HUSKY ENERGY INC.

Wildlife Response Plan

Husky 2018 Superior Refinery Fire

Focus Wildlife and Torey McLeish
5/4/2018

Environmental Unit Leader	[signature]	5/5/18
	Signature	**Date**
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Incident commander	[signature]	5/5/18
	Signature	**Date**

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1. Strategy

1.1. Introduction and Scope

On Thursday April 26, a Tier 1 process safety event occurred on the Husky Superior Refinery in Superior Wisconsin during turn-around preparations. This resulted in a fire and releases of hydrocarbon from at least two sources. The fires were extinguished later that day using water and fire suppressant foam.

As a result of this incident, wildlife may come into contact with released product or may be impacted by cleanup activities. This document has been developed with reference to the site specific emergency response plan and incident action plan, and outlines the mechanisms to mitigate these potential impacts to wildlife. This plan will be implemented as approved but allows for active management, since wildlife dynamics can change quickly, particularly in the spring. As the work outlined in the wildlife mitigation plan continues to be executed, additional wildlife monitoring will also conducted. This plan may be modified as warranted by changing field conditions.

1.1.1. Authorities and responsibilities

The Wisconsin Department of Natural Resources is the primary regulator responsible for wildlife in this incident response. The US Fish and Wildlife Service will be kept informed of wildlife incidents and may elect to become involved at their discretion. Contact details are located in Section 1.14.

1.1.2. Statutory Requirements

1.1.2.1. Federal Permits

A Federal migratory bird rehabilitation permit issued by the U.S. Fish and Wildlife Service is required to handle any migratory birds. This permit is governed by 50 CFR 21.31 and 50 CFR Part 13 and allows for the rehabilitation of sick, injured, or orphaned migratory birds. This is inclusive of transport, transfer, euthanasia, stabilization, and release of native, migratory birds.

1.1.2.2. Wisconsin Permits

Incident-specific permits from the State of Wisconsin are required to capture, handle and rehabilitate oiled wildlife. The Wisconsin Department of Natural Resources will be contacted to provide a temporary incident-specific permit (contingent on facility inspection and approval) if live oiled animals are recovered.

1.1.2.3. Federal Acts

- Migratory Bird Treaty Act
- Endangered Species Act
- Fish and Wildlife Coordination Act
- Oil Pollution Act of 1990
- Comprehensive Environmental Response and Conservation and Liability Act

1.1.2.4. Wisconsin

- Wisconsin Administrative Code, Chapter NR 12, Wildlife Damage and Nuisance Control
- Endangered and Threatened Species Laws (State Statute 29.604 & Administrative Rule NR27)

1.2. Site Setting

The immediate spill site is a petroleum refining industrial site. However, there is high-quality unimpacted habitat adjacent to the impact zone and in the surrounding areas. There is a moderately sized green area to the west of the site, sizeable patches of grassed areas within the fence line of the site, and a small natural watercourse, Newton Creek, to the Southeast. Current and projected temperatures in Superior over the next two weeks are daytime temperatures between 56–75°F and overnight temperatures between 35–49°F.

1.3. Risk Assessment

1.3.1. Types of materials presenting threat

The released materials include asphalt, number six fuel oil (a viscous blend of heavy and light oils), and firefighting foam. The immediate threat of oiling is higher for the No. 6 oil, while asphalt, which represents the majority of the oil spilled, presents a lower level of threat. The heated, liquid asphalt released quickly hardens under current weather conditions (40-70°F), but is expected to remain sticky at surface and present a threat of oiling for larger terrestrial species and oiling and/or trapping for smaller avian or terrestrial species. Stickiness may vary throughout the day and from day to day depending on temperature and weathering.

1.3.2. Vulnerable species and habitats, seasonality

Species of primary concern include deer, which are well known locally and a single individual was observed with partially oiled legs. Deer are resident within the refinery fence-line, and may be accustomed to residing near the warmth of the asphalt tanks. They are highly acclimatized to humans and can enter the fence-line through gaps in fencing and gates.

Given the proximity to Lake Superior, and the time of year, during spring migration, avian species are a concern. Songbird migration is underway with peak migration in May. Given the terrestrial nature of the oil, taxa of highest concern are shorebirds, wading birds, waterfowl, and ground nesting songbirds. Each of these taxa were observed during initial wildlife threat investigation/reconnaissance on May 2, 2018.

