

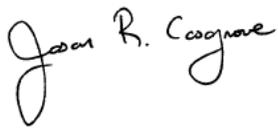
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Natural Resource Damages Assessment and Restoration Planning (DARP) Report

Marathon Pipe Line LLC
MT. ERIE PIPE LINE RELEASE
NEAR ALBION, WAYNE COUNTY, ILLINOIS

November 2010

Revised March 2011



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**Natural Resource Damages
Assessment and Restoration
Planning (DARP) Report**

Mt. Erie Pipe Line Release
Project

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1. Introduction

This document describes the activities related to natural resource damages (NRD) associated with the release of crude oil in August 2008 from a pipe line owned and operated by Marathon Pipe Line LLC (MPL). It describes the nature of the event, the effects and potential effects of the event on the natural resources of the area, and the planned activities to rehabilitate the injured natural resources back to the condition that existed prior to the discharge of oil, and to compensate the public for the interim lost use of natural resources during the recovery period.

1.1 Event History

In the morning hours of August 10, 2008, a sudden pressure drop was noted on a 20-inch diameter pipe line owned and operated by MPL. The pipe line transports crude oil (oil) from Patoka, Illinois, to Owensboro, Kentucky (Figure 1). The pipe line was shut down immediately as pressure sensors noted the pressure drop. Reconnaissance noted a pipe line rupture adjacent to a remote section of gravel road in a predominantly agricultural area south of the towns of Mt. Erie and north of Golden Gate, Wayne County, Illinois. The pipe line release occurred between MPL pumping stations located approximately 10 miles to the northwest and 8 miles to the southeast. The pipe line is buried approximately 5 feet below ground surface at the release location. It has been estimated that approximately 5,000 barrels of oil were released during the pipe line break. Over 3,260 barrels of crude oil have been recovered from the Site (through direct recovery, estimated evaporation, and estimated quantity contained within directly removed soils). To-date, over 6,000 tons of soil has been disposed off-site.

Immediately after the pipe line release, oil exited the ground and sprayed an area of foliage and trees immediately to the southwest of the pipe line rupture. Oil also flowed over the ground surface in the immediate vicinity of the release. In addition to the oil “spray” and surface flow of oil, oil migrated through the subsurface soil due to the pressure of the pipe line (i.e., pipe line pressure at the time of release was estimated to be 200 pounds per square inch (psi)).

The overland oil flow traversed east approximately 70 to 100 feet into a forested area and oil then flowed south to the pipe line right-of-way (ROW). An additional overland

flow pathway of oil flowed southward from the ROW about 430 feet and stopped. At the ROW, oil flowed in a southeasterly direction, and pooled behind a slight hill in the ROW, resulting in backflow of oil northward approximately 100 ft in a narrow, seasonally dry swale. Once the pool in the ROW was large enough, the oil flow extended south of the ROW into forested woodlands. The oil flowed northward out of the forested area back to the ROW, and continued to migrate along the ROW to the southeast until it reached a drainage swale which directed the flow southward at the eastern edge of the woods. The oil flowed southward along a seasonally dry drainage swale to open surface water. Upon reaching the open water, the oil formed a layer on the water surface, and migrated down seasonally dry meandering creek beds and low flow capacity streams (i.e., the abandoned Elm Creek Channel). The oil was largely contained within the creek banks. The extent of spread of released oil is identified on Figure 2.

MPL responded immediately to the release and completed extensive emergency response and mitigation activities at the Site. Those response activities included over 250 personnel with operations 24 hours a day, 7 days a week. Details and approximate locations of immediate response remedial activities are summarized on Figure 2.

MPL has purchased property from both Robert E. and Janice K. Anniss (53 acres) and William E. and Liese Ricketts (104 acres) which contains the Site, affected lands, and adjacent lands (Figure 3).

1.2 Site Description

The overall project area is located in a sparsely occupied, unincorporated area of Wayne County, Illinois. Historic and current land use in the vicinity of the spill is rural with a history of ranching, farming, and oil and gas exploration and production. The immediate project site, or identified release area, generally includes lands proximate to the existing pipeline corridor, south of County Road 5 and west of County Road 3. As noted above, there were two private parcels known to be affected by the release. MPL now owns approximately 157 acres that encompasses the area(s) immediately surrounding the pipe line release.

