fish and Wildlife Service. The review indicates that there is the federally listed endangered Higgins eye mussel and endangered spectacle case mussel could be found at proposed project sites.

**Surrounding Land Use:** Riverine and forest habitats surround the project site.

### 3.8 Alternative H: No Action

Resources and land use will remain in the reduced baseline conditions under the no action alternative until natural recovery is completed which is expected to take up to decades.

**Table 2. Summary of current environmental conditions for the action alternatives considered in the alternative analysis.**

Attribute	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
<b>Project Site</b>	Turkey River bottoms	Turkey River Mounds State Preserve	Turkey River bottoms	Turkey River bottoms	Bluff Slough	Bluff Slough	Bluff Slough
<b>Geological Resources</b>	Lowland soils	Upland soils	Hydric soils with sand deposits	Hydric soils with sand deposits	Sand and gravel	Sand and gravel	Sand and gravel
<b>Hydrology</b>	Floodplain	Upland	Floodplain	Floodplain	Backwater	Backwater	Backwater
<b>Cultural Resources</b>	In vicinity	In vicinity	In vicinity	In vicinity	In vicinity	In vicinity	In vicinity
<b>Habitats</b>	Lowland cropfield	Upland mowed area	Lowland cropfield	Lowland cropfield	Sand and gravel bars	Sand and gravel bars	Sand and gravel bars
<b>Fish and Wildlife</b>	Currently poor	Currently poor	Currently poor	Currently poor	Benthic macroinverts	Benthic macroinverts	Benthic macroinverts

<b>Surrounding Land Use</b>	Forest & agriculture	Forest & housing	Forest and agriculture	Forest and agriculture	Riverine and forest	Riverine and forest	Riverine and forest
<b>Endangered, Threatened, and Candidate Species</b>	None	None	None	None	Higgins eye and spectacle case mussels	Higgins eye and spectacle case mussels	Higgins eye and spectacle case mussels

#### 4.0 Environmental Consequences

##### 4.1 Effects Common to All

**Historical Resources:** The historical maps and site inspections by natural resource agencies indicated that no farmstead or town buildings existed at the proposed project sites.

**Environmental Justice:** Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, 59 Federal Register 7629 (1994), directs Federal agencies to incorporate environmental justice in their decision making process. Federal agencies are directed to identify and address as appropriate, any disproportionately high and adverse environmental effects of their programs, policies and activities on minority or low-income populations.

No environmental justice issues exist for any of the action alternatives. None of the alternatives would create environmental pollution. No minority or low-income populations would be displaced or negatively affected in any other way by the proposed action or any alternative.

There may be benefits to any low-income communities near the project areas by the action alternatives through improvements to environmental conditions and biological diversity.

**Cumulative Impacts:** The phrase “cumulative impacts” refers to the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Enhancing aquatic populations is considered to have positive environmental consequences. Native habitats, fish, and wildlife populations will all benefit on a regional basis by the action alternatives.

##### 4.2 Alternative A: Floodplain Reforestation on Public Lands

**Geological Resources:** The proposed action of reforestation will return the land cover to a prior condition of the ecosystem. The native land cover will prevent erosion of sediments into nearby waterways. The soil compaction from use of agricultural machinery will be repaired by restoring the ecological functions of soil processes.

**Hydrology:** The reforestation plan does not include any changes to topography beyond very small mounds around the tree plantings. There are not any anticipated changes to site’s drainage patterns or for the adjacent properties.

**Archeological Resources:** This restoration action would not affect any archeological resources because there are very limited physical disturbances associated with planting RPM trees.

**Habitat Resources:** The reforestation machinery and equipment would be brought to the proposed project site along existing farm roads. The planting of trees would not cause any adverse modification to existing native habitats. The proposed reforestation alternative would provide new benefits to fish and wildlife. Adjacent aquatic resources would benefit from a buffer zone, reduced erosion, no use of agricultural chemicals. Wildlife would benefit by restoring ecosystem services associated with providing shelter, food, and water.

**Biological Resources:** There may be short term impacts to wildlife using the invasive grasses for shelter or food. There will be long term benefits to amphibians, reptiles, migratory birds, and mammals from restoring the site to a prior condition of the ecosystem by providing shelter, food, and water for a diverse assemblage of bottomland forest species.

**Socioeconomic Impacts:** There are no new losses in local property taxes, because the property has already been transferred from private to public ownership. There will be new economic benefits for local communities from human uses of the ecological services and goods in the restored ecosystem.

