CERTIFIED MAIL – RETURN RECEIPT REQUESTED

March 16, 2017

Colin Harris
Counsel
Faegre Baker Daniels LLP
1470 Walnut Street, Ste. 300
Boulder, CO 80302-5335

On behalf of the Bridger Pipeline, LLC (Bridger)

Re: Presentation to Responsible Party of Partial Claim for Past and Future Assessment Costs for Natural Resource Damage Assessment for the January 2015 Yellowstone River Oil Spill, Pursuant to 33 U.S.C. § 2713

Dear Mr. Harris:

This Presentment Letter (Letter) is written on behalf of the Federal and State Trustees charged with public trust responsibilities for natural resources injured and/or threatened by the January 2015 Yellowstone River Oil Spill (the Incident). The Federal and State Trustees are the United States Department of the Interior, acting through the Fish and Wildlife Service, and the State of Montana (collectively, the Trustees). The Trustees have authority under the Oil Pollution Act (OPA) (33 U.S.C. §§ 2701 *et seq.*) and the Natural Resource Damage Assessment Regulations (15 C.F.R. Part 990) promulgated pursuant to OPA, to conduct a Natural Resource Damages Assessment (NRDA) of injuries to their trust resources caused by the Incident. The State of Montana also has authority under State law. The OPA NRDA Regulations, at 15 C.F.R. 990.27, set forth standards for trustees to consider in the selection of potential assessment procedures. The Trustees have considered those standards and have selected certain assessment procedures to determine and quantify such injuries.

By this Letter, and pursuant to 33 U.S.C. § 2713, the Trustees present to Bridger Pipeline, LLC, (Bridger) a claim for partial past and future assessment activities in the sum of $1,358,451.13. This Partial Claim includes three distinct claims: (1) past and certain future assessment costs related to the Trustee responsibilities for portions of the restoration planning phase; (2) a model-based assessment procedure related to bird injury; and (3) a laboratory-based assessment procedure related to fish injury. These costs are described in the attached Partial Claim for Past and Future Assessment Costs (Partial Claim). Please be advised that the budget and schedule for the assessment work to be performed is an estimate, and actual schedule and costs may vary once detailed planning and design begin and/or as new information becomes available.

If you wish to obtain more information about the Partial Claim, please contact the Trustees as provided in the Partial Claim. Should Bridger decline to pay the above claim, it is the intent of the Trustees, in accordance with 33 U.S.C. § 2713 (c) and (d), to make a claim to the National Pollution Fund Center (NPFC) upon the expiration of ninety (90) days from the date of the presentment of this claim to Bridger. Initiating the described assessment work is time-critical. If Bridger decides, in less than 90 days, not to fund some or all of the Trustee selected assessment activities, please advise the Trustees at your earliest opportunity so we may avoid unnecessary delay in filing a claim with the NPFC to obtain funding for those activities. Thank you for your consideration in this matter.

Sincerely,

Harley Harris
Lawyer/Program Manager
Montana Department of Justice
Natural Resource Damage Program
P.O. Box 201425
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# Partial Claim for Past and Future Assessment Costs
# January 2015 Yellowstone River Oil Spill

Prepared by State and Federal Trustees
State of Montana and U.S. Department of Interior

March 2017

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Appendix A: Federal (February 1, 2016, through September 30, 2016) and State (October 1, 2016, through January 6, 2017) Trustees' Incurred Assessment Costs.

Appendix B: Scope of Work for a Model-based Assessment Procedure Related to Bird Injury and Scope of Work for a Laboratory-based Assessment Procedure Related to Fish Injury.

## 1. Executive Summary

This document provides information regarding the federal and State Trustees' (Trustees) plans to assess injuries to natural resources resulting from the discharge of crude oil by Bridger Pipeline, LLC (Bridger) into the Yellowstone River in January 2015. This Partial Claim for Past and Future Assessment Costs (Partial Claim) provides information regarding certain assessment procedures and methods proposed by the Trustees. The Partial Claim also provides a schedule of when certain assessment work will be conducted, along with the Trustees' cost estimates. This Partial Claim includes three distinct claims, as described below: (1) past and certain future assessment costs related to the trustee responsibilities for portions of the restoration planning phase; (2) a model-based assessment procedure related to bird injury; and (3) a laboratory-based assessment procedure related to fish injury.

The Trustees are currently assessing ecological injuries and service losses. Ecological injuries and service losses under review include those involving birds and fish. Section 4 outlines more specific information regarding the assessment methods detailed in this document that will be used for these categories to assist with injury assessment.

This Partial Claim includes restoration planning activities beginning in February 2016, through approximately 18 months[1] after beginning work on the attached SOWs, and focuses on the injury assessment stage of restoration planning. Planning for the development of the bird injury work plan began in February 2016, by the Department of Interior, while all other injury assessment activities began on or after October 1, 2016. Trustee costs are provided in Section 6. The Trustees are presenting incurred assessment costs between February 1, 2016, and September 30, 2016, (Federal) in the amount of $19,846.71, and October 1, 2016, through January 6, 2017, in the amount of $4,112.31 The Trustees estimate their costs for certain assessment work beyond the incurred costs to be $1,334,411.22. The Trustees anticipate that this certain assessment work will require approximately 18 months to complete once funding has been received. A description of the assessment work planned to date is provided in Section 4, and a schedule of when reports detailed in this document will be completed is provided in Section 5. If the funding proves insufficient, the Trustees will submit a supplemental claim. The total amount reflected in this Partial Claim is $1,358,451.13. The Trustees may have further claims as assessment progresses.

## 2. Assessment Partial Claim Overview

### 2.1 Claimant (Trustee) Information and Coordination

The following officials or their designees are acting on behalf of the public as federal and State Trustees for natural resources:

1. The Governor of the State of Montana (State)

[1] As noted in Appendix B, it is anticipated that the work in the laboratory-based assessment procedure related to fish injury will take 20 months, but it could take longer, depending upon when the phases of work can begin. There will likely be times during the different phases of the fish injury SOW where little or no Trustee staff work is occurring, which is why the budget for staff time is based on 18 months, even though the work is anticipated to take longer. The Trustees anticipate that the budget in this Partial Claim should be adequate to conduct the work outlined in the three separate claims, regardless of whether the work extends over 20 months or longer. However, it is possible that the funding may be insufficient. If the funding proves insufficient, the Trustees will submit a supplemental claim.

2. The U.S. Department of the Interior (DOI), with its Authorized Office designated as the Regional Director of Region 6 of the U.S. Fish and Wildlife Service (FWS)

The statutory authority is detailed in Section 3.1 of this document.

The Trustees entered into a Memorandum of Understanding (MOU) in May 2015, for coordination and cooperation of the Trustees to initiate and conduct preassessment and restoration planning activities for natural resources and services under their trusteeship injured as a result of the January 2015, discharge of oil by Bridger into the Yellowstone River. (Details regarding the incident are provided below in Section 2.2 and details regarding the Responsible Party are provided in Section 2.3.) The FWS and the State of Montana are Co-Lead Administrative Trustees.

The administrative record has been established and is available online at the following website: http://www.cerc.usgs.gov/orda_docs/CaseDetails?ID=1121

## 2.2 Incident Description

On or about January 17, 2015, Bridger's Poplar Pipeline ruptured near Glendive, Montana, spilling at least 30,000 gallons of Bakken crude oil into the Yellowstone River (MT DEQ, 2015). The spill occurred when ice covered much of the Yellowstone River.

Oil sheen was reported at least as far downstream as Crane, Montana (59 river miles downstream from the pipeline crossing). (POLREP #12, USEPA, 2015). Ice on the Yellowstone River prevented cleanup of most of the oil. The conditions also made it difficult to characterize the nature and extent of the contamination. The oil remained in the river from January 17, 2015, through at least the time that the ice started to break up in mid-March 2015. The last documented visible oil film or sheen was observed by the Montana Department of Environmental Quality (DEQ) on April 8, 2015. During some or all of this time period, oil was present in the Yellowstone River throughout the water column.

A second phase of the release occurred in mid-March during ice-out (i.e., the time that the ice began to break up during spring thaw). During this second phase, the oil caused exceedances of surface water quality standards contained in Montana's Circular DEQ-7 Montana Numeric Water Quality Standards (DEQ-7 Standards) and the screening levels in the Montana Risk-Based Corrective Action Guidance for Petroleum Releases (RBCA) in the Yellowstone River.

Elevated concentrations of oil constituents, including benzene and polycyclic aromatic hydrocarbons (PAHs) extended for several miles downstream, with exceedances of the DEQ-7 Standards and screening levels in RBCA recorded as far downstream as the City of Glendive, 6.5 miles from the spill site. The ice-covered river conditions at the time of the spill appear to have trapped volatile constituents in the water. Oil also remained in certain portions of the river not covered by ice.

The discharge continues to adversely affect and threaten natural resources within the jurisdictions of the United States and the State of Montana.

In accordance with the Oil Pollution Act (OPA) and the National Contingency Plan, a Unified Command was organized after the spill under the authority of the United States Environmental Protection Agency (EPA). An EPA On-scene Coordinator led the limited response, which was undertaken by the Responsible Party, Bridger, in coordination with the State of Montana and other federal agencies. While response activities were initiated soon after the Incident, the circumstances surrounding the Incident prevented recovery of the vast majority of the discharged oil. Approximately 2,730 of the 30,000 gallons of crude oil were recovered from the Yellowstone River.

Montana Fish, Wildlife & Parks (FWP) issued a Fish Consumption Advisory on January 21, 2015, due to the spill, which was lifted on April 10, 2015.

## 2.3 Responsible Party Information

Bridger owns and operates the Poplar Pipeline that ruptured in January 2015, spilling crude oil that caused injuries to natural resources as defined by OPA section 1001(20). Bridger is one of the True Companies.

## 2.4 Components of Partial Claim and Amount of Costs Claimed

The Trustees are assessing certain ecological injuries under this Partial Claim. Potential natural resources under the trusteeship of the State of Montana and the United States that may have been, or may be, injured as a result of the Incident, include, but are not limited to: fish and other aquatic organisms, birds (including migratory birds), wildlife, surface water and riverine aquatic habitat, and supported biota, including fish, terrestrial habitat, shoreline habitat, and supported biota adjacent to the river, and the natural resource services provided by these resources. This Partial Claim includes three distinct claims: (1) past and future assessment costs related to the restoration planning phase from February 1, 2016, through approximately 18 months after beginning work on the attached SOWs; (2) a model-based assessment procedure related to bird injury; and (3) a laboratory-based assessment procedure related to fish injury. Future assessment may include information gained from the two studies. Future assessment may also include other natural resources and services provided by natural resources, as well as human use losses.

Total final costs and damages for assessment activities have not yet been estimated. Data collection and analysis will be ongoing, and may result in the identification of additional natural resource damage assessment activities by the Trustees or, alternatively, the decision may be made not to pursue an activity identified in this Partial Claim.

The Trustees expressly reserve their ability to modify and supplement the assessment and restoration planning procedures identified herein. The need for any additional studies and assessment activities and their relationship to existing data collection efforts and analyses and data management will be clearly identified in any future assessment claims. This Partial Claim is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity, by any party against Montana, the United States, their departments, agencies, or entities, their officers, employees, or agents, or any other person.

## 2.5 Statute of Limitations

Claims for natural resource damages sought under OPA must be brought within three years after the date of completion of the natural resources damage assessment. (OPA § 1017, 33 U.S.C. § 2717(f)). Claims under the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA) must be commenced within six years after initiation of physical onsite construction of the final permanent remedy. § 75-10-722, MCA.

# 3. Adherence to Assessment Regulations

## 3.1. Trustee Authority

Natural Resource Trustees are authorized to (1) assess natural resource injuries resulting from a discharge of oil or the substantial threat of a discharge and response activities, and (2) develop and implement a plan for restoration of such injured resources pursuant to OPA, 33 U.S.C. §§ 2701, *et seq.*, Section 311(f) of the Clean Water Act, 33 U.S.C. § 1321(f), and other applicable Federal law, including, but not limited to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300, Subpart G, and the OPA Natural Resource Damage Assessment Regulations (Regulations), 15 C.F.R. Part 990, and applicable State laws and authorities, including, without limitation, CECRA.

By undertaking a natural resource damage assessment (NRDA), the Trustees consider the extent of injuries to natural resources, including the functions and services provided by the injured resource, while determining the appropriate ways of restoring the injured resources and compensating for these injuries. Under OPA, natural resources are defined broadly to include "land, fish, wildlife, biota, air, water, groundwater, drinking water supplies, and other such resources," including those that belong to, are managed by, held in trust by, appertain to, or are otherwise controlled by the United States, a State, an Indian Tribe, or a foreign government. *See* Section 1001(20) of the OPA, 33 U.S.C. § 2701(20). Trustees use the information obtained during the NRDA to develop and implement plans for the "restoration, rehabilitation, replacement, or acquisition of the equivalent of the natural resources under their trusteeship." Section 1006 of the OPA, 33 U.S.C. § 2706. The Trustees may seek damages for these injuries, including the reasonable costs of the assessment. *See* OPA Section 1002(b)(2)(A), 33 U.S.C. § 2702(b)(2)(A).

Federal Trustees are designated pursuant to the NCP, 40 C.F.R. § 300.600 and various Executive Orders. For this incident, the federal Trustee is the United States Department of the Interior, with its Authorized Official designated as the Regional Director of Region 6 of the Fish and Wildlife Service. The State trustee is the Governor of the State of Montana, in accordance with 40 CFR 300.605.

## 3.2. Summary of Preassessment Activities

The Trustees conducted studies and surveys to collect ephemeral data concerning on-site conditions soon after the spill and during and after response activities that would otherwise have been lost or altered.

The Trustees collected water, sediment, and fish samples (muscle tissue, major organs, gills, blood, bile, and reproductive organs), and evaluated information related to potential feasible restoration alternatives and assessment activities, pursuant to 15 C.F.R. §§ 990.44(4) & (5).

### 3.3. Notice of Intent to Conduct Restoration Planning

On October 26, 2016, the Trustees issued a Notice of Intent (NOI), pursuant to 15 CFR 990.44, for the Yellowstone River Oil Spill. In the NOI, the Trustees set forth their determination of jurisdiction to conduct a NRDA and that doing so is appropriate in this matter. Based on information collected and evaluated since January 2015, the Trustees have made a preliminary determination that natural resources and services have been injured. These injuries are expected to continue and limited response actions are not expected to address the injuries. Feasible restoration alternatives exist to address such injuries. As such, Trustees stated their intent to proceed with an NRDA to identify natural resource injuries and proposed restoration alternatives. The NOI was distributed to the public via agency websites and media outlets. The NOI was provided to the responsible party electronically and via certified mail.

### 3.4. Coordination between Trustees and Responsible Party

In April 2015, Bridger sent the Trustees a letter stating that Bridger was willing to cooperate in preassessment activities, and the Trustees informed Bridger that the Trustees would follow up at a later date. Bridger contacted the Trustees again on January 28, 2016, requesting information related to the Trustee's preassessment activities and reiterating a desire to cooperate in preassessment. On February 19, 2016, the Trustees responded and agreed to a meeting to discuss the possibility of a cooperative natural resource damage assessment process. The Trustees met with Bridger in June, 2016. The Trustees sent Bridger a draft letter agreement to address funding and cooperative assessment issues on August 1, 2016. Bridger sent the Trustees an e-mail on September 8, 2016, expressing concerns with the draft letter agreement, but Bridger and the Trustees have not entered into a letter agreement. The Trustees sent Bridger a claim for partial preassessment costs on September 16, 2016. Bridger did not respond, nor pay these costs.

In October 2016, the Trustees formally invited Bridger's participation in the NRDA, in a letter to Bridger enclosing the Trustees' NOI and an invitation for Bridger to participate in the NRDA. In November 2016, Bridger wrote to the Trustees noting its interest in participating in NRDA, and proposing that the Trustees and Bridger discuss Bridger's potential involvement. The Trustees met with Bridger on March 3, 2017.

### 3.5. Coordination between Trustees and Response Agencies

The response agencies notified Trustees of the incident soon after it occurred. The Trustees and response agencies worked to ensure access for NRDA activities, which did not interfere with response actions. The Trustees and response agencies shared information. Where possible, Trustees obtained relevant response data for Trustee data needs rather than collecting data independently.

## 4. Proposed Assessment Procedures

The assessment activities for the attached SOWs, discussed below, will be performed in conjunction with other Trustee activities necessary to move forward with the restoration planning phase. In addition to the contractor costs in the attached SOWs, the Trustees are submitting a separate claim for past and future assessment costs related to the restoration planning phase (including oversight of contractor assessment work) from February 1, 2016, through approximately 18 months after beginning work on the attached SOWs.

### 4.1 Proposed Assessment Methods

The Trustees have determined the following assessment methods are: (1) capable of providing assessment information of use in determining the type and scale of restoration appropriate for the Incident; (2) the costs are reasonably related to the quantity and/or quality of relevant information provided; and (3) reliable and valid for the Incident. The information collected during the model-based assessment procedure related to bird injury and the laboratory-based assessment procedure related to fish injury will be used in determining the need for and scale of restoration actions (restoration selection). The development of the Restoration Plan will be submitted as a separate claim.