There is an extensive palustrine forested wetland extending southward from the release area. This wetland area is part of the Elm Creek and Little Wabash River floodplain. The former channel of the Elm River¹ lies within the property, and it serves to create ponds and oxbows which provide habitat for a variety of wildlife species. The Little Wabash River flows in a southerly direction, south of the immediate project site. The forested wetland is a mixture of deciduous hardwoods characteristic of floodplain habitats. Common trees include: green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*), black willow (*Salix nigra*), swamp white oak (*Quercus bicolor*), hackberry (*Celtis laevigata*), American elm (*Ulmus americana*), black walnut (*Juglans nigra*), shagbark hickory (*Carya ovata*), *Crataegus* species, and bitternut hickory (*Carya cordiformis*). Common understory species include buttonbush (*Cephalanthus occidentalis*), Poison ivy (*Toxicodendron radicans*), trumpet creeper (*Campsis radicans*), and marsh seedbox (*Ludwigia palustris*).

Through its significant habitat structure and contiguity, the large palustrine forest complex in the area of the release site provides habitat for a variety of wildlife species. Wildlife species observed at the Site – or likely to occur at or near the Site – include mammals, birds, snakes and amphibians, and aquatic life.

A portion of the project site in the immediate vicinity of the pipe line release is bounded by an existing Conservation Reserve Program (CRP) contract.

A further description of site conditions can be referenced in the *Wetland Delineation Report* (ARCADIS, September 2010) and *Wetland Mitigation Plan* (ARCADIS, March 2011).

¹ The Elm River was redirected to a channelized drainage ditch located west of the Site prior to 1930 which is the earliest historical mapping identified for the site. Representatives of local and state National Resource Conservation Service and local drainage ditch committee could not provide a general date of construction of the ditch.

1.3 Natural Resource Damages

The NRD resulting from the release of crude oil is regulated under the Oil Pollution Act of 1990, which defines the natural resources as those held “in trust” for the public. The trustees for the natural resources include certain federal and state agencies defined by the Oil Pollution Act of 1990 and Native American nations or tribes affected by the damages. For this event, the trustee has been designated as the United States Fish & Wildlife Services (USFWS). The Illinois Environmental Protection Agency (IEPA) and Illinois Department of Natural Resources (IDNR) are involved in the capacities of remedial investigation manager (IEPA) and technical adviser for natural resource concerns (IDNR).

Natural resources are defined by the regulations to include:

- The environment: land, surface water, groundwater, and air
- Fish, wildlife, vegetation or other living things

NRD assessment (NRDA) is the process of determining the kind and scale of restoration. This document summarizes the NRDA process for this event. The draft Restoration Plan is subject to a public review period.

2. Injury Assessment

The injury assessment phase of the NRD process identifies the natural resources potentially present and estimates the potential injuries to those resources. Descriptions of natural resources occurring, or potentially occurring, in the vicinity of the Site and their potential injuries are provided below.

2.1 Endangered Species

Given the geographic location and available habitats, a federally endangered species, the Indiana Bat (*Myotis sodalis*), could inhabit the Site. In wooded areas, the Indiana Bat may roost under the loose tree bark on dead or dying trees. Roost trees typically are within canopy gaps or along wooded edges. Habitats in which maternity roosts

occur include riparian zones, bottomland and floodplain habitats, wooded wetlands, and upland communities. Indiana bats tend to forage in semi-open to closed forested habitats with an open understory, forest edges, and riparian areas.

Indiana bats are found throughout most of the eastern half of the United States. Approximately half of the known population of all Indiana bats hibernates in the southern half of Indiana; Illinois has an estimated population of 43,000 Indiana Bats. Actual surveys for the endangered Indiana bat were not performed at the Site, but based on the presence of suitable habitat, the Indiana bat may be present (*Biological Assessment Report, Endangered Species – Indiana Bat*, ARCADIS, December 2009). The Missouri Department of Conservation (MDC, *Best Management Practices*, June 2000) states that Indiana bats prefer live shagbark hickory (*Carya ovata*) and large (live or dead) white oak (*Quercus alba*) trees for maternal roost sites. Of all trees removed from the Site during the release response, only 19 trees of these preferred species were removed. This loss of potential habitat (roosting trees and foraging areas) represents a relatively small fraction of the total wooded wetlands available in the vicinity of the release.