**Partnership Considerations:** Being part of a larger river corridor reforestation and management program without any additional costs extends the use of the settlement funds.

#### **4.3 Alternative B: Upland Acquisition and Restoration**

**Geological Resources:** The proposed action of restoration and permanent protection will return the land cover to a prior condition of the ecosystem. The native land cover will prevent erosion of soil particles and help stabilize the bluff.

**Hydrology:** There are not any anticipated changes to site's drainage patterns or for the adjacent properties.

**Archeological Resources:** This restoration action would not affect any archeological resources because there are no physical disturbances associated with planting native vegetation.

**Habitat Resources:** The restoration machinery and equipment would be brought to the proposed project site along existing maintenance roads. The plantings would not cause any adverse modification to existing native habitats. The proposed restoration alternative would provide new benefits to wildlife. Wildlife would benefit by restoring ecosystem services associated with providing shelter, food, and water.

**Biological Resources:** There may be short term impacts to wildlife with new habitat plantings. There will be long term benefits to reptiles, migratory birds, and mammals from restoring the site to a prior condition of the ecosystem by providing shelter, food, and water for a diverse of assemblage of upland species.

**Socioeconomic Impacts:** There will be new losses in local property taxes, because the property will be transferred from private to public ownership. There will be new economic benefits for local communities from human uses of the ecological services and goods in the restored ecosystem.

**Partnership Considerations:** Being part of a larger management plan for the State Preserve System

without any additional costs extends the use of the settlement funds.

#### **4.4 Alternative C: Floodplain Acquisition and Restoration**

**Geological Resources:** The proposed action of reforestation will return the land cover to a prior condition of the ecosystem. The native land cover will prevent erosion of sediments into nearby waterways. The soil compaction from use of agricultural machinery will be repaired by restoring the ecological functions of soil processes.

**Hydrology:** The reforestation plan does not include any changes to topography beyond very small mounds around the tree plantings. There are not any anticipated changes to site's drainage patterns or for the adjacent properties.

**Archeological Resources:** This restoration action would not affect any archeological resources because there are no physical disturbances associated with planting native vegetation.

**Habitat Resources:** The reforestation machinery and equipment would be brought to the proposed project site along existing farm roads. The planting of trees would not cause any adverse modification to existing native habitats. The proposed reforestation alternative would provide new benefits to fish and wildlife. Adjacent aquatic resource would benefit from a buffer zone, reduced erosion, no use of agricultural chemicals. Wildlife would benefit by restoring ecosystem services associated with providing shelter, food, and water.

**Biological Resources:** There may be short term impacts to wildlife using the invasive grasses for shelter or food. There will be long term benefits to amphibians, reptiles, migratory birds, and mammals from restoring the site to a prior condition of the ecosystem by providing shelter, food, and water for a diverse assemblage of bottomland forest species.

**Socioeconomic Impacts:** There may be losses in local property taxes, because the property would be transferred from private to public ownership. There will be new economic benefits for local communities from human uses of the ecological services and goods in the restored ecosystem.

**Partnership Considerations:** Being part of a larger river corridor reforestation and management program without any additional costs extends the use of the settlement funds.

#### **4.5 Alternative D: Floodplain Reforestation on Private Lands**

**Geological Resources:** The proposed action of reforestation will return the land cover to a prior condition of the ecosystem. The native land cover will prevent erosion of sediments into nearby waterways. The soil compaction from use of agricultural machinery will be repaired by restoring the ecological functions of soil processes.

**Hydrology:** The reforestation plan does not include any changes to topography beyond very small mounds around the tree plantings. There are not any anticipated changes to site's drainage patterns or for the adjacent properties.

**Archeological Resources:** This restoration action would not affect any archeological resources because there are very limited physical disturbances associated with planting RPM trees.

**Habitat Resources:** The reforestation machinery and equipment would be brought to the proposed project site along existing farm roads. The planting of trees would not cause any adverse modification to existing native habitats. The proposed reforestation alternative would provide new benefits to fish and wildlife. Adjacent aquatic resource would benefit from a buffer zone, reduced erosion, no use of agricultural chemicals. Wildlife would benefit by restoring ecosystem services associated with providing shelter, food, and water.

**Biological Resources:** There may be short term impacts to wildlife using the invasive grasses for shelter or food. There will be long term benefits to amphibians, reptiles, migratory birds, and mammals from restoring the site to a prior condition of the ecosystem by providing shelter, food, and water for a diverse assemblage of bottomland forest species.