#### 4.1.1 Injury Assessment Methods for Bird Modeling Study

The Trustees are concerned that migratory and other birds were exposed to oil and died during the spill. The open water areas with oil sheens posed a risk to migratory birds. The Trustees propose to conduct modeling to evaluate the impact on birds, as discussed in the attached scope of work. Based on preassessment outcomes, the Trustees plan to focus future assessment efforts toward these affected bird resources, but may expand in the future should potential new injuries be identified. All Trustee NRDA activities will be in accordance with NRDA assessment procedures.

Costs and further activities. The Trustees' anticipated costs associated with these activities are included in the Trustees' budget estimates for this Partial Claim in the claim for past and future assessment costs. The Trustees may develop a Resource Equivalency Analysis (REA) for birds, potentially using a reasonable worst case estimate, in order to help determine the amount of restoration required to offset the losses. If the funding proves insufficient, the Trustees will submit a supplemental claim. The schedule of major actions proposed is provided in Table 5-1, below.

#### 4.1.2 Injury Assessment Methods for Fish Laboratory Study

The Trustees are concerned that aquatic resources present in the river under the ice, including fish, were exposed to and adversely affected by the oil. The Trustees propose to evaluate the effect on fish that experienced prolonged exposure to oil in cold water conditions, as outlined in the attached scope of work.

Based on preassessment outcomes, the Trustees plan to focus future assessment efforts toward the affected aquatic resources, but may expand in the future should potential new injuries be identified. All Trustee NRDA activities will be in accordance with NRDA assessment procedures.

Costs and further activities. The Trustees' anticipated costs associated with these activities are included in the Trustees' budget estimates for this Partial Claim in the claim for past and future assessment costs. The Trustees may develop a Resource Equivalency Analysis (REA) for in-stream aquatic injuries, potentially using a reasonable worst case estimate, in order to help determine the amount of restoration required to offset the losses. If the funding proves insufficient, the Trustees will submit a supplemental claim. The schedule of major actions proposed is provided in Table 5-1, below.

### 4.1.3 Additional Assessments

The Trustees may also consider injury assessment for resources such as wildlife, surface water and riverine aquatic habitat, terrestrial habitat, shoreline habitat, and supported biota adjacent to the river, and the natural resource services provided by these resources, as well as human use, among others, if additional information warrants their consideration. The Trustees will ensure that the additional assessment(s) meets the requirements of the NRDA regulations. If the funding proves insufficient, the Trustees will submit a supplemental claim.

## 4.2 Natural Recovery Estimation

As required under 15 CFR 990.52(c), the Trustees will estimate the rate at which natural recovery would occur without restoration, but including any response actions. Trustees will conduct literature reviews on natural recovery from prolonged exposure to oil and population reduction, and estimate the time for natural recovery.

## 4.3 Restoration Scaling Approaches

### 4.3.1 Habitat Equivalency Analysis

A habitat equivalency analysis (HEA) may be used to scale restoration alternatives to compensate for injuries. A HEA quantifies habitat injuries in terms of discounted service-acre years (DSAYs) to represent the geographic scope and severity of ecological services lost, modified by the duration of injury and discounted over time. Similarly, HEA computes the value of a habitat restoration project in terms of DSAYs to represent the geographic scope and duration of the services it provides, modified by the time the project requires to reach full function and discounted over time.

### 4.3.2 Resource Equivalency Analysis

A Resource Equivalency Analysis (REA) may be used for specific resources that recover at a significantly different rate than their habitat, or that may have had injuries that are not well represented by the level of injury to habitat. The Trustees anticipate using this approach for birds and in-stream injured resources (fish and other aquatic biota).

### 4.3.3 Reasonable Worst Case Estimates of Injury

In cases where accurate calculation of injuries requires significant data collection or analysis that would unduly increase the cost of the assessment, the Trustees may estimate injuries and restoration requirements using a hypothetical reasonable worst case scenario. This allows faster progress towards implementation of restoration and allows funds to be directed toward restoration rather than toward additional assessments. Trustees may consider this approach for injuries to resources as warranted (e.g., fish). If the funding proves insufficient, the Trustees will submit a supplemental claim for development of reasonable worst case estimates.

## 4.4 Quality Assurance and Chain of Custody

Because all work performed for the NRDA should meet high standards of professional performance and technical rigor, highly qualified and experienced experts will design and implement the work. Work products will be developed to meet or exceed generally accepted technical standards, methods, and procedures used in the NRDA field.

Chain of custody forms will continue to be used for field-collected samples. Laboratories performing chemical analyses were required to provide data Quality Assurance and Chain of Custody (QA/QC) packages, which were evaluated by Trustees. Laboratories performing chemical analyses in the future will be required to provide data QA/QC packages.

# 5. Schedule of Assessment Work

The schedule of major actions proposed is provided in Table 5-1, below. Completed activities supporting the Partial Claim include the Notice of Intent, issued in October 2016.

Table 5-1: Preliminary Schedule of January 2015 Yellowstone River Oil Spill NRDA Proposed Activities for this Partial Claim. This schedule is stated in days following start date.

| Proposed NRDA Action | Proposed Report Deadline |
|---|---|
| Bird Mortality Injury Quantification draft report | 105 days |
| Bird Mortality Injury Quantification final report | 150 days |
| Fish Laboratory Toxicity Study Simulating Cold (Under Ice) Exposure to Bakken Crude Oil draft work plan | 21 days |
| Fish Laboratory Toxicity Study Simulating Cold (Under Ice) Exposure to Bakken Crude Oil final work plan | 35 days |
| Phase 1 Fish Laboratory Toxicity Study Simulating Cold (Under Ice) Exposure to Bakken Crude Oil interim report | 200 days after beginning Phase 1 |
| Phase 2 Fish Laboratory Toxicity Study Simulating Cold (Under Ice) Exposure to Bakken Crude Oil interim report | 200 days after beginning Phase 2 |
| Phases 1-3 Fish Laboratory Toxicity Study Simulating Cold (Under Ice) Exposure to Bakken Crude Oil draft report | 200 days after beginning Phase 3 |
| Phases 1-3 Fish Laboratory Toxicity Study Simulating Cold (Under Ice) Exposure to Bakken Crude Oil final report | 220 days after beginning Phase 3 |

## 6. Federal and State Trustee Costs

This Partial Claim sets forth the Trustees' incurred and anticipated assessment costs and the approximate date the Trustees expect to have incurred the anticipated costs. These assessment costs are reasonable assessment costs within the meaning of 15 CFR 990.30. The United States Department of the Interior costs are separated into FWS, Office of Policy, Management and Budget (PMB), and the Solicitor's Office. State of Montana costs are separated into NRDP and FWP. Both Trustees have retained contractors.

Trustees' incurred assessment costs between February 1, 2016, and September 30, 2016, (federal) and October 1, 2016, through January 6, 2017, (State), total $23,959.02 (Table 6-1). The Trustees estimate their costs for certain assessment work beyond the incurred costs to be $1,334,411.22 (Table 6-2). If the funding proves insufficient, the Trustees will submit a supplemental claim. The total amount reflected in this Partial Claim is $1,358,451.13 (Table 6-3). The Trustees estimate that it will require approximately 18 months from the receipt of funding to complete the tasks described in this Partial Claim. In addition to the specific assessment tasks described in Section 4, Trustees' costs include staff time for Trustees' administrative activities and public involvement, as well as other Trustee activities necessary to move forward with the process for evaluating and quantifying potential injuries (injury assessment). The information collected will be used to determine the need for and scale of restoration actions (restoration selection). The development of the Restoration Plan will be submitted as a separate claim.

Table 6-1: Costs Incurred

| **United States Department of Interior Costs (February 1, 2016 through September 30, 2016)** | |
|---|---|
| – U.S. Fish and Wildlife Service (including contractor costs) | $18,462.25 |
| – Office of Policy, Management and Budget | $1,314.44 |
| – Solicitor's Office | $70.02 |
| **State of Montana (October 1, 2016 through January 6, 2017)** | |
| – Natural Resource Damage Program | $4,112.31 |
| – Fish, Wildlife & Parks | $0 |
| **COSTS INCURRED** | $23,959.02 |

Table 6-2: Estimated Costs for Certain Identified Future Assessment Activities

| **United States Department of Interior Costs** | |
|---|---|
| – U.S. Fish and Wildlife Service[1] | $48,171.32 |
| – IEc Technical Support[2] | $104,912.4 |
| – Office of Policy, Management and Budget[3] | $12,620.36 |
| – Solicitor's Office | $11,209.45 |
| Estimated costs subtotal | $176,913.53 |
| **State of Montana** | |
| – Natural Resource Damage Program | $112,878.16 |
| – Fish, Wildlife & Parks | $22,633.53 |
| – Abt Technical Support | $150,986.00 |
| – Appendix B SOW for a Laboratory-based Assessment | $871,000.00 |

| | |
|---|---|
| Procedure Related to Fish Injury. | |
| Estimated costs subtotal | $1,157,497.69 |
| **ESTIMATED COSTS** | $1,334,411.22 |

[1]It is estimated that $24,132 of the FWS costs will be used to participate in the bird injury assessment and restoration planning activities (see Appendix B).
[2]It is estimated that $69,941.6 of IEc costs will be used to participate in the bird injury assessment and restoration planning activities (see Appendix B).
[3] It is estimated that $11,326 of the PMB costs will be used to participate in the bird injury assessment and restoration planning activities (see Appendix B).

Table 6-3: Total Presented Partial Claim

| | |
|---|---|
| Costs Incurred February 1, 2016 to September 30, 2016 (federal) | $19,927.60 |
| Costs Incurred October 1, 2016 to January 6, 2017 (State) | $4,112.31 |
| Estimated Costs for Identified Assessment Activities | $1,334,411.22 |
| **TOTAL PRESENTED PARTIAL CLAIM** | $1,358,451.13 |

## 6.1 United States Department of Interior Costs

### 6.1.1 U.S. Fish and Wildlife Service Costs

#### 6.1.1.1 February 1, 2016, to September 30, 2016, Incurred Costs

FWS assessment costs incurred from February 1, 2016, through September 30, 2016, are $18,462.25. DOI began to develop the bird injury work plan in February 2016, while all other injury assessment activities began after October 1, 2016. Only bird injury assessment activities are included in past costs. A portion of these incurred costs were previously included in the partial claim for past costs presented to Bridger on September 22, 2015, by the DOI. The assessment costs incurred between February 1 – June 30, 2016, ($11,677.51) were included in the September 22, 2016, partial claim and this current partial claim. This claim, however, includes additional incurred costs from July 1 – September 30, 2016. Appendix A contains documentation of incurred costs.

#### 6.1.1.2 Estimated Assessment Costs

FWS estimated resource requirements and these consist of labor, travel, and contractor costs for approximately 18 months of effort in the amount of $153,083.72 (Table 6-5). The activities included in this estimate are provided in Section 4. Tables 6-2 and 6-5 indicate what portion of the total FWS and IEc costs will be used towards working on the bird injury assessment and restoration planning. Detailed costs for the bird injury work can also be found in Appendix B. Over the time period covered by this estimate, some staffing changes may occur, including reassignment of personnel and changes in hourly rates. Estimates in the table below are based on present information. FWS indirect costs are estimated to be 59% of labor costs and DOI Headquarters indirect costs are estimated to be 16.84% of labor costs. The travel estimate is based on costs for trips by FWS staff within Montana to meet with co-Trustees, Bridger, or to provide Trustee oversight during studies. The FWS oversees the contract with IEc for which IEc will provide support for the Trustees' assessment activities. The proposed scope of work for DOI's bird injury tasks is provided in Appendix B.

Table 6-5: Projected costs associated with the FWS Partial Claim for Certain Future Assessment Costs

| Expense Category | hours/week | cost/hour (includes benefits) | 18 Months |
|---|---|---|---|
| **Labor** | | | |
| Acting Case Manager/Senior Contaminants Specialist | 3.3 | $56.56 | $14,705.6 |
| Assistant Contaminants Specialist | 3.3 | $44.6 | $11,596 |
| Labor Subtotal | | | $26,301.6 |
| | | | |
| DOI indirect costs (16.84%) | | | $4,429.19 |
| FWS indirect costs (estimated at 58.93%) | | | $15,499.53 |
| Indirect subtotal | | | $19,928.72 |
| **Total Labor** | | | $46,230.32[1] |
| | | | |
| **Travel** | | | |
| Travel within MT (2 staff x 2 trips x 2 nights/trip) | | | $1,941 |
| | | | |
| **Total Travel** | | | $1,941 |
| | | | |
| **Contracts** | | | |
| IEc Contracting | | | $104,912.4 |
| **Total Contracts** | | | $104,912.4[2] |
| | | | |
| **TOTAL ESTIMATED COSTS** | | | $153,083.72 |

[1]It is estimated that $24,132 of the FWS total labor will be used to participate in the bird injury assessment and restoration planning activities (see Appendix B).
[2]It is estimated that $69,941.6 of IEc costs will be used to participate in the bird injury assessment and restoration planning activities (see Appendix B).

FWS Personnel:

The Acting Case Manager/Senior Contaminant Specialist position is currently held by Karen Nelson. Karen Nelson is a toxicologist at FWS's Helena, Montana Ecological Service Field Office. She participates in Trustee conference calls and meetings, as well as meetings with Bridger. She is responsible for all case management activities. Ms. Nelson reviews documents and work products associated with the bird injury assessment and other parts of the Trustee claim, assists with the development of budgets, provides oversight of field work and data analysis, and keeps technical and financial records. She also serves as a liaison between field staff and upper management and coordinates the work of FWS's contractor.

The Assistant Contaminant Specialist position is currently held by David Rouse. David Rouse is a toxicologist at FWS's Helena, Montana Ecological Service Field Office. He participates in Trustee conference calls and meetings and provides technical support to the avian injury assessment. Mr. Rouse reviews other documents and work products associated with other parts of the Trustee claim and assists with the development of budgets and cost tracking.

### 6.1.2 Office of Policy, Management, and Budget Costs

#### 6.1.2.1 February 1, 2016, to September 30, 2016, Incurred Costs

PMB assessment costs incurred from **February 1, 2016, to September 30, 2016,** are $1,314.44 (Table 6-1). The assessment costs that were incurred between February 1 – June 30, 2016, ($647.11) were included in the September 22, 2016, partial claim and this current partial claim. This claim, however, includes additional incurred costs from July 1 – September 30, 2016. Appendix A contains documentation of incurred costs.

#### 6.1.2.2 Estimated Assessment Costs

DOI-PMB estimated resource requirements consist of labor costs for approximately 18 months of effort in the amount of $12,620.36 (Table 6-6). The activities included in this estimate are provided in Section 4. Tables 6-2 and 6-6 indicate what portion of the total PMB costs will be used toward working on the bird injury assessment and restoration planning. Detailed costs for the bird injury work can also be found in Appendix B. Over the time period covered by this estimate, some staffing changes may occur, including reassignment of personnel and changes in hourly rates. Estimates in the table below are based on present information. DOI Headquarters indirect costs are estimated to be 16.84% of labor costs.

Table 6-6: Projected costs associated with the PMB Partial Claim for Certain Future Assessment Costs

| Expense Category | hours/week | cost/hour (includes benefits) | 18 months (78 Weeks) |
|---|---|---|---|
| **Labor** | | | |
| Economist | 2 | $69.24 | $10,801.44 |
| Labor Subtotal | | | $10,801.44 |
| | | | |
| DOI indirect costs (16.84%) | | | $1,818.96 |
| Indirect subtotal | | | $1,818.96 |
| **Total Labor** | | | $12,620.36 |
| **TOTAL ESTIMATED COSTS** | | | $12,620.36[1] |

[1]It is estimated that $11,326 of the total estimated PMB costs will be used to participate in the bird injury assessment and restoration planning activities (see Appendix B).

PMB Personnel:

The Economist position is currently held by Christian Crowley. Christian Crowley is an economist at DOI Headquarters. Mr. Crowley provides economics assistance for the avian injury assessment. He also participates in the identification of restoration requirements for injured resources.

### 6.1.3 DOI – Solicitor's Office Costs

#### 6.1.3.1 February 1, 2016, to September 30, 2016, Incurred Costs

The DOI Solicitor's Office provides NRDA legal support for DOI bureaus, including the FWS and BLM. The DOI Solicitor's assessment costs incurred from February 1, 2016, to September 30, 2016, are $70.02 (Table 6-1). A portion of these incurred costs were previously included in the partial claim for past costs presented to Bridger on September 22, 2015 by the DOI. The assessment costs that incurred between February 1 – June 30, 2016, ($46.68) were included in the September 22, 2016, partial claim and this current partial claim. This claim, however, includes additional incurred costs from July 1 – September 30, 2016. Appendix A contains documentation of incurred costs.

#### 6.1.3.2 Estimated Assessment Costs

The Solicitor's Office resource requirements consist of labor and travel costs for a total of $11,209.45 estimated below (Table 6-7).