The total size of suitable habitat for the Indiana bat around the action area was determined to be approximately 233 acres; of that area, a total area of 10.3 acres was cleared of its trees. The extent of modification to summer habitat for the Indiana Bat does not represent an appreciable change to the quality of summer habitat in the vicinity of the release, as the modification (tree clearing) was limited to the narrow linear features of access roads installed and enhanced at the Site, on a limited scale. This modification is similar in nature to, and may not represent a substantially greater extent than, the tree mortality related to the natural variation of the flooding regime in the vicinity of the Site. Finally, alternative suitable habitat for summer roost habitat is available elsewhere on the Site and nearby, where the timber stand contains old growth individuals of the preferred tree species. In the *Biological Opinion* prepared by USFWS (2010) pursuant to this issue, USFWS determined the following:

“We conclude that bats including the federally listed endangered Indiana bat may have been incidentally harassed or harmed by the otherwise authorized tree removal activities for the emergency response. However, based on the best available information, the take of the Indiana bats by the response actions when

added to the reduced fitness or survival due to the environmental baseline conditions will not cause a detectable negative effect in reproduction or recruitment of the species in this region. The harassment or harm if present was near the end of the summer season which is past the birth and immature care phases of the reproductive cycle so the young bats were volant (capable of flight and caring for self). The loss of a primary maternity roost tree is not unique in that forest succession and storms may also cause the loss of roost trees. “

Restoration planning and implementation will incorporate measures that avoid any adverse effects to the endangered bats that may be present at the site.

2.2 Waters of the U.S., including Wetlands

Waters of the United States, including Wetlands (waters/wetlands) were delineated by ARCADIS using methods outlined in the 1987 USACE *Wetlands Delineation Manual* (Environmental Laboratory, 1987) (hereafter, 1987 Manual) and 2008 *Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (USACE, 2008) (hereafter, 2008 Regional Supplement). Field work was performed on September 10 and 11, 2008 with additional data collection on July 15 and 16, 2010. In addition to the wetland delineation, ARCADIS delineated boundaries of all impacted areas within wetlands.

Impacts to waters/wetlands have been divided into three functional categories: oil spill/staining remediation; placement of fill in waters/wetlands; and vegetation clearing in waters/wetlands. The impacts may be summarized as follows:

- **Oil spill/staining remediation:** The areas of this remediation were in lower elevations of the Site, predominantly within the “historical” channel for the Elm River. Remedial activities included flushing of surface oils and some shallow surface scraping of the channel bed and banks. The pre-construction course, condition, capacity, and location of open waters was maintained and/or restored throughout these impacted areas.
- **Structural fill:** Roads were constructed or improved; two interceptor trenches were constructed; a variety of structures – berms, dams, bridges, siphon dams, etc – were constructed throughout the Site.

- **Tree clearing:** To allow access for response and remedial activities, selected trees were cleared in locations throughout the Site.

2.3 Aquatic and Aquatic-Dependent Communities

Portions of the Site lie within the floodplain of the Elm River. These areas contain several ponds, or sloughs, which are periodically flooded. This habitat is presumed to not support substantial fish communities, but would support benthic macroinvertebrates, aquatic vegetation, and aquatic-dependent wildlife. The USFWS requested that the benthic macroinvertebrate community² of the aquatic habitats associated with the Site be evaluated for potential injuries to the natural resources, resulting from the release, with the intent to provide information for the injury assessment and restoration selection process.

Sampling locations and methods were selected by ARCADIS (on behalf of MPL) and the trustee in a cooperative process. A total of 10 locations were collected in Site locations and nearby reference areas, with five locations in each. Co-located sediment samples were collected and analyzed for the constituents of concern related to the pipe line release.

One sampling location within the Site had macroinvertebrate data that suggested the benthic community may be degraded. The sediment sample from this location also had the most reported detections and highest concentrations of the constituents of concern, and was the only Site location during this sampling event whose sample concentrations exceeded the criteria of concern. The physical habitat at this location was also the most modified, and structurally simplified, of all sampling locations, partially as a result of activities conducted during the recovery and remediation following the release.

² Here, the phrase “benthic macroinvertebrates” refers to all aquatic and semiaquatic macroinvertebrates that may be collected within an aquatic habitat. It includes those macroinvertebrates that occupy the sediment surface, are within the sediment, on submerged structure, on vegetation, or free-swimming.

Several additional aquatic-dependent wildlife, specifically several turtles and two ducks, were lost as a result of oiling.

3. Restoration Planning

Two kinds of restoration are recognized in the NRD process:

- Primary restoration – restoration to return the natural resources and the services they provide to the kind and level present before the release.
- Compensatory restoration – restoration to compensate for the services temporarily lost before the affected natural resources are restored to their full function.