Amphibian (frog) calls were noted on site, in close proximity to the released hydrocarbon, as well as tadpoles seen in Stormwater Pond 4. Two muskrat were observed in Stormwater Pond 4 as well as one in Firewater Ponds 2/3.

1.3.3. Effects of oil and wildlife at risk

One deer was observed oiled on the morning of May 1, 2018. It was oiled from the hoof to approximately 15" up the leg. This is consistent with typical oiling patterns observed in adult deer, which impact the hoof through the hock and do not appear to have long-term effects on health. Oil may weather (harden) causing fur loss or be reduced by contact with vegetation and water sources. This is slightly mitigated by the time of year: warmer weather developing through the spring and summer will limit the negative effects of potential fur loss.

In other wildlife, including amphibians, birds and small mammals, increased hydrocarbon concentrations affect the ability of organisms to effectively thermo– and osmoregulate. Sites of osmoregulation include

the skin in some aquatic wildlife including amphibians. Hydrocarbons can also lead to gastrointestinal irritation, pneumonia, inability to thermoregulate, and immunosuppression.

Husky will adapt the approach to wildlife management and deterrence strategies continually as information about impacted and threatened (potentially impacted) wildlife on the site is updated. See Section 1.7 Summary of Threats and Mitigations.

A summary of the potential effects of the relevant contaminants on the wildlife taxa is presented in Table 1, although species specific effects of exposure are not currently available for all species. The information in Table 1 focuses on direct exposure to hydrocarbon. Table 2 lists Species at Risk that have the potential to occur within the project area. None of these species have been observed onsite.

Table 1 Potential Effects of Hydrocarbon Exposure on Wildlife Taxa

Taxonomic Group	Potential Effects
Amphibians	Direct exposure to hydrocarbons may affect amphibians during all phases of their life cycle due to absorption through their skin. Direct contact with certain hydrocarbons may result in burns or tissue degradation. Additionally, egg masses and tadpoles may die from exposure.
Small Mammals	Aquatic based mammals such as muskrats may be affected by long-term direct exposure to hydrocarbons. Direct oil impacts result in thermoregulatory and nutritional imbalances, oil ingestion and decreased waterproofing.
Waterfowl	The materials released can result in reduced cohesion of feathers on waterfowl impacting the ability of the feathers to maintain a waterproof thermal barrier for individuals that land on affected water bodies or are exposed to contaminants in terrestrial areas near the shore. Waterfowl may be affected by long-term direct exposure to hydrocarbons in the affected area by consuming affected water and food sources as well. Heavily impacted waterfowl are often unable to maintain buoyancy and may be unable to properly forage and maintain hydration.
Songbirds and other Bird Species	Songbirds and other species in this situation are not likely to be exposed for the long-term. The risk is direct exposure to oil and therefore bird species that use shoreline habitat for bathing and foraging are more susceptible to direct contact with oil – due to their high metabolism and body mass to surface area ratio, these species are prone to hypothermia and emaciation.
Ungulates	Large ungulates, in particular deer, may be directly oiled. Provided oil impacts are limited to the lower regions of the legs, effects may be temporary.

1.3.4. Priority species for protection or rehabilitation

Table 2 Species at Risk Potentially Occurring in the Project Area

Common Name	Scientific Name	Wisconsin State Status	Federal Status
Birds			
Piping Plover	*Charadrius melodus*	Endangered	Endangered
Black Tern	*Chlidonias niger*	Endangered	BCC-BCR
Red Knot	*Calidris canutus rufa*		Threatened