Table 6-7: Projected costs associated with the DOI Solicitor's Office Partial Claim for Certain Future Assessment Costs

| Expense Category | hours/week | cost/hour (includes benefits) | 18 months (78 Weeks) |
|---|---|---|---|
| **Labor** | | | |
| Attorney-Advisor Office of the Solicitor | 1.3 | $75.79 | $7,882.1 |
| | | | |
| DOI indirect costs (16.84%) | | | $1,327.35 |
| **Total Labor** | | | $9,209.45 |
| | | | |
| **Travel** | | | |
| Travel for meetings with PRP (1 staff x 4 trips x 1 night/trip) | | | $2,000 |
| | | | |
| **TOTAL ESTIMATED COSTS** | | | $11,209.45 |

Solicitor's Office Personnel:

Dana Jacobsen is currently the DOI Solicitor assigned to this matter. She is located in the DOI Solicitor's Office, Rocky Mountain Region in Lakewood, CO. Solicitor costs include activities to assess natural resource damages under OPA Sections 1002(b)(2)(A) and 1006(c), including restoration planning and the development of a plan for restoration, rehabilitation, replacement, or acquisition of the equivalent of the natural resources under DOI trusteeship, public notice and comment activities, trustee coordination, administrative activities, and participation in conference calls and meetings with Trustees and with Bridger.

## 6.2 State of Montana Costs

### 6.2.1 Natural Resource Damage Program Costs

#### 6.2.1.1 October 1, 2016, to January 6, 2017, Incurred Costs

Natural Resource Damage Program (NRDP) assessment costs incurred from October 1, 2016, to January 6, 2017, are $4,112.31 Appendix A contains documentation of incurred costs.

#### 6.2.1.2 Estimated Assessment Costs

NRDP's estimated future resource requirements consisting of labor, travel, and contractor costs for the approximately 18 months of effort is $263,864.16, plus laboratory research cost, as detailed in Appendix B. The activities included in this estimate are provided in Section 4. Additionally, NRDP will incur some general assessment costs to evaluate and quantify potential injuries and for determination of further actions that are not directly tied to oversight of the attached SOWs. Over the time period covered by this estimate, some staffing changes may occur, including reassignment of personnel and changes in hourly rates. Estimates in the table below are based on present information. The travel estimate is based on costs for trips by NRDP

staff within Montana to meet with co-Trustees, Bridger, or to provide Trustee oversight during studies.

NRDP will continue its contract with Abt Associates (Abt). Abt will provide technical assistance and support for the discussions and potential coordination with Bridger. Also, the proposed scopes of work for assessment tasks related to birds and fish are provided in Appendix B.

Table 6-8: Projected costs associated with NRDP Partial Claim for Certain Future Assessment Costs

| Expense Category | hours/ week | cost/hour (includes benefits) | 18 months |
|---|---|---|---|
| **Labor** | | | |
| Lawyer/Program Manager | 3.3 | $59.59 | $15,493.40 |
| Assistant Attorney General | 5.6 | $55.38-$59.78 | $26,422.76 |
| Restoration Program Chief | 5.6 | $57.71 | $25,507.82 |
| Environmental Science Specialist | 9.3 | $43.48 | $31653.44 |
| Administrative Specialist | .6 | $39.70 | $2064.40 |
| Labor Subtotal | | | $101,141.82 |
| | | | |
| NRDP indirect costs (8%) | | | $8091.34 |
| | | | |
| **Total Labor** | | | $109,233.16 |
| | | | |
| **Travel** | | | |
| Travel within MT (3 staff x 4 trips x 2 nights/trip) | | | $3,645 |
| | | | |
| **Contracts** | | | |
| Abt | | | $150,986.00 |
| **Total Contracts** | | | $112,878.16 |
| | | | |
| **TOTAL ESTIMATED COSTS** | | | $263,864.16 |

Natural Resource Damage Program Personnel:

The Lawyer/Program Manager position is currently held by Harley Harris. Mr. Harris provides overall management and supervision of the State's NRDA activities. Mr. Harris reviews documents and work products associated with the Trustee claim, and assists with the development of budgets. Mr. Harris also performs certain legal work relating to those activities, such as compliance with any operating MOAs or MOUs. Mr. Harris also participates in conference calls and meetings with Trustees and with Bridger. In addition, Mr. Harris coordinates the work of the State's staff and its consultants.

The Assistant Attorney General positions are currently held by Katherine Haque-Hausrath and Mary Capdeville. Ms. Capdeville and Ms. Haque-Hausrath provide legal advice relating to the NRDA activities. Ms. Capdeville also serves as the backup for the Lawyer/Program Manager.

Ms. Capdeville and Ms. Haque-Hausrath participate in conference calls and meetings with Trustees and with Bridger. In addition, they coordinate certain work of the State's staff and its consultants.

The Environmental Specialist position is currently held by Beau Downing. Mr. Downing is assigned to work on and manage certain technical aspects of the State's NRDA activities. Mr. Downing, along with FWP staff, provides oversight of field work and data analysis. Mr. Downing, along with the NRDP Restoration Program Chief, Doug Martin, also participates in conference calls and meetings with Trustees and with Bridger. In addition, Mr. Downing and Mr. Martin assist in coordinating the work of the State's consultants.

Accounting and administrative assistance is currently being provided by Kathy Coleman.

### 6.2.2 Fish, Wildlife & Parks Estimated Assessment Costs

FWP's estimated future resource requirements consisting of labor and travel for the approximately 18 months of effort is $22,633.53. The activities included in this estimate are work and management of certain technical aspects of the State's NRDA activities. FWP staff will provide oversight of field work and data analysis and also participate in conference calls and meetings with Trustees and Bridger. Over the time period covered by this estimate, some staffing changes may occur, including reassignment of personnel and changes in hourly rates. Estimates in the table below are based on present information. The travel estimate is based on costs for trips by FWP staff within Montana to meet with co-Trustees, Bridger, or to provide Trustee oversight during studies.

Table 6-9: Projected costs associated with FWP conducting assessment activities as part of the January 2015 Yellowstone River Oil Spill Natural Resource Damage Assessment

| Expense Category | hours/ week | cost/hour (includes benefits) | 18 months (78 Weeks) |
|---|---|---|---|
| **Labor** | | | |
| | | | |
| Region Supervisor Region 7 | .6 | $ 58.94 | $3,064.88 |
| Fisheries Manager Region 7 | .6 | $ 52.37 | $2,723.24 |
| Fisheries Biologist | 1.3 | $ 38.72 | $ 4,026.88 |
| Fisheries Biologist | 1.3 | $ 36.52 | $3,798.08 |
| | | | |
| Labor Subtotal | | | $13,613.08 |
| | | | |
| FWP indirect costs (18.75%) | | | $2,552.45 |
| | | | |
| Total Labor | | | $16,165.53 |
| | | | |
| **Travel** | | | |
| Travel within MT (2staff x 4 trips x 2 nights/trip) | | | $6,468 |
| **TOTAL ESTIMATED COSTS** | | | $22,633.53 |

Fish, Wildlife & Parks Personnel:

The Region 7 Operations Manager position is currently held by Mr. Schmitz, who is assigned to work on technical aspects of the State's NRDA activities related to fishery resources. Mr. Schmitz will also participate in conference calls and meetings with Trustees and Bridger. In addition, Mr. Schmitz assists in coordinating the work of the State's consultants related to fishery resources.

The Fisheries Management position is currently held by Mr. Mike Backes. Mr. Backes is assigned to work on technical aspects of the State's NRDA activities related to aquatics. Mr. Backes will also participate in conference calls and meetings with Trustees and Bridger. In addition, Mr. Backes assists in coordinating the work of the State's consultants related to aquatics.

The Fisheries Biologist positions are held by Caleb Bollman and Mathew Rugg. Mr. Bollman and Mr. Rugg will provide input on the fish study, including work plans and report, and do periodic review of findings.

## 7. Restoration Alternatives Evaluation and Development

The evaluation and development of alternatives and development of the Restoration Plan is not included in the approximately 18-month timeline covered by this Partial Claim, but the Trustees' actions during the year will result in progress toward the Restoration Plan. Any claim for development of the Restoration Plan will be presented separately from this current Partial Claim, once associated costs have been developed. Similarly, the costs of implementing the Restoration Plan are also not included in the current Partial Claim.

## 8. Points of Contact

### 8.1 U.S. Department of Interior

Karen J. Nelson
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Environmental Contaminants Specialist
585 Shepard Way, Suite 1
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Dana Jacobsen
Assistant Regional Solicitor
Department of the Interior
Office of the Solicitor
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dana.jacobsen@sol.doi.gov

## 8.2 State of Montana

Harley Harris
Lawyer/Program Manager
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beaudowning@mt.gov

# Appendix A

**DOI Incurred Cost Summary**

| Expense Totals | January 1-March 31, 2016 | April 1- June 30, 2016 | July 1 - September 30, 2016 | Total |
|---|---|---|---|---|
| FWS | *$ 1,426.71* | *$ 10,250.80* | $ 6,784.74 | $ 18,462.25 |
| PMB | | *$ 647.11* | $ 667.33 | $ 1,314.44 |
| DOI-SOL | *$ 46.68* | | $ 23.34 | $ 70.02 |
| Totals per Time Period | *$ 1,473.39* | *$ 10,897.91* | $ 7,475.41 | |
| **Grand Total** | | | | **$ 19,846.71** |

*Italicized costs are those previously included in the September 2016 partial claim submitted to Bridger*

# United States Fish and Wildlife Service
# Cost Documentation
## Bridger Bird
## 01/01/2016 Through 03/31/2016

| Cost Category | Amount |
|---|---|
| FWS Direct Costs | $811.69 |
| FWS Indirect Support Costs | $478.33 |
| DOI Indirect Support Costs (16.84% of FWS Labor) | $136.69 |
| **Total Cost for Billing Period 01/01/2016 Through 03/31/2016** | **$1,426.71** |

I certify to the accuracy of the information provided in this report as well as all attached supporting information.

KAIMY MARKS Digitally signed by KAIMY MARKS Date: 2017.02.28 08:04:21 -07'00'

Signature

9/2/2016

Date:

Kaimy Marks, Administrative Officer
USFWS
Region 6

# United States Fish and Wildlife Service
# Bridger Bird
# Contracts Detail Report

| Contract No. | Ref Trans No. | Date | Vendor | Amount | Remarks |
|---|---|---|---|---|---|

**Total Contracts** **$0.00**

# United States Fish and Wildlife Service

## Bridger Bird

## Labor Detail Report

### 01/01/2016 Through 03/31/2016

| Pay Period | Employee Name | Pay Type | Cost/Hour | Hours | Amount | Remarks |
|---|---|---|---|---|---|---|
| **2016 PP06 - 02/21/16 to 03/05/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $54.22 | 6.5 | $352.40 | |
| | ROUSE, DAVID R | Regular Time | $43.85 | 6 | $263.12 | |
| Summary for 2016 PP06 - 02/21/16 to 03/05/16 (2 detail records) | | | | 12.50 | $615.52 | |
| **2016 PP07 - 03/06/16 to 03/19/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $54.22 | 2 | $108.44 | |
| | ROUSE, DAVID R | Regular Time | $43.87 | 2 | $87.73 | |
| Summary for 2016 PP07 - 03/06/16 to 03/19/16 (2 detail records) | | | | 4.00 | $196.17 | |
| **Total Labor** | | | | **16.50** | **$811.69** | |

# United States Fish and Wildlife Service
# Bridger Bird
# Land and Structures Detail Report

| Contract No. | Ref Trans No. | Date | Vendor | Amount | Remarks |
|---|---|---|---|---|---|

**Total Land and Structures** **$0.00**

# United States Fish and Wildlife Service
# Bridger Bird
# Supplies and Equipment Detail Report

| Date | Merchant | Cardholder | Amount | Remarks |
|---|---|---|---|---|
| **Total Supplies and Equipment** | | | **$0.00** | |

# United States Fish and Wildlife Service
# Bridger Bird
# Travel Detail Report

| Name | Dates of Travel | Document No | Vendor | Amount | Remarks |
|---|---|---|---|---|---|
| Summary for (0 detail records) | | | | $0.00 | |
| **Total Travel** | | | | **$0.00** | |

***Report Note: Travel Vouchers for many of these travelers were not available as of the end of the billing period. Voucher costs will be included on the next bill.***

# United States Fish and Wildlife Service
# Bridger Bird
# Vehicle Detail Report

| Vehicle/Traveler | Vendor | Amount | Remarks |
|---|---|---|---|

**Total Vehicle** **$0.00**

***Report Note: Charges with employee name are for fuel for rental cars which is a travel related expense; receipts are part of travel voucher and are not included.***

# United States Fish and Wildlife Service
# Cost Documentation
## Bridger Bird
## 04/01/2016 Through 06/30/2016

| Cost Category | Amount |
|---|---|
| FWS Direct Costs | $6,990.60 |
| FWS Indirect Support Costs | $2,636.32 |
| DOI Indirect Support Costs (16.84% of FWS Labor) | $623.87 |
| **Total Cost for Billing Period 04/01/2016 Through 06/30/2016** | **$10,250.80** |

I certify to the accuracy of the information provided in this report as well as all attached supporting information.

KAIMY MARKS Digitally signed by KAIMY MARKS
Date: 2017.02.28 08:05:13 -07'00'

Signature

9/1/2016

Date:

Kaimy Marks, Administrative Officer
USFWS
Region 6

# United States Fish and Wildlife Service
# Bridger Bird
# Contracts Detail Report

## 04/01/2016 Through 06/30/2016

| Contract No. | Ref Trans No. | Date | Vendor | Amount | Remarks |
|---|---|---|---|---|---|
| F15PD00587 | 5001099219 | 06/22/2016 | INDUSTRIAL ECONOMICS, INCOR | $3,285.88 | |
| **Total Contracts** | | | | **$3,285.88** | |

# United States Fish and Wildlife Service

# Bridger Bird

# Labor Detail Report

## 04/01/2016 Through 06/30/2016

| Pay Period | Employee Name | Pay Type | Cost/Hour | Hours | Amount | Remarks |
|---|---|---|---|---|---|---|
| **2016 PP08 - 03/20/16 to 04/02/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $54.22 | 6.5 | $352.40 | |
| | ROUSE, DAVID R | Regular Time | $43.85 | 5.5 | $241.20 | |
| Summary for 2016 PP08 - 03/20/16 to 04/02/16 (2 detail records) | | | | 12.00 | $593.60 | |
| **2016 PP09 - 04/03/16 to 04/16/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $54.22 | 2 | $108.43 | |
| | ROUSE, DAVID R | Regular Time | $43.86 | 2.5 | $109.64 | |
| Summary for 2016 PP09 - 04/03/16 to 04/16/16 (2 detail records) | | | | 4.50 | $218.07 | |
| **2016 PP10 - 04/17/16 to 04/30/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $54.22 | 11 | $596.39 | |
| | ROUSE, DAVID R | Regular Time | $43.85 | 8 | $350.81 | |
| Summary for 2016 PP10 - 04/17/16 to 04/30/16 (2 detail records) | | | | 19.00 | $947.20 | |
| **2016 PP11 - 05/01/16 to 05/14/16** | | | | | | |
| | ROUSE, DAVID R | Regular Time | $43.86 | 3 | $131.57 | |
| Summary for 2016 PP11 - 05/01/16 to 05/14/16 (1 detail record) | | | | 3.00 | $131.57 | |
| **2016 PP12 - 05/15/16 to 05/28/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $54.22 | 4.5 | $243.98 | |
| | ROUSE, DAVID R | Regular Time | $43.85 | 21 | $920.93 | |
| Summary for 2016 PP12 - 05/15/16 to 05/28/16 (2 detail records) | | | | 25.50 | $1,164.91 | |
| **2016 PP13 - 05/29/16 to 06/11/16** | | | | | | |

| Pay Period | Employee Name | Pay Type | Cost/Hour | Hours | Amount | Remarks |
|---|---|---|---|---|---|---|
| | NELSON, KAREN J | Regular Time | $55.66 | 3 | $166.98 | |
| | ROUSE, DAVID R | Regular Time | $43.85 | 11 | $482.39 | |
| Summary for 2016 PP13 - 05/29/16 to 06/11/16 (2 detail records) | | | | 14.00 | $649.37 | |
| **Total Labor** | | | | **78.00** | **$3,704.72** | |

# United States Fish and Wildlife Service
# Bridger Bird
# Land and Structures Detail Report

| Contract No. | Ref Trans No. | Date | Vendor | Amount | Remarks |
|---|---|---|---|---|---|

**Total Land and Structures** **$0.00**

# United States Fish and Wildlife Service
# Bridger Bird
# Supplies and Equipment Detail Report

| Date | Merchant | Cardholder | Amount | Remarks |
|---|---|---|---|---|
| **Total Supplies and Equipment** | | | **$0.00** | |

# United States Fish and Wildlife Service
# Bridger Bird
# Travel Detail Report

| Name | Dates of Travel | Document No | Vendor | Amount | Remarks |
|---|---|---|---|---|---|
| Summary for (0 detail records) | | | | $0.00 | |
| **Total Travel** | | | | **$0.00** | |

***Report Note: Travel Vouchers for many of these travelers were not available as of the end of the billing period. Voucher costs will be included on the next bill.***

# United States Fish and Wildlife Service
# Bridger Bird
# Vehicle Detail Report

| Vehicle/Traveler | Vendor | Amount | Remarks |
|---|---|---|---|

**Total Vehicle** **$0.00**

***Report Note: Charges with employee name are for fuel for rental cars which is a travel related expense; receipts are part of travel voucher and are not included.***

# United States Fish and Wildlife Service
# Cost Documentation
## Bridger Bird
## 07/01/2016 Through 09/30/2016

| Cost Category | Amount |
|---|---|
| FWS Direct Costs | $6,519.13 |
| FWS Indirect Support Costs | $207.65 |
| DOI Indirect Support Costs (16.84% of FWS Labor) | $57.95 |
| **Total Cost for Billing Period 07/01/2016 Through 09/30/2016** | **$6,784.74** |

I certify to the accuracy of the information provided in this report as well as all attached supporting information.