Primary restoration activities were initiated shortly after the release, and are ongoing. These have been described in detail in documents associated with the response and remediation activities proposed at the Site and will be summarized below.

Several compensatory restoration options were considered in the NRDA process, including a variety of planting options and excavation of the oxbow channels on the site to create deeper water habitat. Proposed compensatory restoration activities are detailed in a *Wetlands Mitigation Plan* (ARCADIS 2011).

To achieve proposed functional lift, the following is proposed in the *Wetlands Mitigation Plan*: (1) restoration of 7.1 acres of impacted palustrine forested wetlands on-site, (2) restoration of 14.2 acres of adjacent agricultural fields; and (3) installation of bat houses and wood duck boxes. Respective to the Nationwide Permit, the proposed mitigation is intended to account for all temporary impacts to palustrine forested wetland habitat and reflects a 3:1 mitigation ratio. Respective to formal consultation with USFWS relative to impacts to faunal populations, installed habitat features are intended to enhance habitat for the Indiana bat and wood duck. Additionally, and outside the scope of the intended mitigation plan, an area of 7.9 acres (initially cleared in the Conservation Resource Program area during immediate response activities) will be restored, subsequent to completion of bioremediation activities.

Remediation plans pertaining to impacted media have been assembled in a *Remediation Action Plan* (RAP). Surface soil, subsurface soil, sediment, and shallow groundwater media investigation, characterization, and monitoring have been conducted under the auspices of the IEPA and INDR. Following is a summary of RAP-proposed activities:

- Soils in the immediate vicinity of surface soil sample SS-03 (located just to the south of the pipe line point of release) will be remediated (via excavation and off-site disposal) in order to remove potential residential soil inhalation risk.
- Surficial soils (in the vicinity of the vegetation-disturbed Conservation Resource Program area of the site) will be incorporated into an enhanced bioremediation treatment zone/area.
- Institutional controls have been incorporated in the remedial action, as described in the RAP. Marathon has recorded an Environmental Land Use Control (ELUC) with Wayne County that incorporates into the remedial action a construction worker caution zone covering the entire remediation site and a groundwater use prohibition. Workers who disturb soil within the construction worker zone during excavation or other activities will be notified of the potential presence of impacts and will be required to use appropriate personal protective equipment (PPE). The groundwater use restriction will prohibit use of groundwater at the site for potable purposes and will address the groundwater ingestion and soil component to groundwater ingestion risks.
- A Declaration of Restrictive Covenant for Conservation has been recorded for the site with Wayne County (per the USACE).
- A construction worker caution notification will be attached to the deed of the property in the recording of a No Further Remediation (NFR) Letter with the county. The construction worker caution notification will address potential construction worker soil inhalation risks presented by site soils.

- Monthly free product recovery activities will be conducted on monitoring well MW-7 (located just to the south of the pipe line's point of release) until free product has not been observed in the well for three consecutive months.

3.1 Primary Restoration

Primary restoration activities include:

- Removal of structural fill
- Tree planting, to offset losses incurred by clearing and other activities during the response phase and remediation activities
- Restoration of wetlands impacted by the oil release and response phase and remediation activities

The planned efforts will result in the restoration of habitats and services present at the Site to near pre- release conditions. Tree planting will be of sufficient density to achieve nearly pre-release conditions (once the trees mature). A total of 7.1 acres will be subject to the primary restoration. In addition, over an acre will be included in primary restoration related to implementation of the *Remedial Action Plan* (ARCADIS 2011) – outlined activities.

3.2 Compensatory Restoration

Three main elements of potential compensatory restoration have been identified in discussions with the trustee. MPL currently plans to initiate projects for these restoration opportunities. They are:

- Installing and maintaining two steel, seven chambered, artificial bat houses and planting trees to provide habitat for the Indiana Bat;

- Installing and maintaining ten wood duck nesting boxes to increase local productivity of the wood duck³; and
- Restoring a palustrine forested wetland in the existing agricultural field to the east of the project site to create additional wetland habitat.

The primary objective of the Mt. Erie palustrine forested wetland restoration is the enhancement of ecosystem functioning associated with the large on-site wetland complex. This enhancement mitigates for unavoidable impacts to waters/wetlands that resulted from remedial activities and compensates the public for the interim lost use of natural resources during the recovery period. To achieve the proposed lift in wetlands function, MPL has proposed restoration of 14.2 acres of adjacent agricultural fields.