**Socioeconomic Impacts:** There may be losses in local property taxes, because the property would be transferred from private to public ownership. There will be new economic benefits for local communities from human uses of the ecological services and goods in the restored ecosystem.

**Partnership Considerations:** Being part of a larger river corridor reforestation and management program without any additional costs extends the use of the settlement funds.

#### **4.6 Alternative E: Mussel Stocking**

**Geological Resources:** There will be no change to the soils.

**Hydrology:** There are not any anticipated changes to site's drainage patterns or for the adjacent properties.

**Archeological Resources:** This restoration action would not affect any archeological resources because there are no physical disturbances associated with stocking of aquatic species into the Upper Mississippi River.

**Habitat Resources:** There would be no adverse effects to natural resources as a result of the project. The injured mussel bed will benefit from the reintroduction of lost species.

**Biological Resources:** There will be beneficial effects from the augmentation of existing mussel species by recruitment of new young into the population that has been impacted by the release of hazardous substances and zebra mussel infestations. Genetic considerations and diversity will be managed by only using the brood stock collected in Pool 11 or the adjacent Pools 10 and 12 of the Upper Mississippi River.

**Socioeconomic Impacts:** There will be new economic benefits for local communities from human uses of the ecological services and goods in the restored ecosystem.

**Partnership Considerations:** The mussel propagation alternative has partnership opportunities including Federal agencies, State agencies, and local governments of the adjacent communities.

#### 4.7 **Alternative F: Shoreline Habitat Restoration Public Lands**

**Geological Resources:** The proposed action of restoration will benefit the geological resources by helping to prevent erosion of sediments into nearby waterways.

**Hydrology:** There are not any anticipated changes to site's drainage patterns or for the adjacent properties.

**Archeological Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicate the potential for historic sites along the Iowa side of Mississippi River along Pool 11 (<http://digital.lib.uiowa.edu/maps/>). A thorough archaeological review will be performed prior to restoration site selection in order to prevent impacts to archeological resources.

**Habitat Resources:** The restoration machinery and equipment would be brought to the proposed project site along existing farm roads or by boat. The placing of the rocks, rootwads, or artificial structures will benefit existing eroded shoreline structures by providing stability to the sandy shoreline. The proposed restoration alternative would provide new benefits to fish and wildlife. Wildlife would benefit by restoring ecosystem services associated with providing shelter, food, and spawning substrate.

**Biological Resources:** There may be short term impacts to wildlife using the existing shoreline for shelter or food. There will be long term benefits to fish, amphibians, reptiles, migratory birds, and mammals from restoring the site by providing shelter, food, and spawning substrate for a diverse of assemblage of aquatic species.

**Socioeconomic Impacts:** There will be new economic benefits for local communities from human uses of the ecological services and goods in the restored ecosystem.

**Partnership Considerations:** The shoreline restoration alternative has partnership opportunities including Federal agencies, State agencies, and local governments of the adjacent communities.

#### 4.8 **Alternative G: Shoreline Habitat Restoration Private Lands**

**Geological Resources:** The proposed action of restoration will benefit the geological resources by helping to prevent erosion of sediments into nearby waterways.

**Hydrology:** There are not any anticipated changes to site's drainage patterns or for the adjacent properties.

**Archeological Resources:** There are no buildings or building foundations at the project site. We reviewed the public version of the cultural resources spatial database (Isites) for Iowa maintained by the Office of State Archeologist for the State of Iowa (<http://ags.gis.iastate.edu/IsitesPublicAccess/>). The Isites map indicates that there are cemeteries and archeological sites along the Upper Mississippi River in Clayton County. Early plat maps of the townships for Clayton County indicate the potential for historic sites along the Iowa side of Mississippi River along Pool 11



Socioeconomic Issues	No Changes	Neutral	No Changes	No Changes	No Changes	No Changes	Neutral	No Changes
Part of larger restoration effort	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

## 5.0 List of Preparers

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## 6.0 References, Consultation, and Coordination

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## 7.0 Public Review and Comment

The Restoration Plan and Environmental Assessment report was posted on the Rock Island, IL Ecological Services web site starting on \*, 2015 at <http://www.fws.gov/midwest/RockIsland/ec/Restoration/index.html>.

A legal notice of availability was published in the \* News by the U.S. Fish and Wildlife Service on \*, 2015 to solicit comment, issues, or concerns from the public. The public comment period is open between the dates of \*, 2015 and \*, 2015.

Public comments are pending the results of the public review period.

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Appendix A: Map of the Guttenberg Train Derailment Site, Iowa