KAIMY MARKS Digitally signed by KAIMY MARKS
Date: 2017.02.28 08:05:32 -07'00'

Signature

12/5/2016

Date:

Kaimy Marks, Administrative Officer
USFWS
Region 6

# United States Fish and Wildlife Service

## Bridger Bird

## Labor Detail Report

### 07/01/2016 Through 09/30/2016

| Pay Period | Employee Name | Pay Type | Cost/Hour | Hours | Amount | Remarks |
|---|---|---|---|---|---|---|
| **2016 PP14 - 06/12/16 to 06/25/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $55.68 | 3 | $167.03 | |
| | ROUSE, DAVID R | Regular Time | $43.87 | 1 | $43.87 | |
| Summary for 2016 PP14 - 06/12/16 to 06/25/16 (2 detail records) | | | | 4.00 | $210.90 | |
| **2016 PP15 - 06/26/16 to 07/09/16** | | | | | | |
| | ROUSE, DAVID R | Regular Time | $43.88 | 0.5 | $21.94 | |
| Summary for 2016 PP15 - 06/26/16 to 07/09/16 (1 detail record) | | | | 0.50 | $21.94 | |
| **2016 PP16 - 07/10/16 to 07/23/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $55.67 | -1 | ($55.67) | |
| Summary for 2016 PP16 - 07/10/16 to 07/23/16 (1 detail record) | | | | -1.00 | ($55.67) | |
| **2016 PP19 - 08/21/16 to 09/03/16** | | | | | | |
| | NELSON, KAREN J | Regular Time | $55.66 | 3 | $166.98 | |
| Summary for 2016 PP19 - 08/21/16 to 09/03/16 (1 detail record) | | | | 3.00 | $166.98 | |
| **Total Labor** | | | | **6.50** | **$344.15** | |

# United States Fish and Wildlife Service
# Bridger Bird
# Contracts Detail Report

## 07/01/2016 Through 09/30/2016

| Contract No. | Ref Trans No. | Date | Vendor | Amount | Remarks |
|---|---|---|---|---|---|
| F15PD00587 | 5000930973 | 07/18/2016 | INDUSTRIAL ECONOMICS, INCOR | $5,794.00 | |
| F15PD00587 | 5001222656 | 09/19/2016 | INDUSTRIAL ECONOMICS, INCOR | $380.98 | |
| **Total Contracts** | | | | **$6,174.98** | |

# United States Fish and Wildlife Service
# Bridger Bird
# Land and Structures Detail Report

| Contract No. | Ref Trans No. | Date | Vendor | Amount | Remarks |
|---|---|---|---|---|---|

**Total Land and Structures** **$0.00**

# United States Fish and Wildlife Service
# Bridger Bird
# Supplies and Equipment Detail Report

| Date | Merchant | Cardholder | Amount | Remarks |
|---|---|---|---|---|
| **Total Supplies and Equipment** | | | **$0.00** | |

# United States Fish and Wildlife Service
# Bridger Bird
# Travel Detail Report

| Name | Dates of Travel | Document No | Vendor | Amount | Remarks |
|---|---|---|---|---|---|
| Summary for (0 detail records) | | | | $0.00 | |
| **Total Travel** | | | | **$0.00** | |

***Report Note: Travel Vouchers for many of these travelers were not available as of the end of the billing period. Voucher costs will be included on the next bill.***

# United States Fish and Wildlife Service
# Bridger Bird
# Vehicle Detail Report

| Vehicle/Traveler | Vendor | Amount | Remarks |
|---|---|---|---|

**Total Vehicle** **$0.00**

***Report Note: Charges with employee name are for fuel for rental cars which is a travel related expense; receipts are part of travel voucher and are not included.***

U.S. DEPARTMENT OF THE INTERIOR
Natural Resource Damage Assessment & Restoration Program
Labor Cost Report

2/27/2017

| | |
|---|---|
| Incident/Site name, location: | **Yellowstone River – Bridger Pipeline Oil Spill** |
| Incident/Site FPN or CERCLA ID no.: | |
| Inclusive dates of billing: | **Jan 1, 2016 - September 30, 2016** |
| Billing bureau/office: | **OS/ PPA - Office of Policy Analysis** |
| Billing bureau/office contact: | **Christian Crowley 202 208 3799** |
| Are travel orders attached? (YES or NO): | **No** |
| If YES, how many are attached? | |

LABOR REPORT

| Employee name (last, first)/ Date of activity | Pay grade | Activity code(s)[1] | No. of hours | Pay rate per hour | Cost | Office use |
|---|---|---|---|---|---|---|
| 4/19/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 5/17/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 5/27/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 5/31/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 6/7/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 6/14/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 6/21/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 6/28/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 7/5/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 7/19/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 7/26/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 8/2/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 8/16/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 8/23/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 8/30/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 9/10/2016 | 13.07 | 1.3 | 1.00 | $69.23 | $69.23 | |
| 9/13/2016 | 13.07 | 1.3 | 0.25 | $69.23 | $17.31 | |
| Total | | | 16.25 | | | |

| | |
|---|---|
| Sub-Total of direct labor cost: | $1,124.99 |
| USFWS indirect rate #1, if applicable (@ 52% of labor cost): | $0.00 |
| DOI indirect rate #2, if applicable (@ 16.84% of labor cost): | $189.45 |
| Total labor cost: | $1,314.44 |

Activity Code key:

**1.0: Trustee Notification, Coordination, Management, and Reporting**
1.1: Trustee Coordination with other agencies and within agencies
1.2: Work organization and Planning
1.3: Study Planning
1.4: Implementation and oversight
1.5: Administrative tasks
1.6: Contract Management
1.7: Budget Keeping
1.8: Cost Tracking and Documentation

**2.0: Contractor support for Activity 1**
2.1: Work Organization
2.2: Planning
2.3: Study Planning

**3.0: Data evaluation, collection, sampling, analysis, reporting, storage**
3.1: Data Evaluation
3.2: Data Collection
3.3: Data Sampling
3.4: Data Analysis
3.5: Data Reporting
3.5: Data Storage

Remarks:

IAG Number: E11809-OI1
DCN: 2/V/SZ/172/95/0/E11809/74100/2523
Name of Incident: Yellowstone River – Bridger Pipeline Oil Spill
FPN: E11809
NPFC Interagency Agreement Number: 34-11-46 34-11-461VX3002
Date Occurred: July 1, 2011
Location: Yellowstone River corridor and environs, Laurel Montana

**Indirect Cost:**

| Agency | Amount |
|---|---|
| DOI (16.84% on labor only): | |
| BLM (18.4% labor, travel, & equipment): | |
| FWS (52% labor & travel): | |
| BIA/Tribe (20% estimated on labor and travel): | |
| Total Federal Indirect Cost: | |
| State (21.34% labor and travel): | |
| Total Indirect Cost (Federal and State): | |

United States Department of the Interior

OFFICE OF THE SOLICITOR

Rocky Mountain Region
755 Parfet Street, Suite 151
Lakewood, CO 80215
TELE. (303) 231-5353
FAX (303) 231-5363

**Labor and Travel Costs for Natural Resource Damage Assessment**
**Yellowstone River: Poplar Pipeline**
**Through November 30, 2016**

**Employee:** Dana Jacobsen, Assistant Regional Solicitor, Office of the Solicitor, Rocky Mountain Region. Pay grade: GS-15, step 8, Hourly Rate (salary and indirect costs) =$93.36

## Labor

| Date | Activity | Hours |
|---|---|---|
| 02/23/15 | Call with Trustees | 1.5 |
| 03/10/15 | Call with Trustees | 0.5 |
| 03/17/15 | Call with Trustees | 0.25 |
| 03/31/15 | Call with Trustees | 0.5 |
| 04/07/15 | Call with Trustees, review MOU | 1.0 |
| 04/09/15 | Call with Trustees | 1.0 |
| 04/28/15 | Call with Trustees | 0.5 |
| 05/14/15 | Call with Trustees | 0.5 |
| 06/04/15 | Call with Trustees, review doc | 1.0 |
| 06/30/15 | Call with Trustees | 0.5 |
| 07/15/15 | Review information | 1.0 |
| 10/27/15 | Call with FWS (Nelson) NRD | 0.5 |
| 01/29/16 | Review draft letter to PRP | 0.25 |
| 03/30/16 | Review draft NRD work outline | 0.5 |
| 04/05/16 | Call with Montana (Capdeville) Re: NRD | 1.0 |
| 04/21/16 | Call with Trustees | 1.0 |
| 06/22/16 | Call with Trustees | 1.0 |
| 06/27/16 | Meeting in Helena MT with PRP | 9.0 |
| 07/14/16 | Comment draft letter agreement | 1.0 |
| 07/15/16 | Comments draft letter agreement | .25 |

| | | |
|---|---|---|
| 07/28/16 | Comment on draft letter agreement | 0.5 |
| 09/15/16 | Comment on draft email to PRP | .50 |

Total Hours: 23.74

**Grand Total Labor: $2,217.30 (Assessment Costs: $70.02)**

**Travel**

**Travel to Helena, MT** June 27, 2016 to meet with PRP regarding NRD issues

**Grand Total Travel**: $489.21 (plane ticket, per diem, parking, transaction fees) (see attached)

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**Grand Total Labor + Travel for Dana Jacobsen:** $2,706.51

| Vendor | Name | Funds Center | Invoice | Document Date | Clearing Date | Clearing Doc.# | PO Number | PO Line Itm | Debit Amount | Credit Amount | Debit/Credit Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2003524265 | 05/08/2015 | 05/08/2015 | 2003524265 | F15PD00587 | 10 | $ 1,473.72 | $ 0.00 | $ 1,473.72 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2003599830 | 06/02/2015 | 06/02/2015 | 2003599830 | F15PD00587 | 10 | $ 1,265.14 | $ 0.00 | $ 1,265.14 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2004080766 | 11/02/2015 | 11/02/2015 | 2004080766 | F15PD00587 | 10 | $ 1,176.98 | $ 0.00 | $ 1,176.98 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2004678125 | 06/23/2016 | 06/23/2016 | 2004678125 | F15PD00587 | 10 | $ 1,297.22 | $ 0.00 | $ 1,297.22 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2004678125 | 06/23/2016 | 06/23/2016 | 2004678125 | F15PD00587 | 30 | $ 3,285.88 | $ 0.00 | $ 3,285.88 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2004755956 | 07/19/2016 | 07/19/2016 | 2004755956 | F15PD00587 | 10 | $ 1,193.34 | $ 0.00 | $ 1,193.34 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2004755956 | 07/19/2016 | 07/19/2016 | 2004755956 | F15PD00587 | 30 | $ 5,794.00 | $ 0.00 | $ 5,794.00 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2004948940 | 09/20/2016 | 09/20/2016 | 2004948940 | F15PD00587 | 10 | $ 3,430.60 | $ 0.00 | $ 3,430.60 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2004948940 | 09/20/2016 | 09/20/2016 | 2004948940 | F15PD00587 | 30 | $ 380.98 | $ 0.00 | $ 380.98 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 2005314391 | 02/10/2017 | 02/10/2017 | 2005314391 | F15PD00587 | 10 | $ 1,716.20 | $ 0.00 | $ 1,716.20 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201318229 | 05/06/2015 | 05/08/2015 | 2003524265 | F15PD00587 | 10 | $ 0.00 | $ -1,473.72 | $ -1,473.72 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201337903 | 05/19/2015 | 06/02/2015 | 2003599830 | F15PD00587 | 10 | $ 0.00 | $ -1,265.14 | $ -1,265.14 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201488670 | 10/20/2015 | 11/02/2015 | 2004080766 | F15PD00587 | 10 | $ 0.00 | $ -1,176.98 | $ -1,176.98 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201488670 | 10/20/2015 | # | # | F15PD00587 | 10 | $ 0.00 | $ 0.00 | $ 0.00 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201695762 | 06/21/2016 | 06/23/2016 | 2004678125 | F15PD00587 | 10 | $ 0.00 | $ -1,297.22 | $ -1,297.22 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201695762 | 06/21/2016 | 06/23/2016 | 2004678125 | F15PD00587 | 30 | $ 0.00 | $ -3,285.88 | $ -3,285.88 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201695762 | 06/21/2016 | # | # | F15PD00587 | 10 | $ 0.00 | $ 0.00 | $ 0.00 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201695762 | 06/21/2016 | # | # | F15PD00587 | 30 | $ 0.00 | $ 0.00 | $ 0.00 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201720158 | 07/18/2016 | 07/19/2016 | 2004755956 | F15PD00587 | 10 | $ 0.00 | $ -1,193.34 | $ -1,193.34 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201720158 | 07/18/2016 | 07/19/2016 | 2004755956 | F15PD00587 | 30 | $ 0.00 | $ -5,794.00 | $ -5,794.00 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201784953 | 09/19/2016 | 09/20/2016 | 2004948940 | F15PD00587 | 10 | $ 0.00 | $ -3,430.60 | $ -3,430.60 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201784953 | 09/19/2016 | 09/20/2016 | 2004948940 | F15PD00587 | 30 | $ 0.00 | $ -380.98 | $ -380.98 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201784953 | 09/19/2016 | # | # | F15PD00587 | 10 | $ 0.00 | $ 0.00 | $ 0.00 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201784953 | 09/19/2016 | # | # | F15PD00587 | 30 | $ 0.00 | $ 0.00 | $ 0.00 |
| 70104035 | INDUSTRIAL ECONOMICS, INCORPORATED | FF06E11000 | 5201912509 | 02/08/2017 | 02/10/2017 | 2005314391 | F15PD00587 | 10 | $ 0.00 | $ -1,716.20 | $ -1,716.20 |
| | | | | | | | | **Totals** | **$ 21,014.06** | **$ -21,014.06** | |

F15PD00587

## SUPPLEMENTAL INVOICING INFORMATION

If desired, this order (or a copy thereof) may be used by the Contractor as the Contractor's invoice, instead of a separate invoice, provided the following statement, (signed and dated) is on (or attached to) the order: "Payment is requested in the amount of $ _____ . No other invoice will be submitted." However, if the Contractor wishes to submit an invoice, the following information must be provided: contract number (if any), order number, item number(s), description of supplies or service, sizes, quantities, unit prices, and extended totals. Prepaid shipping costs will be indicated as a separate item on the invoice. Where shipping costs exceed $10 (except for parcel post), the billing must be supported by a bill of lading or receipt. When several orders are invoiced to an ordering activity during the same billing period, consolidated periodic billings are encouraged.

## RECEIVING REPORT

Quantity in the "Quantity Accepted" column on the face of this order has been: ☐ inspected, ☒ accepted, ☐ received by me and conforms to contract. Items listed below have been rejected for the reasons indicated.

| SHIPMENT NUMBER | PARTIAL | X | DATE RECEIVED | SIGNATURE OF AUTHORIZED U.S. GOV'T REP. | DATE |
|---|---|---|---|---|---|
| | FINAL | | 09/19/2016 | KAIMY MARKS | 09/19/2016 |
| TOTAL CONTAINERS | | GROSS WEIGHT | RECEIVED AT MT ES | TITLE Administrative Officer | |

## REPORT OF REJECTIONS

| ITEM NO. | SUPPLIES OR SERVICES | UNIT | QUANTITY REJECTED | REASON FOR REJECTION |
|---|---|---|---|---|
| 010 | Services provided through 8/31/2016 | | | $3430.60 |
| 030 | Services provided through8/31/2016 | | | $380.98 |

IEc

INDUSTRIAL ECONOMICS, INCORPORATED

September 16, 2016

**INVOICE SUBMITTED VIA INTERNET PAYMENT PLATFORM**

Invoice #21499/1100-824

Jon Morse
FWS. Division of Contracting and GE
Lake Plaza North
134 Union Boulevard
Lakewood, CO 800228

Contract # GS-10F-0061N
Task Order # F15PD00587

For professional services provided through August 31, 2016
in connection with the above referenced contract:

| | |
|---|---|
| CLINs 0001 and 0002 | $3,430.60 |
| CLIN 0003 | $380.98 |
| Current Amount Due: | $3,811.58 |

Michael C. Donlan
Principal

cc: Karen_Nelson@fws.gov

Remit to
Industrial Economics, Inc, AC # 564853990
Routing Transit # 211371120
C/O Cambridge Savings Bank
IEC Tax Identification #: 04-2735625

2067 Massachusetts Avenue
Cambridge, MA 02140 USA
617.354.0074 | 617.354.0463 fax
www.indecon.com

0001.