These projects will account for all temporary impacts to palustrine forested wetland habitat. In addition, MPL will work with the *Natural Resources Conservation Service* to address the restoration of an area (7.9 acres) of the Site, cleared during response activities, which is currently held as CRP lands.

Based on project discussions among all parties, the agricultural field adjacent to the east edge of the Site was selected as an appropriate mitigation area to account for impacts, including natural resource damages, to the wetland ecosystem and other natural resources resulting from the pipe line release, response and remedial activities, and subsequent damages and losses of natural resources services. This site was selected because it is owned by MPL, provides an appropriate on-site mitigation option which provides resource-to-resource compensatory restoration, and will significantly increase ecosystem functioning to the Elm River floodplain ecosystem.⁴ The

³ Additional details as they relate to proposed artificial bat houses and wood duck boxes are contained within the *Wetlands Mitigation Plan* (ARCADIS 2011).

⁴ A 1999 USACE publication (*Case Study: Application of the HGM Western Kentucky Low-Gradient Riverine Guidebook to Monitoring Wetland Development*) which evaluated rates of restored ecosystem functioning in previous agricultural fields demonstrated that the restoration of a agricultural field to low-gradient riverine/floodplain wetlands had dramatic functional results in a

restoration site boundary follows the elevation of the 5 percent daily exceedance flow events estimated for the Site based upon available mapping and site observations.

Consistent with USACE requirements for the restoration project, trees will be planted at a density of:

- 60 stems/acre, if utilizing RPM⁵ nursery trees (minimum 3-gallon container and 30 inch tall), or
- 450 stems/acre, if utilizing bare root seedlings (minimum 30 inches tall).

It is anticipated that RPM nursery trees will be utilized for this project. Only hard mast species (i.e., oak and hickory species) will be planted. They are highly valuable to aquatic-dependent wildlife and are a requirement of USACE. The planted areas will also be seeded with a native floodplain seed mix. Depending on water levels (and site accessibility), planting is tentatively scheduled for late spring / early summer 2011. The restoration plan design is provided in the *Wetland Mitigation Plan* and may be summarized as follows:

1. Site preparation. Establish a plant staging area, and installation of any necessary sediment and erosion control measures.
2. Clearing of vegetation necessary to facilitate removal of fill and/or structures.
3. Removal of all temporary fill materials and/or structures.
4. Tilling and grading of impacted areas and restoration site.
5. Installation of monitoring wells (for site hydrology monitoring) within restoration site.
6. Planting of native tree and shrub species within all impacted areas and the adjacent restoration site, consistent with planting plan.

⁵ <http://www.rpmecosystems.com/>

7. Short term adaptive management would include: (1) planting native tree and shrub species to replace mortality that occurs over the first year of compliance monitoring; and/or (2) control of invasive non-native species which establish within restoration site.

The following table summarizes proposed plantings within the impacted waters / wetlands within the project site:

Scientific Name	Common name	Density (# / Acre)	Total Number to be Planted
<i>Quercus bicolor</i>	Swamp White Oak	10	71
<i>Quercus lyrata</i>	Overcup oak	10	71
<i>Quercus palustris</i>	Pin oak	10	71
<i>Quercus michauxii</i>	Swamp Chestnut Oak	10	71
<i>Quercus macrocarpa</i> *	Bur oak	5	36
<i>Carya laciniosa</i>	Kingnut hickory	5	36
<i>Carya illoinensis</i>	Sweet pecan	5	36
<i>Carya cordiformis</i>	Bitternut hickory	5	36

The following table summarizes proposed plantings within the adjacent restoration project at the site (12.2 acre Oak-Hickory mixed hardwood Palustrine forest):

Scientific Name	Common name	Density (# / Acre)	Total Number to be Planted
<i>Quercus bicolor</i>	Swamp White Oak	5	61
<i>Quercus lyrata</i>	Overcup oak	10	122
<i>Quercus palustris</i>	Pin oak	5	61
<i>Quercus michauxii</i>	Swamp Chestnut Oak	5	61
<i>Quercus macrocarpa</i> *	Bur oak	5	61
<i>Carya laciniosa</i>	Kingnut hickory	10	122
<i>Carya illoinensis</i>	Sweet pecan	5	61
<i>Carya cordiformis</i>	Bitternut hickory	5	61
<i>Ulmus americana</i>	American elm	10	122

The following table summarizes proposed plantings within the adjacent restoration project at the site (2 acre Oak-Hickory-Elm mixed hardwood Palustrine forest:

Scientific Name	Common name	Density (# / Acre)	Total Number to be Planted
<i>Carya laciniosa</i>	Kingnut hickory	10	20
<i>Quercus lyrata</i>	Overcup oak	10	20
<i>Ulmus americana</i>	American elm	10	20
<i>Quercus michauxii</i>	Swamp Chestnut Oak	10	20
<i>Quercus palustris</i>	Pin oak	7	14
<i>Carya illoinensis</i>	Sweet pecan	6	12
<i>Quercus macrocarpa*</i>	Bur oak	7	14
<i>Cephalanthus occidentalis</i>	Buttonbush	30	60

Compliance monitoring will be conducted following all restoration plantings for a minimum of 5 years, consistent with requirements of the NWP. If the performance standards defined below are met after the 5 years period, the USACE will be petitioned to reduce further monitoring requirements. If performance standards are not met after 5 years, compliance monitoring will continue until a point when they are met. Compliance monitoring will focus on survivorship of native trees and shrub plantings, as well as monitoring the establishment of invasive non-native plant species.

3.3 Compensatory Project Scaling

As described above, the planned compensatory restoration will have three elements:

- Enhancement of habitat for the Indiana Bat,
- Enhancement of habitat for aquatic-dependent wildlife, and
- Tree planting in areas of impacts and wetlands restoration in the agricultural fields east of the project site.

The requirement for NRD under OPA is that lost services be compensated for by the creation of additional service flows that are: comparable in what services are provided (e.g., habitat type) and geographically nearby to the area injury. This is the “in place, in kind” consideration for compensatory restoration.

The determination of the quantity of compensatory services provided by restoration projects is typically based on an analysis of the services the injured site provides before, during, and after damages have occurred. One commonly used method to calculate these losses is based on the quality of the habitat injured, the total area of injury, and the duration of injury⁶. To compensate for a loss of services in an area of a certain habitat type over a period of time, an equivalent area of that habitat type would be restored, or otherwise created, and the habitat would provide those services for a certain period of time. The net effect of the restoration would be to create additional ecological service or function, to equal or exceed the total services loss.

For this site, the proposed wetlands restoration project includes both the restoration of the injured wetlands and the restoration of agricultural fields to wetlands. The following assumptions can be applied to the evaluation of the value of the restoration:

- The injured site wetlands will be restored, thereby limiting their injury and loss of service to a relatively limited period of time.
- The restored adjacent wetlands (currently an agricultural field) will provide services for a period of time substantially longer than the period during which site wetlands were impacted by the spill event⁷.
- The proposed compensatory restoration project will result in the restoration of equivalent wetlands habitat and function in an area directly adjacent to the Site – satisfying the requirement that restoration be “in place”.

⁶ This is Habitat Equivalency Analysis. See <http://www.darrp.noaa.gov/library/pdf/heaoverv.pdf> for an overview of the method.

⁷ A deed restriction will protect all restored areas in perpetuity.

- The proposed compensatory restoration project will result in the restoration of an adjacent area twice the size of the affected (injured) wetlands on the Site, whose services are sufficient to replace the interim lost use of the natural resources during the recovery period.
- The restored adjacent wetlands will provide a variety of ecological services that are similar to those impacted on the Site, thereby satisfying the requirement that restoration be “in kind” (i.e., resource-to-resource).
- The enhanced function of the restored adjacent wetlands will provide substantially higher ecosystem functioning than those offered by an agricultural field, thereby generating a “lift” in function and ecological services (natural resources) as a result of the restoration.

The result of the proposed compensatory restoration will be to provide additional natural resource services:

- That are similar in nature to those injured on the Site,
- For a period of time far in excess of the period of injury on the Site, and
- In an area twice the size of the injured wetlands on the Site.

3.4 Compensatory Projects Effects

The planting and other work planned in the field adjacent to the Site represents the majority of planned compensatory restoration. The Department of the Interior Departmental Manual, 516 DM 6, Appendix 1, Section 1.4 identifies “classes of actions which do not individually or cumulatively have a significant effect on the human environment.” NRDA restoration plans prepared under CERCLA or the Oil Pollution Act are excluded under 1.4(11), “when only minor or negligible change in the use of the affected areas is planned.”