BILLING #: 021499

BILLING DATE: 00/00/00

CUST:

CONTRACTOR: INDUSTRIAL ECONOMICS, INC
2067 Massachusetts Avenue
Cambridge, MA 02140

TOTAL CONTRACT: 85,000.00
WBS NAME: F15PD00587
WBS NUMBER: 1100.01.0034

| BILL PD END: 08/31/16 | CURRENT RATE | CURRENT HOURS | CURRENT BILLABLE | CUMULATIVE HOURS | CUMULATIVE BILLABLE |
|---|---|---|---|---|---|
| Amend, M Disc/16 | 72.00 | 0.5 | 36.00 | 0.5 | 36.00 |
| Berger, M Disc/16 | 65.00 | 6.5 | 422.50 | 6.5 | 422.50 |
| Dwyer, J Disc/16 | 175.00 | 8.1 | 1,417.50 | 59.2 | 10,360.00 |
| Kutryb, E Disc/16 | 117.00 | 1.6 | 187.20 | 2.7 | 315.90 |
| Martin, N Disc/16 | 109.00 | 14.0 | 1,526.00 | 23.3 | 2,539.70 |
| Ware, M Disc/16 | 145.00 | 0.5 | 72.50 | 3.1 | 449.50 |
| Barbati, A Disc/16 | 57.00 | 0.0 | 0.00 | 3.3 | 188.10 |
| Benishek, C Disc/16 | 59.00 | 0.6 | 35.40 | 3.9 | 230.10 |
| Kutryb, E Disc/15 | 115.00 | 0.0 | 0.00 | 3.8 | 437.00 |
| Ware, M Disc/15 | 161.00 | 0.0 | 0.00 | 0.2 | 32.20 |
| Collins, R Disc/15 | 70.00 | 0.0 | 0.00 | 0.8 | 56.00 |
| Donlan, M Disc/15 | 214.00 | 0.0 | 0.00 | 1.5 | 321.00 |
| Watt, B Disc/15 | 56.00 | 0.0 | 0.00 | 0.1 | 5.60 |
| Dwyer, J Disc/15 | 171.00 | 0.0 | 0.00 | 19.2 | 3,283.20 |
| Martin, N Disc/15 | 103.00 | 0.0 | 0.00 | 1.5 | 154.50 |
| TOTALS | | 31.8 | 3,697.10 | 129.6 | 18,831.30 |
| Direct Matl. & Supl. | | | 92.22 | | 375.84 |
| Communications | | | 22.26 | | 90.72 |
| SUBTOTAL ODCS | | | 114.48 | | 466.56 |
| TOTAL NON-LABOR BILLABLE | | | 114.48 | | 466.56 |
| TOTAL BILLING | | | 3,811.58 | | 19,297.86 |

# MONTHLY PROGRESS REPORT

## Period July 1, 2016 through August 31, 2016

| | |
|---|---|
| **Date of Report:** | **September 15, 2016** |
| **Contractor:** | **Industrial Economics, Incorporated (IEc)** |
| **GSA Contract Number:** | **GS-10F-0061N** |
| **Delivery Order Number:** | **F15PD00587** |
| **Delivery Order Title:** | **Yellowstone River-Bidger Pipeline Oil Spill** |
| **Contract Officer's Technical Representative:** | **Karen Nelson** |

**Part I. Activities Undertaken During Billing Period:**

- Participated in Trustee conference calls as requested.
- Revised bird injury and restoration work plan.
- Conducted preliminary evaluation of potential data sources and approaches to quantify bird injury and restoration.

**Part II. Difficulties Encountered and Remedial Action Taken:**

- None

**Part III . Activities Anticipated during the Next Month:**

- Participate in Trustee conference calls as requested.
- Review data and documents as requested.
- Complete bird injury and restoration work plan if requested.

F15PD00586

## SUPPLEMENTAL INVOICING INFORMATION

If desired, this order (or a copy thereof) may be used by the Contractor as the Contractor's invoice, instead of a separate invoice, provided the following statement, (signed and dated) is on (or attached to) the order: "Payment is requested in the amount of $ _____ . No other invoice will be submitted." However, if the Contractor wishes to submit an invoice, the following information must be provided: contract number (if any), order number, item number(s), description of supplies or service, sizes, quantities, unit prices, and extended totals. Prepaid shipping costs will be indicated as a separate item on the invoice. Where shipping costs exceed $10 (except for parcel post), the billing must be supported by a bill of lading or receipt. When several orders are invoiced to an ordering activity during the same billing period, consolidated periodic billings are encouraged.

## RECEIVING REPORT

Quantity in the "Quantity Accepted" column on the face of this order has been: ☐ inspected, ☒ accepted, ☐ received by me and conforms to contract. Items listed below have been rejected for the reasons indicated.

| SHIPMENT NUMBER | PARTIAL | X | DATE RECEIVED | SIGNATURE OF AUTHORIZED U.S. GOV'T REP. | DATE |
|---|---|---|---|---|---|
| | FINAL | | 07/18/2016 | KAIMY MARKS | 07/18/2016 |
| TOTAL CONTAINERS | | GROSS WEIGHT | RECEIVED AT MT ES | TITLE Administrative Officer | |

## REPORT OF REJECTIONS

| ITEM NO | SUPPLIES OR SERVICES | UNIT | QUANTITY REJECTED | REASON FOR REJECTION |
|---|---|---|---|---|
| 010 | Services provided through 6/30/2016 | | | $1193.34 |
| 030 | Services provided through 6/30/2016 | | | $5794.00 |

IEc

INDUSTRIAL ECONOMICS, INCORPORATED

July 14, 2016

**INVOICE SUBMITTED VIA INTERNET PAYMENT PLATFORM**

Invoice #21315/1100-824

Jon Morse
FWS, Division of Contracting and GE
Lake Plaza North
134 Union Boulevard
Lakewood, CO 800228

Contract # GS-10F-0061N
Task Order # F15PD00587

For professional services provided through April 30, 2016
in connection with the above referenced contract:

| | |
|---|---|
| CLINs 0001 and 0002 | $1,193.34 |
| CLIN 0003 | $5,794.00 |
| Current Amount Due: | $6,987.34 |

Michael C. Donlan
Principal

Remit to
Industrial Economics, Inc. AC # 564853990
Routing Transit # 211371120
C/O Cambridge Savings Bank
IEC Tax Identification # 04-2735625

2067 Massachusetts Avenue
Cambridge, MA 02140 USA
617.354.0074 | 617.354.0463 fax
www.indecon.com

# MONTHLY PROGRESS REPORT

## Period May 1, 2016 through June 30, 2016

| | |
|---|---|
| **Date of Report:** | **July, 13, 2016** |
| **Contractor:** | **Industrial Economics, Incorporated (IEc)** |
| **GSA Contract Number:** | **GS-10F-0061N** |
| **Delivery Order Number:** | **F15PD00587** |
| **Delivery Order Title:** | **Yellowstone River-Bidger Pipeline Oil Spill** |
| **Contract Officer's Technical Representative:** | **Karen Nelson** |

**Part I. Activities Undertaken During Billing Period:**

- Participated in Trustee conference calls as requested.
- Revised bird injury and restoration work plan.
- Reviewed DARTS case description and draft Notice of Intent.
- Participated in conference call with Bridger Pipeline LLC (June 27).

**Part II. Difficulties Encountered and Remedial Action Taken:**

- None

**Part III . Activities Anticipated during the Next Month:**

- Participate in Trustee conference calls as requested.
- Review data and documents as requested.
- Continue to draft and revise bird injury and restoration work plan.

BILLING #: 021315

BILLING DATE: 00/00/00

CUST:

CONTRACTOR: INDUSTRIAL ECONOMICS, INC
2067 Massachusetts Avenue
Cambridge, MA 02140

TOTAL CONTRACT: 85,000.00
WBS NAME: F15PD00587
WBS NUMBER: 1100.01.0034

| BILL PD END: 06/30/16 | CURRENT RATE | CURRENT HOURS | CURRENT BILLABLE | CUMULATIVE HOURS | CUMULATIVE BILLABLE |
|---|---|---|---|---|---|
| Dwyer, J Disc/16 | 175.00 | 29.7 | 5,197.50 | 51.1 | 8,942.50 |
| Kutryb, E Disc/16 | 117.00 | 0.0 | 0.00 | 1.1 | 128.70 |
| Martin, N Disc/16 | 109.00 | 8.3 | 904.70 | 9.3 | 1,013.70 |
| Ware, M Disc/16 | 145.00 | 2.3 | 333.50 | 2.6 | 377.00 |
| Barbati, A Disc/16 | 57.00 | 3.3 | 188.10 | 3.3 | 188.10 |
| Benishek, C Disc/16 | 59.00 | 3.3 | 194.70 | 3.3 | 194.70 |
| Kutryb, E Disc/15 | 115.00 | 0.0 | 0.00 | 3.8 | 437.00 |
| Ware, M Disc/15 | 161.00 | 0.0 | 0.00 | 0.2 | 32.20 |
| Collins, R Disc/15 | 70.00 | 0.0 | 0.00 | 0.8 | 56.00 |
| Donlan, M Disc/15 | 214.00 | 0.0 | 0.00 | 1.5 | 321.00 |
| Watt, B Disc/15 | 56.00 | 0.0 | 0.00 | 0.1 | 5.60 |
| Dwyer, J Disc/15 | 171.00 | 0.0 | 0.00 | 19.2 | 3,283.20 |
| Martin, N Disc/15 | 103.00 | 0.0 | 0.00 | 1.5 | 154.50 |
| TOTALS | | 46.9 | 6,818.50 | 97.8 | 15,134.20 |
| Direct Matl. & Supl. | | | 136.01 | | 283.62 |
| Communications | | | 32.83 | | 68.46 |
| SUBTOTAL ODCS | | | 168.84 | | 352.08 |
| TOTAL NON-LABOR BILLABLE | | | 168.84 | | 352.08 |
| TOTAL BILLING | | | 6,987.34 | | 15,486.28 |

F15PD00587

## SUPPLEMENTAL INVOICING INFORMATION

If desired, this order (or a copy thereof) may be used by the Contractor as the Contractor's invoice, instead of a separate invoice, provided the following statement, (signed and dated) is on (or attached to) the order: "Payment is requested in the amount of $ _____ . No other invoice will be submitted." However, if the Contractor wishes to submit an invoice, the following information must be provided: contract number (if any), order number, item number(s), description of supplies or service, sizes, quantities, unit prices, and extended totals. Prepaid shipping costs will be indicated as a separate item on the invoice. Where shipping costs exceed $10 (except for parcel post), the billing must be supported by a bill of lading or receipt. When several orders are invoiced to an ordering activity during the same billing period, consolidated periodic billings are encouraged.

## RECEIVING REPORT

Quantity in the "Quantity Accepted" column on the face of this order has been: ☐ inspected, ☒ accepted, ☐ received by me and conforms to contract. Items listed below have been rejected for the reasons indicated.

| SHIPMENT NUMBER | PARTIAL | X | DATE RECEIVED | SIGNATURE OF AUTHORIZED U.S. GOV'T REP. | DATE |
|---|---|---|---|---|---|
| | FINAL | | 06/21/2016 | KAIMY MARKS | 06/22/2016 |
| TOTAL CONTAINERS | | GROSS WEIGHT | RECEIVED AT MT ES | TITLE Administrative Officer | |

## REPORT OF REJECTIONS

| ITEM NO. | SUPPLIES OR SERVICES | UNIT | QUANTITY REJECTED | REASON FOR REJECTION |
|---|---|---|---|---|
| 010 | Services provided through 4/30/2016 | | | $1297.22 |
| 030 | Services provided through 4/30/2016 | | | $3285.88 |

IEc

INDUSTRIAL ECONOMICS, INCORPORATED

June 21, 2016

**INVOICE SUBMITTED VIA INTERNET PAYMENT PLATFORM**

Invoice #21260/1100-824 **REVISED**

Jon Morse
FWS, Division of Contracting and GE
Lake Plaza North
134 Union Boulevard
Lakewood, CO 800228

**Contract # GS-10F-0061N**
**Task Order # F15PD00587**

For professional services provided through April 30, 2016
in connection with the above referenced contract:

| | |
|---|---|
| CLINs 0001 and 0002 | $1,297.22 |
| CLIN 0003 | $3,285.88 |
| **Current Amount Due:** | **$4,583.10** |

Michael C. Donlan
Principal

Remit to
Industrial Economics, Inc, AC # 564853990
Routing Transit # 211371120
C/O Cambridge Savings Bank
IEC Tax Identification #: 04-2735625

2067 Massachusetts Avenue
Cambridge, MA 02140 USA
617.354.0074 | 617.354.0463 fax
www.indecon.com

0001.

BILLING #: 021260

BILLING DATE: 00/00/00

CUST:

CONTRACTOR: INDUSTRIAL ECONOMICS, INC
2067 Massachusetts Avenue
Cambridge, MA 02140

TOTAL CONTRACT: 85,000.00
WBS NAME: F15PD00587
WBS NUMBER: 1100.01.0034

| BILL PD END: 04/30/16 | CURRENT RATE | CURRENT HOURS | CURRENT BILLABLE | CUMULATIVE HOURS | CUMULATIVE BILLABLE |
|---|---|---|---|---|---|
| Dwyer, J Disc/16 | 175.00 | 21.4 | 3,745.00 | 21.4 | 3,745.00 |
| Kutryb, E Disc/16 | 117.00 | 1.1 | 128.70 | 1.1 | 128.70 |
| Martin, N Disc/16 | 109.00 | 1.0 | 109.00 | 1.0 | 109.00 |
| Ware, M Disc/16 | 145.00 | 0.3 | 43.50 | 0.3 | 43.50 |
| Kutryb, E Disc/15 | 115.00 | 1.3 | 149.50 | 3.8 | 437.00 |
| Ware, M Disc/15 | 161.00 | 0.0 | 0.00 | 0.2 | 32.20 |
| Collins, R Disc/15 | 70.00 | 0.0 | 0.00 | 0.8 | 56.00 |
| Donlan, M Disc/15 | 214.00 | 0.0 | 0.00 | 1.5 | 321.00 |
| Watt, B Disc/15 | 56.00 | 0.0 | 0.00 | 0.1 | 5.60 |
| Dwyer, J Disc/15 | 171.00 | 0.9 | 153.90 | 19.2 | 3,283.20 |
| Martin, N Disc/15 | 103.00 | 1.5 | 154.50 | 1.5 | 154.50 |
| TOTALS | | 27.5 | 4,484.10 | 50.9 | 8,315.70 |
| Direct Matl. & Supl. | | | 79.75 | | 147.61 |
| Communications | | | 19.25 | | 35.63 |
| SUBTOTAL ODCS | | | 99.00 | | 183.24 |
| TOTAL NON-LABOR BILLABLE | | | 99.00 | | 183.24 |
| TOTAL BILLING | | | 4,583.10 | | 8,498.94 |

# MONTHLY PROGRESS REPORT

## Period October 1, 2015 through April 30, 2015

| | |
|---|---|
| **Date of Report:** | **May 20, 2015** |
| **Contractor:** | **Industrial Economics, Incorporated (IEc)** |
| **GSA Contract Number:** | **GS-10F-0061N** |
| **Delivery Order Number:** | **F15PD00587** |
| **Delivery Order Title:** | **Yellowstone River-Bidger Pipeline Oil Spill** |
| **Contract Officer's Technical Representative:** | **Karen Nelson** |

**Part I. Activities Undertaken During Billing Period:**

- Participated in conference calls as requested.
- Developed first draft and revised bird injury and restoration work plan.

**Part II. Difficulties Encountered and Remedial Action Taken:**

- None

**Part III . Activities Anticipated during the Next Month:**

- Participate in Trustee conference calls as requested.
- Review data and documents as requested.
- Continue to draft and revise bird injury and restoration work plan.