The effects of the planned compensatory restoration activities at the Site may be summarized as follows:

- The bat houses have no anticipated effects on any use of the area.

- The field will be restored to its previous condition as wetlands associated with the former channel of the Elm River; this activity converts an agricultural field into a wetlands, which is an improvement in its natural resources value.
- Excavation, planting, or other disturbance in the field will be restricted to the “plow zone” which limits the potential to impact archeological or other human resources potentially present in the field.
- Erosion controls will be implemented during restoration activities.
- The field currently has no recreational value, and no known historical value.
- Marathon owns the field, and therefore changes to the land use of the field will have no economic impact.

The effects of the restoration on the use of the affected area are minimal, and will results in substantial increase in the natural resources and the services they provide. As such, these restoration activities meet the description of the Departmental Manual as not having “significant effects”.

4. Compliance Monitoring and Adaptive Management Plan

Compliance monitoring for a period of at least 5 years will be conducted following all restoration plantings. This is also consistent with requirements of the Nationwide Permit program. If performance standards as defined below are met after 5 years, MPL will petition to be released from further monitoring requirements. If performance standards are not met after 5 years, compliance monitoring will continue until a point when they are met. Compliance monitoring will focus on survivorship of native trees and shrub plantings, as well as monitoring the establishment of invasive non-native plant species.

The performance standards for this restoration plan are:

1. Survival of 90% of planted trees if using RPM plant stock, or 80% survivorship if using bare root seedlings.
2. A density of at least 60 stems/acre if using RPM plant stock, or 450 stems/acre if using bare root seeding after five years of compliance monitoring.

3. No tree species will comprise more than 25% percent of the total tree density after five years of compliance monitoring
4. Herbaceous cover over a minimum of 70% of the restored areas. At a time when tree canopy is greater than 60% of the restored areas, than this herbaceous cover is anticipated to decrease and will not significantly affect the functioning of the palustrine forest ecosystem.
5. Parameters of the USACE *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and 2008 *Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (USACE, 2008) are met within the restored areas.

As part of the compliance monitoring program, five permanent sample locations will be established in the restored impacted areas, and fourteen permanent sample locations will be established within the restoration site. Fifteen permanent photograph locations will also be established throughout the restored impacted areas and restoration site. Compliance monitoring will consist of a site visits twice per year (spring and autumn) by a qualified wetland scientist. The spring visit will be focused on a qualitative assessment of non-native invasive species establishment within the restoration site, downloading data from each water level recorder, and taking photographs at all photo locations. The autumn site visit will consist of data collection at all permanent sample plot locations, downloading water level recorder data, and taking photographs at all photo locations.

Vegetation will be assessed using a 1/10-acre (radius 37.3 feet) circular plot for the tree and shrub stratum, and a 1/100-acre (radius 11.8 feet) circular plot for the herbaceous and vine stratum. Plots will be centered by a 5-foot metal fence post placed immediately following all restoration plantings. A GPS position will be taken for each permanent sample plot location. GPS positions and final monitoring locations will be provided as part of the baseline monitoring report. Within each plot, six measurements will be annually taken: (1) identification of all species present; (2) numbers of all tree identified tree and shrub species; (3) percent cover for each species; (4) total percent cover of vegetation; (5) total percent cover of trees; and (6) total percent cover of herbaceous species.

A baseline monitoring report will be prepared immediately following all planting activities in order to establish baseline conditions to compare subsequent monitoring results. An annual monitoring report will be provided by January 31st of the following year subsequent to all data collection. The overall objective of each monitoring report will be to illustrate progress toward, or deviation from, stipulated performance standards. This will be done by summarizing data, as well as providing comparisons to data collected in previous years.

A final petition to be released from monitoring requirements will include a full wetland delineation survey of the restored areas. The survey will include established sampling locations along the surveyed boundary consistent with methods outlined in USACE *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and 2008 *Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (USACE, 2008).

4.1 Adaptive Management

Adaptive management will be performed on-site based upon observations and results of the compliance monitoring program. The objective of adaptive monitoring is to facilitate development of the restored palustrine forested wetland community, and maintain progress towards articulated performance standards.

The ability to react to the dynamic nature of restored systems, in order to increase the likelihood of restoration success, is the basis for adaptive management. Through analysis of data during monitoring events, management recommendations will be made and implemented. Data collected regarding the performance standards will be evaluated to gauge whether satisfactory progress is being made. If progression toward attainment of performance standards is not observed, management actions will be recommended and implemented to increase the likelihood these standards are met within the 5 year monitoring period. Each of the steps in the adaptive management program (i.e., monitoring, assessment, evaluation, recommendation, and implementation) will interact with the preceding steps to create a continuous process that builds upon originally stated goals and lessons learned from past experiences.

If progress toward meeting performance standards is not evident following any complete year of monitoring, potential for success of the mitigation area will be evaluated, and contingency measures will be proposed in the annual monitoring report. Potential adaptive management actions include, but potentially are not limited to:

1. Additional enhancement plantings will be installed after the first year of compliance monitoring, and in subsequent years, if necessary to maintain the desired tree density of either 60 stems/acre of RPM stock or 450 stems/acre of bare root seedlings.
2. Control invasive non-native plant species. Depending upon the weeds of concern that establish within the restoration site, maintenance will consist of (1) manual control), and/or (2) chemical control. Chemical control will only be used on species where manual control has been determined to not be effective, and after consultation with IEPA and IDNR. A control schedule will be dependent upon the weeds of concerns that establish within the restoration site.

4.1.1 Bat House Maintenance

Little maintenance is required after installing a bat house. Annual monitoring will only ensure that the integrity of the predator guard is maintained.

4.1.2 Wood Duck Box Maintenance

The installed wood duck boxes will also require annual maintenance. During the fall monitoring, old nesting materials should be removed from each box and replaced with fresh wood shavings. In addition, the integrity of the nest box will be annually evaluated and repaired as necessary. The integrity of the predator guard will be maintained.

5. Past and Future Involvement of Responsible Party

MPL has been (and will continue to be) the active lead and responsible party on resolution of NRD matters pertaining to the August 2008 crude oil release from the

MPL-owned pipe line. All activities pertaining to resolution of matters associated with NRD have been reviewed and directed by MPL and MPL's authorized representatives. All proposed and future activities at the site (whether pertaining to NRD and/or restoration/remediation) will also be directed by MPL and MPL's authorized representatives.

6. Agencies Contacted

Following is a list of Federal and State agencies (primary point of contact noted only) contacted and communicated with throughout implementation of emergency response measures, reconnaissance activities, site characterization, monitoring, remediation, and mitigation:

United States Fish & Wildlife Service
Rock Island Field Office
1511 47th Avenue
Moline, IL 61265
Mike Coffey
(309) 757-5800 ext. 206

United States Army Corps of Engineers
Louisville District, West Section
P.O. Box 489
Newburgh, IN 47629-0489
Robert Brown
(812) 853-7632

United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Mail Code SE-5J
Chicago, IL 60604-3507
Kevin Turner
(618) 997-0115

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Illinois Environmental Protection Agency
Bureau of Land, Division of Remediation Management
1021 North Grand Avenue, P.O. Box 19276
Springfield, IL 62794-9276
Jody Kershaw
(217) 524-3285

Illinois Department of Natural Resources
Office of Realty and Environmental Planning
One Natural Resources Way
Springfield, IL 62702
Beth Whetsell
(217) 557-7816

Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, IL 62701-1512
Anne Haaker
(718) 785-4998

7. References

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Hosner, J.F. and L. S. Minckle. 1963. Bottomland Hardwood Forests of Southern Illinois--Regeneration and Succession. Ecology, Vol. 44, No. 1. pp. 29-41

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Norton, E.A., R.S. Smith, E.E. DeTurk, F.C. Bauer and L.H. Smith. 1931. Wayne County Soils. University of Illinois Agricultural Experiment Station Soil Report 49.

U.S. Army Engineer Waterways Experiment Station. 1999. Case Study: Application of the HGM Western Kentucky Low-Gradient Riverine Guidebook to Monitoring of Wetland Development. WRP Technical Notes Collection (TN WRP WG-EV-2.0). www.wes.army.mil/el/wrp

U.S. Army Corps of Engineers. 2005. Technical Standard for Water-Table Monitoring of Potential Wetland Sites. ERDC TN-WRAP-05-2

U.S. Army Corps of Engineers. 2008. Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region.

U.S. Army Corps of Engineers, 1987. *Wetlands Delineation Manual* (Environmental Laboratory, 1987) (hereafter, 1987 Manual).

U.S. Army Corps of Engineers, 2008. *Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*.

U.S. Fish & Wildlife Services, 2010. *Biological Opinion*