**Bridger Oil Spill**
**State of Montana NRDA Costs**
**Agency payroll NRDP 10/01/16-1/06/2017**

**NRDP**

| | |
|---|---|
| **Payroll Costs** | **$3,807.69** |
| **Contractor Costs** | **$0.00** |
| **Indirects (8% of labor )** | **$304.62** |
| **TOTAL NRDP COSTS** | **$4,112.31** |
| **TOTAL COSTS** | **$4,112.31** |

**NRDP**

| | |
|---|---|
| Payroll | $3,807.69 |
| Travel | $0.00 |
| Consulting | $0.00 |
| Other NRDP Operating | $0.00 |
| Indirects | $304.62 |
| TOTAL NRDP | $4,112.31 |

NRDP Payroll

| Employee | Amount |
|---|---|
| Robert Collins | $0.00 |
| Doug Martin | $458.73 |
| Mary Capdeville | $443.19 |
| Kathy Coleman | $0.00 |
| Beau Downing | $646.32 |
| Tom McMeans | $0.00 |
| Michelle Golden | $0.00 |
| Katherine Haque-Hausrath | $2,141.21 |
| Harley Harris | $118.24 |
| Alicia Stickney | $0.00 |
| **Total** | **$3,807.69** |

| Name | Pay Period End | Empl ID | Fiscal Year | Position | Hours | Earn Code 1 | Earn Descript | Hrly Rate | Sum of Earnings |
|---|---|---|---|---|---|---|---|---|---|
| **Capdeville,Mary T** | **2016-10-28** | 000661 | **2017** | 41130196 | **3** | REG | **Regular Ear** | 45.484099 | 136.44 |
| | | | | | | | | 45.484099 Total | 136.44 |
| | | | | | **(blank)** | BEN | **Benefits** | 45.484099 | 40.74 |
| | | | | | | | | 45.484099 Total | 40.74 |
| | **2016-10-28 Total** | | | | | | | | **177.18** |
| | **2016-11-25** | 000661 | **2017** | 41130196 | **0.5** | REG | **Regular Ear** | 45.484099 | 22.74 |
| | | | | | | | | 45.484099 Total | 22.74 |
| | | | | | **(blank)** | BEN | **Benefits** | 45.484099 | 6.82 |
| | | | | | | | | 45.484099 Total | 6.82 |
| | **2016-11-25 Total** | | | | | | | | **29.56** |
| | **2016-12-09** | 000661 | **2017** | 41130196 | **0.5** | REG | **Regular Ear** | 45.484099 | 22.74 |
| | | | | | | | | 45.484099 Total | 22.74 |
| | | | | | **(blank)** | BEN | **Benefits** | 45.484099 | 6.82 |
| | | | | | | | | 45.484099 Total | 6.82 |
| | **2016-12-09 Total** | | | | | | | | **29.56** |
| | **2016-12-23** | 000661 | **2017** | 41130196 | **3.5** | REG | **Regular Ear** | 45.484099 | 159.19 |
| | | | | | | | | 45.484099 Total | 159.19 |
| | | | | | **(blank)** | BEN | **Benefits** | 45.484099 | 47.7 |
| | | | | | | | | 45.484099 Total | 47.7 |
| | **2016-12-23 Total** | | | | | | | | **206.89** |
| **Capdeville,Mary T Total** | | | | | | | | | **443.19** |
| **Downing,Justin** | **2016-10-28** | 051147 | **2017** | 41130185 | **5** | REG | **Regular Ear** | 31.465000 | 157.34 |
| | | | | | | | | 31.465000 Total | 157.34 |
| | | | | | **(blank)** | BEN | **Benefits** | 31.465000 | 57.72 |
| | | | | | | | | 31.465000 Total | 57.72 |
| | **2016-10-28 Total** | | | | | | | | **215.06** |
| | **2016-11-25** | 051147 | **2017** | 41130185 | **1.5** | REG | **Regular Ear** | 31.465000 | 47.18 |
| | | | | | | | | 31.465000 Total | 47.18 |
| | | | | | **(blank)** | BEN | **Benefits** | 31.465000 | 17.3 |
| | | | | | | | | 31.465000 Total | 17.3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Downing,Justin** | **2016-11-25 Total** | | | | | | | | **64.48** |
| | **2016-12-23** | 051147 | **2017** | 41130185 | **5.5** | REG | **Regular Ear** | 31.465000 | 173.06 |
| | | | | | | | | 31.465000 Total | 173.06 |
| | | | | | **(blank)** | BEN | **Benefits** | 31.465000 | 63.47 |
| | | | | | | | | 31.465000 Total | 63.47 |
| | **2016-12-23 Total** | | | | | | | | **236.53** |
| | **2017-01-06** | 051147 | **2017** | 41130185 | **3** | REG | **Regular Ear** | 31.465000 | 94.36 |
| | | | | | | | | 31.465000 Total | 94.36 |
| | | | | | **(blank)** | BEN | **Benefits** | 31.465000 | 35.89 |
| | | | | | | | | 31.465000 Total | 35.89 |
| | **2017-01-06 Total** | | | | | | | | **130.25** |
| **Downing,Justin Total** | | | | | | | | | **646.32** |
| **Haque-Hausrath,Katherine M** | **2016-10-14** | 044333 | **2017** | 41130188 | **4.8** | REG | **Regular Ear** | 41.929650 | 201.26 |
| | | | | | | | | 41.929650 Total | 201.26 |
| | | | | | **(blank)** | BEN | **Benefits** | 41.929650 | 61.54 |
| | | | | | | | | 41.929650 Total | 61.54 |
| | **2016-10-14 Total** | | | | | | | | **262.8** |
| | **2016-10-28** | 044333 | **2017** | 41130188 | **8.1** | REG | **Regular Ear** | 41.929650 | 339.63 |
| | | | | | | | | 41.929650 Total | 339.63 |
| | | | | | **(blank)** | BEN | **Benefits** | 41.929650 | 103.82 |
| | | | | | | | | 41.929650 Total | 103.82 |
| | **2016-10-28 Total** | | | | | | | | **443.45** |
| | **2016-11-25** | 044333 | **2017** | 41130188 | **4** | REG | **Regular Ear** | 41.929650 | 167.72 |
| | | | | | | | | 41.929650 Total | 167.72 |
| | | | | | **(blank)** | BEN | **Benefits** | 41.929650 | 51.28 |
| | | | | | | | | 41.929650 Total | 51.28 |
| | **2016-11-25 Total** | | | | | | | | **219** |
| | **2016-12-09** | 044333 | **2017** | 41130188 | **12.9** | REG | **Regular Ear** | 41.929650 | 540.86 |
| | | | | | | | | 41.929650 Total | 540.86 |
| | | | | | **(blank)** | BEN | **Benefits** | 41.929650 | 165.37 |
| | | | | | | | | 41.929650 Total | 165.37 |
| | **2016-12-09 Total** | | | | | | | | **706.23** |
| | **2016-12-23** | 044333 | **2017** | 41130188 | **8.1** | REG | **Regular Ear** | 41.929650 | 339.63 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Haque-Hausrath,Katherine M** | **2016-12-23** | 044333 | **2017** | 41130188 | **8.1** | REG | **Regular Earni** | 41.929650 Total | | 339.63 |
| | | | | | **(blank)** | BEN | **Benefits** | 41.929650 | | 103.82 |
| | | | | | | | | 41.929650 Total | | 103.82 |
| | **2016-12-23 Total** | | | | | | | | | **443.45** |
| | **2017-01-06** | 044333 | **2017** | 41130188 | **1.2** | REG | **Regular Ear** | 41.929650 | | 50.33 |
| | | | | | | | | 41.929650 Total | | 50.33 |
| | | | | | **(blank)** | BEN | **Benefits** | 41.929650 | | 15.95 |
| | | | | | | | | 41.929650 Total | | 15.95 |
| | **2017-01-06 Total** | | | | | | | | | **66.28** |
| **Haque-Hausrath,Katherine M Total** | | | | | | | | | | **2141.21** |
| **Harris,Harley Ross** | **2016-11-25** | 002397 | **2017** | 41130197 | **2** | REG | **Regular Ear** | 45.380000 | | 90.76 |
| | | | | | | | | 45.380000 Total | | 90.76 |
| | | | | | **(blank)** | BEN | **Benefits** | 45.380000 | | 27.48 |
| | | | | | | | | 45.380000 Total | | 27.48 |
| | **2016-11-25 Total** | | | | | | | | | **118.24** |
| **Harris,Harley Ross Total** | | | | | | | | | | **118.24** |
| **Martin,Douglas H** | **2016-10-14** | 000189 | **2017** | 41130195 | **1** | REG | **Regular Ear** | 43.729750 | | 43.73 |
| | | | | | | | | 43.729750 Total | | 43.73 |
| | | | | | **(blank)** | BEN | **Benefits** | 43.729750 | | 13.32 |
| | | | | | | | | 43.729750 Total | | 13.32 |
| | **2016-10-14 Total** | | | | | | | | | **57.05** |
| | **2016-12-23** | 000189 | **2017** | 41130195 | **2.5** | REG | **Regular Ear** | 43.729750 | | 109.32 |
| | | | | | | | | 43.729750 Total | | 109.32 |
| | | | | | **(blank)** | BEN | **Benefits** | 43.729750 | | 33.31 |
| | | | | | | | | 43.729750 Total | | 33.31 |
| | **2016-12-23 Total** | | | | | | | | | **142.63** |
| | **2017-01-06** | 000189 | **2017** | 41130195 | **4.5** | REG | **Regular Ear** | 43.729750 | | 196.82 |
| | | | | | | | | 43.729750 Total | | 196.82 |
| | | | | | **(blank)** | BEN | **Benefits** | 43.729750 | | 62.23 |
| | | | | | | | | 43.729750 Total | | 62.23 |
| | **2017-01-06 Total** | | | | | | | | | **259.05** |
| **Martin,Douglas H Total** | | | | | | | | | | **458.73** |
| **Grand Total** | | | | | | | | | | **3807.69** |

# Appendix B

# Work Plan for estimating bird mortality from the Bridger oil spill

**Objective:** *Collect spill data and bird population data suitable for estimating bird injury and restoration needs resulting from the Bridger Pipeline Oil Spill, Yellowstone River, Montana.*

## 1. Introduction

On January 17, 2015, the Poplar Pipeline which is owned and operated by Bridger Pipeline LLC of Casper, WY discharged at least 30,000 gallons of Bakken crude oil into the Yellowstone River just upstream of Glendive, MT. At the time of the release, the Yellowstone River and its floodplain were experiencing winter conditions and were covered in ice and snow and the river was ice-covered along large extents of its length. The Yellowstone River supports a wide-array of migratory birds, protected by the Migratory Bird Treaty Act, including bald eagles (*Haliaeetus leucocephalus*) which are also protected by the Bald and Golden Eagle Protection Act. Despite the winter conditions on the river, areas of open water existed in the Yellowstone River downstream of the spill site for about a month prior to the ice breaking up around March 14, 2015 and many of these open water areas exhibited oil sheen. These open water areas are important habitats for migratory birds as they often provide the only available water when ice and snow blanket the area. When the ice broke up, most of the oil trapped under the ice at the spill location moved downstream, however several large chunks of ice released oil into the river for approximately another week. Small oil/sheen areas were located adjacent to and below the melting oiled ice chunks.

The Unified Command was established on January 19, 2015 at the Dawson County Disaster and Emergency Service Center in Glendive, MT. The Unified Command was responsible for directing response activities including cleanup of oil from the Yellowstone River. The U.S. Environmental Protection Agency entered into a Unified Command with Bridger Pipeline LLC and Montana Department of Environmental Quality. Dawson County, Montana Disaster and Emergency Services, Montana Department of Fish Wildlife and Parks, (MTFWP), U.S. Department of Transportation – Pipeline and Hazardous Materials Safety Administration and U.S. Fish and Wildlife Service (USFWS) were supporting agencies. Initial cleanup activities occurred on the south side of the river, about six miles upstream of Glendive and near the site of the pipeline break. However, because of weather and river ice conditions, cleanup was difficult.

Natural Resource Trustees (Trustees) are authorized under the Oil Pollution Act (OPA, 33 U.S.C. 2701 *et seq.*) to assess injury caused to natural resources by discharges of oil as part of a natural resource damage assessment (NRDA). On January 20, 2015 the USFWS was coordinating natural resource damage pre-assessment activities with co-trustees. The Trustees are concerned that migratory and other birds were exposed to oil and died during the spill. The open water areas with oil sheens posed a risk to migratory birds. As part of Incident Command, a Wildlife Branch was identified within the Environmental Unit (CTEH, 2015a). During Phase I, the Wildlife Branch requested wildlife rescue support. Unified Command denied the request and no reason was provided (Karen Nelson pers. comm.). Also, due to dangerous ice conditions on the river during Phase I, no organized oiled wildlife searches were conducted (CTEH, 2015a). During Phase II and III (as ice was breaking up and after ice broke up), MTFWP managed

Fishing Access Sites were monitored weekly for observations of bird use, ice conditions and presence of oiled habitat (CTEH, 2015b).

To estimate the total number of birds affected by a spill of oil, it is customary to use wildlife searches for dead and dying birds close to the date of discovery of the spill, and with significant searcher effort. For example, during the recent *Deepwater Horizon* oil spill (*DWH*), teams walked sandy beaches to specifically look for dead birds. The ability of searchers to find dead birds (searcher efficiency) ranged from 79 to 93 percent (IEc, 2015a). Weekly monitoring may be too infrequent due to the disappearance of dead birds by scavenging (carcass persistence). Carcass persistence after seven days from the *DWH* ranged from 29 to 53 percent for carcasses on beaches and only 4 to 26 percent for carcasses in marsh habitat (IEc, 2015a). River riparian habitat is likely more similar to marsh habitat, and hence it is unlikely that a carcass remained along the river for seven days to be found during weekly searches. Moreover, carcass persistence rates can vary between seasons and winter carcass persistence rates have been reported to be lower than those rates of other seasons like spring and summer (Flint et al., 2010; Smallwood, 2007).

Because of safety concerns during Phase I, no organized search efforts for dead and dying birds occurred. Also during Phase II and III, only weekly observations for birds at specific locations occurred. Therefore, the search effort for dead and dying birds was inadequate for quantifying bird injury using models that utilize collected birds and the Trustees must use other approaches. The objective of the activities described in the injury quantification part of this work plan include collecting spill data (extent and degree of oiling) and winter bird population data suitable for estimating bird mortality. A similar approach has been previously used in other coastal spills (e.g. *T/V Puerto Rican* [PRBO, 1985] and *DWH* [IEc 2015b]). Once injury has been quantified, the activities described in the restoration planning part of this work plan include identification of suitable restoration approaches for key species and scaling restoration to adequately restore for birds killed by the Bridger pipeline oil spill.

## 2. Injury quantification

### A. Extent and degree of oiling

Maps, databases and all other locational or geographic data sources associated with the Bridger Pipeline Oil Spill will be used to document the extent of oiling downstream from the pipeline break within the Yellowstone River. As was the case for response actions, this effort will have two parts:

1) The first part will utilize data associated with Phase I and Phase II response efforts.
2) The second part will utilize data associated with Phase III response efforts.

The information from both of these efforts will be used to estimate: (a) the areas of the river where birds would have been exposed to oil when ice covered the river (Bird Exposure Area 1 – BEA1) and (b) the areas where birds would have been exposed to oil during and immediately after ice breakup (Bird Exposure Area 2 - BEA2). The ice began to break up around March 14 and river operations were postponed until March 20, 2015. These two time periods have different

extents of oiling. During BEA1 bird oil exposure was primarily confined to the open pools of water. During BEA2 bird oil exposure was primarily associated with oil leaching from large chunks of ice or other accumulations.

*Bird Exposure Area 1*: BEA1 is the geographic extent of the oil downstream from the pipeline break during the time period when ice covered the river (i.e., BEA1 has both geographic and seasonal components). Using all available locational or geographic data (including but not limited to maps, overflights, drone flights, oil sampling databases), a comprehensive description of river conditions including the open water areas (number and size) as well as the observed or sampled oil conditions of those open waters will be developed. This description will include the furthest distance downstream oil was observed from the pipeline break. Within BEA1, the number of open water areas will be enumerated as well as the size of each of the open water areas. Additionally, using data where available, or a reasonable worst-case approach, the extent of oiling (percent area covered) for each open water area will be estimated for the BEA1. This will result in a site map identifying open river areas and observed and/or measured oiled open areas.

*Bird Exposure Area 2*: BEA2 is the geographic extent of the oil downstream during the time period ice was breaking up and after ice broke up (i.e., BEA2 has both geographic and seasonal components). Using all available locational or geographic data (including but not limited to maps, overflights, drone flights, oil sampling databases), a comprehensive description of river conditions during and immediately after ice breakup (about March 14) as well as the observed or sampled oil conditions for the river will be developed (hereafter referred to as the bird exposure area – BEA2). This description will include the furthest distance downstream oil was observed from the pipeline break and the extent of oiling (percent area covered) for the river within the BEA2. In addition to the description, a site map identifying BEA2 and identifying known (observed and/or measured) oiled areas will be produced.

### B. Effects of oil on birds

The adverse effects of oil to birds will be described. This effort is anticipated to be a general overview of the oil effects to birds using existing scientific, agency, trustee and other source reports and information. The overview will consider the physical effects of oil on feathers and the likely effect to birds from oil on feathers in cold weather (BEA1) and in slightly warmer weather (BEA2). Also the physiological effects of oil on birds will be described.

Using this information, the estimated mortality of birds will be determined for each of the following four categories of oiling; trace (less than 5% of the body surface), light (5 to 20%), moderate (21 to 40%), and heavy (greater than 40%). These oiling categories have been used in other oiled bird assessments (e.g., *Athos 1* [Nixon et.al, 2008] and *DWH* [Haney, 2011]). In the absence of data, we will distribute the number of oiled birds evenly across the four oiling levels. For example, if 100 birds were estimated to be oiled, 25 would be considered trace oiled, 25 would be lightly oiled, 25 would be moderately oiled and 25 would be heavily oiled. Since the number of oiled birds will vary by species, we will distribute the oiling categories as a percentage. Therefore, each oiling category will be 25% of the total estimated number of oiled birds. The mortality estimates for each oiling category will be determined for birds exposed

during BEA1 river conditions and BEA2 river conditions and will evaluate potential differences in air and water temperature at those times.

### C. Bird density estimates

Bird density estimates will be developed in cooperation with USFWS and MTFWP using literature and seasonally-appropriate site-specific data and surveys (conducted during and prior to the spill, including historical data and surveys). This effort will include a description of the species and populations of migratory and other birds that use and live within the Yellowstone River during BEA1 and BEA2. This effort will also include a review of Bridger spill overflights and drone flights conducted during response efforts in Phase I, II and III of the spill. The goal of this effort is to estimate the species and number of birds likely exposed to oil within BEA1 and BEA2. From this effort the list of impacted species will be determined and the density of each species will be estimated for BEA1 and BEA2. As data are reviewed, bird species of special concern including but not limited to, federally and state-listed threatened and endangered species and species of conservation concern will be recognized in the analysis.

It would be preferable to determine the number of each species of bird using an area of oiled water. However, with the available data, it is more likely that a total number of birds using an area will be determined and that the relative proportion of each species exposed to oil will need to be estimated based on surveys and best professional judgment. This assumption will be used in estimating bird mortalities described in section D.

### D. Bird mortality estimates

Using the four oiling categories described previously (trace, light, moderate and heavy), the Trustees will assume an equal proportion of birds were oiled for each category (i.e., 25% of the oiled birds were trace oiled, 25% of the birds were lightly oiled, etc.) for the reasons described previously. A table illustrating the expected fate of birds in each oiling category will then be developed including the mortality estimates for each species and oiling category combination within BEA1 and BEA2.

An example of a complete calculation for trace-oiled hypothetical ‘species Y’ within BEA1 follows:

***Estimating number of ‘species Y’ birds oiled:***

| | | | | |
|---|---|---|---|---|
| **Average density of birds in open area (birds/km$^2$)** | **X** | **Area of oiling within open area (km$^2$)** | **=** | **Number birds oiled** |
| **Number birds oiled** | **X** | **‘Species Y’ proportion of total birds** | **=** | **Number of ‘species Y’ birds oiled** |

***Number of <u>trace</u> oiled 'species Y' birds that died:***

| **Number of 'species Y' birds oiled** | **X** | **Proportion of birds oiled (25% for trace oiling category)** | **X** | **Fate (% expected mortality for trace oiling category)** | **=** | **Estimated number of 'species Y' birds killed in trace oiling category** |
|---|---|---|---|---|---|---|

For 'species Y' within BEA1, this same calculation is then conducted for each additional oiling category (light, moderate and heavy) and the number of 'species Y' birds killed within BEA1 is equal to the sum of birds killed within each oiling category. The same approach is then used for BEA2. The 'species Y' results for BEA1 and BEA2 are then added for a total mortality for 'species Y'. This same estimation is conducted for each species exposed to oil during the spill. In addition, due to the transitory nature of birds, birds will move from area to area, and new birds may have arrived in the area thereby increasing the opportunity for additional birds to be killed. An evaluation will be conducted to determine the approaches for estimating the number of additional birds that were killed due to the presence of the oil over time.

### E. Lost productivity

Birds killed during the spill were mature birds and most species were likely of reproducing age. Therefore, the loss of these birds would reduce the number of young birds produced during the next breeding season. As part of our bird injury quantification we will also estimate the lost productivity for the birds killed. Lost productivity will be determined using life history parameters for each of the species. The lost productivity for each species will be added to the number of birds killed for that species to quantify the total bird injury.

A report will be provided which; 1) describes the primary data used in bird injury quantification, 2) the equations used for estimating bird injury and 3) summarizes the injury quantification. The summary will include a table which identifies the species and number of birds for each species killed by the spill.

## 3. Restoration planning

Upon completion of injury quantification, key avian species for which injury has been quantified, and requiring restoration, will be identified by the Trustees. Upon identification of those species, appropriate restoration approaches will be determined. Restoration approaches will include actions that benefit the injured species and likely will include several different types of restoration actions including but not limited to: increasing/enhancing nesting habitat, reducing predators at existing nesting areas, providing or enhancing overwinter or migratory stopover areas, or improving foraging habitat. After identifying appropriate restoration approaches, the restoration will be scaled to address both the species and number of birds that were injured for each species. For some species, it may be best to identify a mix of restoration (e.g., both increasing nesting habitat and providing predator control). In addition to determining various restoration approaches, the cost for the restoration actions will be estimated, and the potential

general geographic areas for where the restoration may be implemented will be identified. Cost estimates will include the following costs: drafting a restoration plan; public review, comment and plan revision; implementing the restoration actions; costs for restoration monitoring and any corrective actions needed in light of adaptive management principles

A report will be provided including a description of the suite of identified restoration approaches, the appropriate scale of restoration to compensate for the injured birds, the potential location for implementing the restoration actions, and the estimated costs for restoration. The report will also include descriptions of the sources that identified the restoration approaches, the sources for the scaling approaches which restore the quantified injured birds and sources for the cost estimates of the various restoration actions.

## 4. Data management

### A. Injury quantification

This effort does not include any primary data collection. Existing data will be utilized, including but not limited to copies of field datasheets, electronic databases, photos, overflights, drone flights, shoreline surveys, meeting notes, response plans and any other data or information collected during the spill. Historical bird population information either gathered by natural resource management agencies (e.g., USFWS, MTFWP) or available in scientific reports or literature will also be relied upon. Further, scientific reports and literature will be used for determining the effect of oil to birds. Life history parameters will be obtained from the literature and from appropriate experts. Additionally all data calculations (e.g., excel files) will be provided.

### B. Restoration planning

Federal and state agencies as well as non-governmental organizations (e.g., Ducks Unlimited) will be consulted to identify existing successful restoration approaches and restoration plans. Additionally all restoration scaling (e.g., excel files) will be provided.

## 5. Schedule

### A. Injury quantification

It will likely take an estimated 45 days to gather all data, maps, field notes, overflights, shoreline surveys and other existing site-specific data. These activities will be conducted cooperatively with the Trustees and the contractor and may require significant Trustee participation. The contractor will then have 60 days to compile the data, conduct the analysis, and generate a first draft report. The Trustees will have 30 days to review the draft report and provide comments to the contractor. The contractor will have 15 days to address comments and produce a final draft report.

### B. Restoration planning

After injury quantification occurs, it will likely take an estimated 45 days to contact agencies and non-governmental organizations, gather all restoration approaches, scale restoration approaches and compile costs. These activities will be conducted cooperatively with the Trustees and the contractor and may require significant Trustee participation. The contractor will then have 60 days to compile the information, scale the restoration approaches, and generate a first draft report. The Trustees will have 30 days to review the draft report and provide comments to the contractor. The contractor will have 15 days to address comments and produce a final draft report.

## 6. Estimated costs

### A. Injury quantification

USFWS - Includes labor and indirect costs ($12,066)

DOI Economist Support – Includes labor and indirect costs ($5663)

Contractor support - Includes labor, open market items and travel ($37,908.80)

### B. Restoration planning

USFWS - Includes labor and indirect costs ($12,066)

DOI Economist Support – Includes labor and indirect costs ($5663)

Contractor support - Includes labor, open market items and travel ($32,032.80)

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# memorandum

**Environment and Natural Resources**

**Date:** 03/10/2017

**To:** Beau Downing, Montana Natural Resource Damage Program

**From:** Jeffrey Morris, PhD and Kaylene Ritter, PhD, Abt Associates

**Subject:** Fish Laboratory Toxicity Study Simulating Cold (Under Ice) Exposure to Bakken Crude Oil

## 1. Introduction

The State of Montana (the State) and its co-Trustee, the U.S. Fish and Wildlife Service, are conducting natural resource damage assessment (NRDA) activities related to Bridger Pipeline's Yellowstone River oil spill (the spill). The company's Poplar pipeline ruptured on January 17, 2015, near Glendive, Montana, spilling more than 30,000 gallons of Bakken crude oil into the river (MT-DEQ, 2015). The spill occurred when ice covered much of the Yellowstone River. This created challenges for the recovery of the spilled oil and for characterizing the nature and extent of contamination. Elevated concentrations of oil constituents, including benzene and polycyclic aromatic hydrocarbons (PAHs) extended for several miles downstream, with exceedances of water quality standards and screening levels recorded as far downstream as the City of Glendive, 6.5 miles from the spill site. The ice-covered river conditions at the time of the spill appear to have trapped volatile constituents in the water. The Trustees are concerned that natural resources present in the river under the ice, including fish, were exposed to and adversely affected by the oil.

PAHs and other oil constituents are toxic to fish (e.g., Wu et al., 2012; Bornstein et al., 2014; Brown-Peterson et al., 2015; Lee et al., 2015a, 2015b; Morris et al., 2015; DWH NRDA Trustees, 2016; Esbaugh et al., 2016). However, very few of the oil toxicity studies have examined the toxicity of oil:

- On the fish species that inhabit the lower Yellowstone River
- Using Bakken crude oil
- In very cold water capped with ice.

The few studies that tested oil toxicity under colder water conditions are inconclusive. Some study results have suggested changes in sensitivity to PAHs under cold conditions (e.g., Korn et al., 1979), possibly associated with changes in PAH degradation and loss under colder conditions. Other studies have shown increased sensitivity to oil when water temperatures are either above or below optimum levels (e.g., Linden et al., 1979).

At the request of the State, Abt Associates (Abt) prepared this memorandum describing a cold-water, laboratory-based toxicity study that will provide injury determination information on fish species exposed to oil under the ice. This memorandum provides a general description of the

goals of the study and the general approach (the first step to implement this sort of study would be to develop a more detailed work plan). The rest of this memorandum is organized as follows:

- Section 2 provides background information on the toxicological effects of oil on fish; and the purpose, need, and goals of the laboratory toxicity testing study
- Section 3 provides the proposed overall laboratory toxicity testing study approach
- Section 4 provides an estimate of costs to prepare a full work plan and implement the study.

References are provided at the end of the memorandum.

## 2. Purpose, Need, and Study Goals

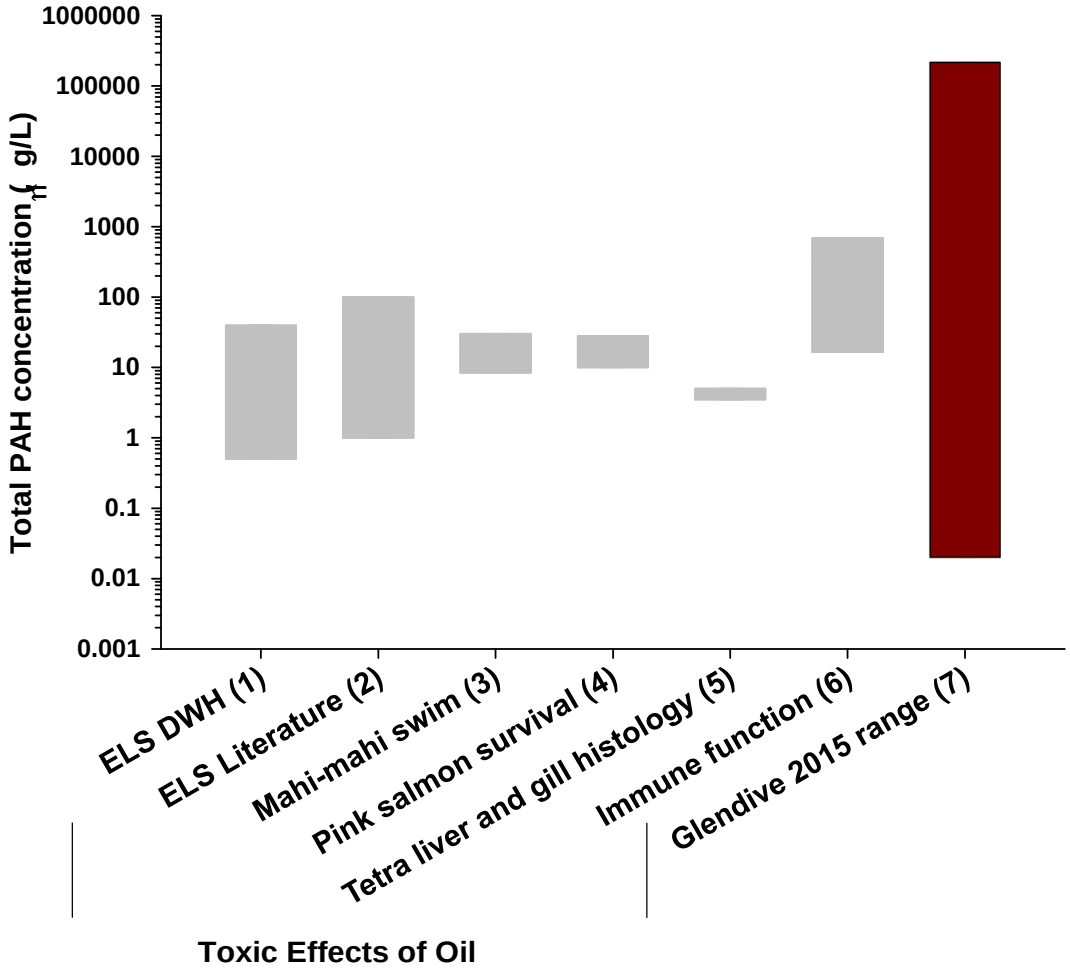
Many previous studies have shown that oil (and PAHs within oil) is toxic to fish, causing many different adverse effects (e.g., Wu et al., 2012; Bornstein et al., 2014; Brown-Peterson et al., 2015; Lee et al., 2015a, 2015b; Morris et al., 2015; DWH NRDA Trustees, 2016; Esbaugh et al., 2016). PAH concentrations in the Yellowstone River downstream from the Glendive spill exceeded toxic concentrations reported in the literature and measured during the *Deepwater Horizon* (DWH) NRDA toxicity testing program (Figure 1). However, as noted previously, few studies have examined the toxicity of Bakken crude oil on Yellowstone River species, particularly in cold water and under ice. Additional research is needed to address these data gaps.

When the Glendive spill occurred, the Yellowstone River was mostly frozen. The ice may have served as a cap; volatile compounds like benzene that normally evaporate quickly after a spill were present in elevated concentrations downstream of the spill site. These volatile compounds can cause narcotic toxic effects (narcosis) that reduce activity and can lead to acute mortality.

In addition to volatile compounds like benzene, PAH concentrations were also elevated in the river after the spill. PAHs are lipophilic compounds that readily absorb into fatty tissues and lipid-rich cell membranes in all organisms. This can occur in aquatic environments through dermal exposure or ingestion of these contaminants. In vertebrates such as fish, the body recognizes PAHs as toxicants, triggering a physiological PAH detoxification process. Cellular enzymatic activity (cytochrome P4501A or CYP1A enzyme) driving this detoxification produces reactive oxygen species (ROS) and other toxic metabolites that cause tissue and cell damage (e.g., Timme-Laragy et al., 2009; Jung and Di Giulio, 2010; Van Tiem and Di Giulio, 2011). The resulting oxidative stress can result in tissue and DNA damage, craniofacial and skeletal malformations, and cardiovascular deformities. In addition, PAH exposure can cause reduced cardiac function because of disruptions to normal heart muscle cell function (e.g., Brette et al., 2014).

PAH exposure under cold-water conditions presents a situation where the fish's metabolism and subsequent detoxification capacities could be reduced, which would result in an accumulation of PAHs in the tissues and a delayed toxicological response (Chapman, 2015). Once water temperatures began to rise in the spring and fish metabolism increased, it is possible that PAH detoxification processes in fish would increase, resulting in toxic concentrations of ROS and other metabolites as stored PAHs are consumed.

**Figure 1. Effects ranges for oil toxicity for early life stage (ELS) and older life stage fish and concentrations of PAHs detected following the Glendive oil spill in 2015.**




Sources: (1) Morris et al., 2015; (2) Lee et al., 2015a, 2015b; (3) Mager et al., 2014; Morris et al., 2015; DWH NRDA Trustees, 2016; (4) Birtwell et al., 1999; (5) Akaishi et al., 2004; (6) Carls et al., 1998; Ortell et al., 2015; DWH NRDA Trustees, 2016..

On the other hand, some fish acclimating to seasonal cold-water conditions increase their mitochondrial density, similar to many resident Arctic or polar fish species (e.g., Regoli et al., 2005; O'Brien, 2011), through a process called mitochondrial biogenesis. Mitochondria in fish and other animals can produce CYP1A in response to hydrocarbon exposure (e.g., Jung and Di Giulio, 2010). Fish with increased mitochondrial density may increase CYP1A-induced PAH detoxification. While this would help to detoxify the PAHs, it could also lead to increased toxic ROS and other metabolites that are byproducts of the detoxification process. Existing literature has not adequately addressed the mechanisms of PAH toxicity in near-freezing waters, nor is the literature sufficient to determine whether the cold water might increase or decrease PAH toxicity compared to ambient water temperatures in most toxicity tests.

Whether cold-water PAH exposure results in increased PAH concentrations in the tissue or an enhanced detoxification response due to cold-water induced mitochondrial biogenesis, either

situation could potentially increase the toxicity of PAHs to certain fish species under winter conditions. However, these theories, along with species-specific PAH sensitivity, are topics that should be further investigated through targeted laboratory testing under cold-water conditions.

Accordingly, the goals of the laboratory toxicity-testing study are to:

- Test the toxicity of Bakken crude oil on the particular species and life stages that were likely exposed at the time of the spill
- Test and evaluate the toxicity of Bakken crude oil under environmental conditions present during the spill, including:
  - Toxicity under cold conditions
  - Toxicity under closed atmospheric conditions (as existed when ice capped the river)
  - Toxicity after prolonged exposures of several weeks.

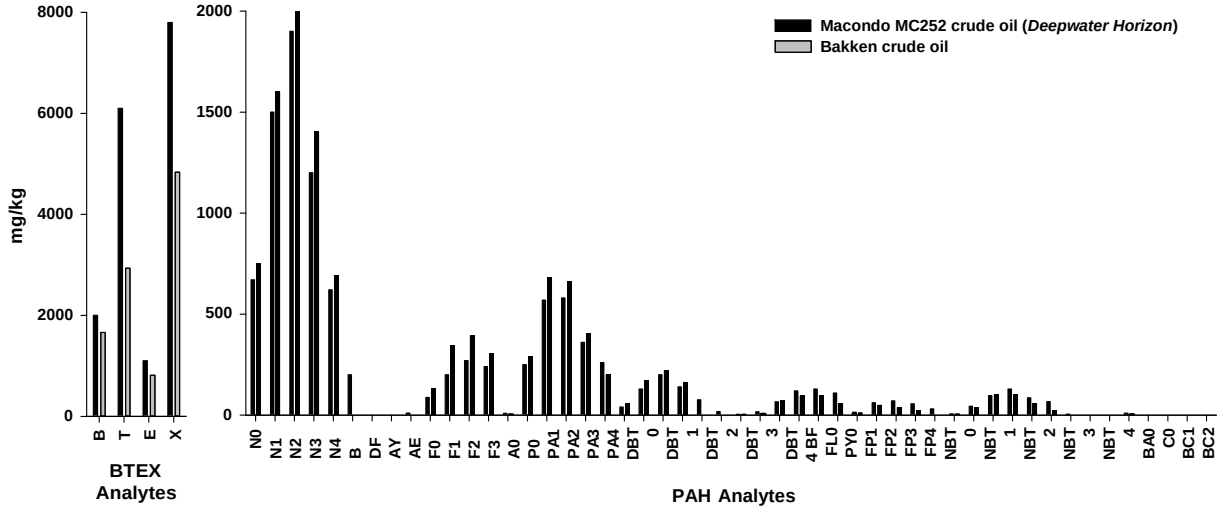
## 3. Approach

This section provides a general overview of the laboratory toxicity-testing study that can address some of these unanswered questions. It first describes preliminary oil chemistry characterization that will form the underlying basis for the toxicity tests. It then discuss the selection of species and life stages for the study, followed by a general description of the anticipated laboratory setup, the types of tests to be run, exposure duration, and endpoints.

### 3.1 Oil Exposure and Chemistry

To design a laboratory study addressing the toxic effects of oil in water, the first step is to characterize the oil when mixed with water. This requires creating water-oil mixtures, or water accommodated fractions (WAFs), with Bakken crude oil to characterize the chemistry of the oil-water mixture to which fish were likely exposed. As part of the DWH NRDA toxicity testing program (Morris et al., 2015), Abt and our collaborators conducted extensive research on the physical properties and chemistry of oil/water mixtures, focused on WAFs prepared with a range of oils under different weathering states and mixing conditions (Forth et al., 2015a). The DWH oil and Bakken crude oil are similar oils (Figure 2), so the DWH data will be relevant to the oil characterization of Bakken crude. However, the DWH spill occurred in the deep sea, and the oil surfaced in the open ocean. Volatile compounds such as benzene, toluene, ethylbenzene, and xylenes (BTEX) quickly evaporated in the Gulf of Mexico. This contrasts with the spill in the Yellowstone River, which occurred in very cold water capped with ice. Therefore, additional cold water, closed-system (capped) WAF characterization should be conducted prior to conducting any bioassays for this project, to confirm and determine relevant mixing and exposure procedures. This requires collecting water samples during testing at different time points during the exposures, and analyzing the samples for a full suite of up to 50 PAHs (e.g., EPA Method 8270D; Forth et al., 2015b), as well as for volatile compounds such as BTEX (e.g., EPA Method 8260C).

**Figure 2. BTEX and PAH concentrations in un-weathered Macondo MC252 (Forth et al., 2015a) and Bakken (Etkin and Moore, 2015, Tables 45-46) crude oils.**




## 3.2 Cold-Water Bioassays

### 3.2.1 Species and Life Stages

Early life stages are typically more sensitive to contaminants than juvenile or adult life stages. Therefore, this testing program will include the youngest life stages likely to have been exposed to the oil for each test species. A list of fish species found in this reach is provided in Tables 1 and 2. Species of most concern that may potentially be tested include the endangered pallid sturgeon (*Scaphirhynchus albus*; or appropriate surrogate species), and burbot (*Lota lota*). Additional species that could also be tested include goldeye (*Hiodon alosoides*), channel catfish (*Ictalurus punctatus*), shorthead redhorse (*Moxostoma macrolepidotum*), river carpsucker (*Carpiodes carpio*), and shovelnose sturgeon (*Scaphirhynchus platorynchus*). Most of these species have not been tested for PAH sensitivity. In some cases, unique aquaculture systems may be required to facilitate rearing, holding, and toxicity testing.

Burbot inhabit the Yellowstone River system and spawn under the ice in January and February, which coincides with the timing of the spill. Therefore, embryonic and larval burbot may have been exposed to oil due to this spill. Burbot have been successfully cultured in the Twin Rivers Sturgeon and Burbot Hatchery (Kootenai Tribe Fish and Wildlife Department, Idaho), suggesting that it will be possible to conduct bioassays using early life stage burbot. Additionally, pallid sturgeon are also regularly cultured at a dozen different hatcheries in the Missouri River Basin as part of the population augmentation program for this species. This program includes two hatcheries in Montana (Mile City Hatchery and the Bozeman Fish Technology Center), again suggesting that these fish would be available for toxicity testing. Pallid sturgeon typically spawn in May or June, so the youngest life stage in the system during the spill would have been year-one juveniles; this life stage may not be available in hatcheries so a younger life stage could be used.

**Table 1. Lower Yellowstone River fish species that Montana Fish, Wildlife & Parks (MT-FWP) personnel compiled during spill assessment activities.**

| Common name | Latin name |
|---|---|
| Bigmouth buffalo | *Ictiobus cyprinellus* |
| Black bullhead | *Ameiurus melas* |
| Blue sucker[a] | *Cycleptus elongates* |
| Brook stickleback | *Culaea inconstans* |
| Burbot[b] | *Lota lota* |
| Channel catfish | *Ictalurus punctatus* |
| Common carp | *Cyprinus carpio* |
| Crappie spp. | *Pomoxis spp.* |
| Emerald shiner | *Notropis atherinoides* |
| Fathead minnow | *Pimephales promelas* |
| Flathead chub | *Platygobio gracilis* |
| Freshwater drum | *Aplodinotus grunniens* |
| Goldeye | *Hiodon alosoides* |
| Largemouth bass | *Micropterus salmoides* |
| Longnose dace | *Rhinichthys cataractae* |
| Longnose sucker | *Catostomus catostomus* |
| Mountain sucker | *Catostomus platyrhynchus* |
| Paddlefish | *Polyodon spathula* |
| Pallid sturgeon[c] | *Scaphirhynchus albus* |
| River carpsucker | *Carpiodes carpio* |
| Sauger[a] | *Sander Canadensis* |
| Shorthead redhorse | *Moxostoma macrolepidotum* |
| Shortnose gar[a] | *Lepisosteus platostomus* |
| Shovelnose sturgeon | *Scaphirhynchus platorynchus* |
| Smallmouth bass | *Micropterus dolomieu* |
| Smallmouth buffalo | *Ictiobus bubalus* |
| Stonecat | *Noturus flavus* |
| Sunfish spp. | *Lepomis spp.* |
| Walleye | *Sander vitreus* |
| Western silvery minnow/plains minnow | *Hybognathus argyritis* |
| White sucker | *Catostomus commersonii* |
| Yellow bullhead | *Ameiurus natalis* |
| Yellow perch | *Perca flavescens* |

a. Montana State species of concern.
b. Montana State potential species of concern.
c. Montana State species of concern and federally listed endangered species.

**Table 2. Additional lower Yellowstone River fish species that Holton and Johnson (2003) identified as occurring in this reach in *A Field Guide to Montana Fishes*.**

| Common name | Latin name |
|---|---|
| Brassy minnow | *Hybognathus hakinsoni* |
| Creek chub | *Semotilus atromaculatus* |
| Golden shiner | *Notemigonus crysoleucas* |
| Green sunfish | *Lepomis cyanellus* |
| Lake chub | *Couesius plumbeus* |
| Northern pike | *Esox Lucius* |
| Northern redbelly dace | *Phoxinus eos* |
| Plains killifish | *Fundulus zebrinus* |
| Rainbow smelt | *Osmerus mordax* |
| Sand shiner | *Notropis stramineus* |
| Sturgeon chub | *Macrhybopsis gelida* |
| Western mosquitofish | *Gambusia affinis* |

### 3.2.2 Exposure System

Investigating potential toxicological effects of the spill will require a unique exposure system design that will emulate the environmental and chemical conditions present during the spill. These include nearly freezing water temperatures and a system closed to the atmosphere, which will prevent evaporation of volatile constituents such as BTEX. Therefore, bioassays should be conducted in specially designed, zero-headspace chambers (e.g., similar to those described in the Chemical Response to Oil Spills: Ecological Research Forum, CROSERF; Aurand and Coelho, 2005), with water circulating through modified freezers or cold rooms that can maintain near freezing water temperatures. The water in these chambers will also be under constant recirculation and receive periodic renewal from freshly formulated WAF preparations.

### 3.2.3 Exposure Duration

Fish downstream of the spill were potentially exposed to oil constituents in the water column for several weeks following the spill, because of dissolution and periodic release of oil trapped in pockets under the river ice and near the riverbanks. Therefore, relevant bioassay exposure durations were likely longer than the typical 96-hour exposures in acute tests. Additionally, delayed effects of oil exposure may have occurred after the water temperature increased. These tests should include long-term monitoring of organism survival and development following oil exposure. Water temperatures should be increased slowly over this time to increase fish metabolism and simulate warming spring conditions. This metabolic increase may be a critically dangerous time for exposed organisms that accumulated PAHs during cold-water exposure, as the organisms increase detoxification that potentially creates high concentrations of ROS and other toxic metabolites.

### 3.2.4 Endpoints

Multiple endpoints can be quantified in these bioassays, depending on the species, life stage, and exposure duration for each test. At a minimum, the tests will include typical toxicity endpoints such as survival, growth, and development. Additional endpoints that may be quantified include

reproductive effects (gamete development and fecundity), immune system suppression, cardiovascular toxicity, swim performance, and general behavior.

# 4. Estimated Costs and Timeline

Following the model that Abt used for the DWH aquatic toxicity program, a lead contractor will oversee this study. The lead contractor will provide overall project management as well as expert technical support, oversight, and data analysis and interpretation for this toxicity work. The lead contractor will vet, hire, and form a close collaboration with the laboratories and scientists conducting the bioassays, as well as the laboratories and chemists performing analytical chemistry and data validation. The following sections describe the three phases of the study, followed by estimated costs, broken into the three study phases.

## 4.1 Phase 1

This phase includes two tasks: 1) project initiation and 2) methods development and preliminary toxicity testing.

### 4.1.1 Task 1 - Project Initiation

Task 1 will include the lead contractor identifying and contracting all collaborating laboratories and consultants. This task will also include initial work plan and quality assurance project plan (QAPP) development.

### 4.1.2 Task 2 – Methods Development and Preliminary Testing

Under Task 2, the lead contractor will work closely with the testing laboratories to develop bioassay exposure methods that emulate conditions present during the spill. This will generally include an exposure system that can deliver a WAF in a chemical and physical state similar to the mixture likely present during and after the spill. This requires maintaining cold temperatures and closed or partially closed atmospheric conditions. Once the exposure system is functional, the lead contractor and laboratory team will begin preliminary pilot testing, first using model species, such as fathead minnow, and then target species, such as burbot, at multiple life stages. The goal will be to ensure that the exposure system functions properly and to generate preliminary toxicity data that will inform Phase 2.

## 4.2 Phase 2

If method development is successful in Phase 1, definitive Phase 2 testing will begin with a resident species and life stage (such as embryonic/larval burbot) present during the spill, involving extended exposure durations.

## 4.3 Phase 3

Phase 3 work will be a continuation of the definitive testing conducted under Phase 2, with a different target species and life stage. For example, bioassays under this phase may be conducted using juvenile pallid sturgeon.

## 4.4 Estimated Costs

The estimated cost for the three phases of the study is $871,000 (Table 3). Below are the different cost components and assumptions.

**Project Management and Oversight** – As noted above, the lead contractor will be responsible for identifying, contracting, and managing all laboratories and consultants participating in this project through all three phases. In addition to the initial project setup, the lead contractor will also provide ongoing project management, visit and audit testing facilities, participate in bioassay testing, and conduct data processing and preliminary data analysis.

**Work Plan and Procedures Development** - In collaboration with the testing laboratories, the lead contractor will produce a detailed study plan for each phase of the study, including bioassay testing plans, standard operating procedures, and a QAPP. All of these plans will ensure reliable testing and a reliable and high- quality product that is appropriate for assessing certain ecological injuries (e.g., Morris et al., 2015).

**Laboratory Toxicity Testing** – As described above, the lead contractor/testing laboratory team will likely conduct bioassays on multiple life stages of a model test species, such as fathead minnow, as well as bioassays with target species, such as early life stage (embryo and larval) burbot and juvenile (year-one) pallid sturgeon. This work will most likely be conducted in collaboration with a university partner with environmental toxicology and aquaculture expertise, preferably including natural resource damage assessment experience. This study would likely require supporting a post-doctoral candidate full time, plus additional laboratory technical support, hours for a Principal Investigator, and budget for equipment and supplies needed to conduct these unique tests. Phase 1 costs include supplies and equipment to setup the laboratory, plus method development, pilot studies to establish the appropriate testing scenario and WAF dilutions, and preliminary tests with model and target species. Phases 2 and 3 are less expensive based on the assumption that definitive tests can be quickly conducted because of the methods development work in Phase 1.

**Analytical Chemistry and Data Validation** - The final number of water and tissues samples analyzed during the three phases of the study will depend on the study design and the results of the preliminary laboratory trials (Phase 1). The testing laboratory will likely analyze a subset of samples as part of real-time project monitoring and methods development. A commercial analytical laboratory with experience producing complex and reliable analytical data will analyze the remaining samples, collected at key points during the bioassays. The results from these definitive analytical samples will be sent to a third-party data validator to ensure compliance with the QAPP.

**Report Writing -** The lead contractor will produce interim and final reports for all three phases of this aquatic toxicity program. Additional data analysis and interpretation will be included as part of the report writing.

**Table 3. Approximate costs to conduct laboratory toxicity testing to determine the potential adverse effects of the oil spill on target fish species in the lower Yellowstone River in the winter of 2015.**

| Task | Description | Estimated cost |
|---|---|---|
| Phase 1 | Contracting, methods development, preliminary testing | $396,400 |
| Phase 2 | Definitive testing with target species, such as embryo/larval burbot | $256,400 |
| Phase 3 | Definitive testing with target species, such as juvenile sturgeon | $218,200 |
| **Total** | | **$871,000** |

### 4.5 Project Timeline

Once all contracting and subcontracting activities are finalized, Phase 1 of this project will likely last approximately 6 to 8 months. Phases 2 and 3 will likely last an additional 6 months each. These overall timeframes depend on the start dates, as certain test species such as burbot may only be available as early life stage organisms during one short period each year. Therefore, if necessary the 6-month period during which Phase 2 work is conducted on early life stage burbot may be conducted over two 3-month periods when the species/life stage is available (i.e., January-March during Year 1 of Phase 2 and January-March during Year 2 of Phase 2).

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