Common Name	Scientific Name	Wisconsin State Status	Federal Status
Peregrine Falcon	*Falco peregrinus*	Endangered	
Worm-eating Warbler	*Helmitheros vermivorum*	Endangered	
Caspian Tern	*Hydroprogne caspia*	Endangered	
Loggerhead Shrike	*Lanius ludovicianus*	Endangered	
Red-necked Grebe	*Podiceps grisegena*	Endangered	
Yellow-throated Warbler	*Setophaga dominica*	Endangered	
Kirtland's Warbler	*Setophaga kirtlandii*	Endangered	Endangered
Forster's Tern	*Sterna forsteri*	Endangered	
Common Tern	*Sterna hirundo*	Endangered	
Henslow's Sparrow	*Ammodramus henslowii*	Threatened	
Great Egret	*Ardea alba*	Threatened	
Upland Sandpiper	*Bartramia longicauda*	Threatened	
Red-shouldered Hawk	*Buteo lineatus*	Threatened	
Yellow Rail	*Coturnicops noveboracensis*	Threatened	
Acadian Flycatcher	*Empidonax virescens*	Threatened	
Spruce Grouse	*Falcipennis canadensis*	Threatened	
Kentucky Warbler	*Geothlypis formosa*	Threatened	
Yellow-Crowned Night-Heron	*Nyctanassa violacea*	Threatened	
Cerulean Warbler	*Setophaga cerulea*	Threatened	
Hooded Warbler	*Setophaga citrina*	Threatened	
Greater Prairie-Chicken	*Tympanuchus cupido*	Threatened	
Bell's Vireo	*Vireo bellii*	Threatened	
Amphibians			
Blanchard's Cricket Frog	*Acris blanchardi*	Endangered	
Reptiles			
Slender Glass Lizard	*Ophisaurus attenuatus*	Endangered	
Queensnake	*Regina septemvittata*	Endangered	

Common Name	Scientific Name	Wisconsin State Status	Federal Status
Eastern Massasauga	*Sistrurus catenatus catenatus*	Endangered	
Ornate Box Turtle	*Terrapene ornata*	Endangered	
Western Ribbonsnake	*Thamnophis proximus*	Endangered	
Eastern Ribbonsnake	*Thamnophis sauritus*	Endangered	
Wood Turtle	*Glyptemys insculpta*	Threatened	

1.4. Key Considerations for the Wildlife Response Plan

Breeding birds, both migratory and resident species, and mammals may come in contact with the exposed oil. Key wildlife considerations include the following:

- ensuring the safety of personnel
- determining wildlife use of the site
- reducing impacts and removing contaminants through clean-up efforts
- reducing wildlife exposure to affected habitat
- rehabilitation, decontamination, and release of impacted wildlife if necessary
- coordinating with Wisconsin Department of Natural Resources, US Fish and Wildlife Service and other governmental agencies

Containment and recovery operations will focus on removing the impacts from the environment, a crucial step in reducing all impacts associated with this release. This wildlife management plan will focus on mitigating the potential harm, reducing the exposure of wildlife to affected habitat, monitoring wildlife presence and capture, and treatment of impacted wildlife.

1.5. Ensuring Personnel Safety around Wildlife

Attempts to rescue oiled birds or wildlife may be suspended due to unsafe operating conditions. Captured birds or wildlife are often aggressive and should be regarded as dangerous. Birds with sharp beaks will often aim for the eyes of their captors or produce puncture wounds. The toenails or claws on many birds can produce scratches that may lead to infection.

Handling oiled birds or wildlife may result in personnel contacting oil products which are toxic to both animals and humans. Care should be taken to minimize contact with these products. Safety Data Sheets (SDS) for the expected hydrocarbon or chemical products with which birds may have come in contact should be consulted to ensure that proper personal protective equipment is being worn before handling a bird.

The incident occurred within an area where deer are known to reside. To reduce human-animal conflicts, staff onsite will be educated in safe practices for working near wildlife. Tailgate discussions on wildlife safety onsite include reminding staff of the following:

- Do not feed any wildlife
- Properly dispose of all garbage and food items
- Work in teams and not alone
- Be aware of surroundings, monitor for wildlife and inclusively notify response crews of any large wildlife that may be present in the response area.
- Maintain a safe distance from wildlife unless properly trained

As some wildlife may present the threat of zoonotic disease, it's critical that only those individuals properly trained and equipped handle wildlife, both alive or dead. This is also a condition of our permits.

1.6.Wildlife Observations and Assessment

1.6.1. Observation Protocol

Response teams will report sightings of wildlife within the response area and any impacted wildlife to the Environmental Unit. If impacted wildlife are observed, the Environmental Unit must be contacted immediately and they will respond to the issue, as appropriate. At current date (May 2-8), Torey McLeish (1-403-828-3418) is leading Husky's wildlife response. Longer term contacts include Mark Darby (+1-218-525-5848), David Beattie (+1-218-348-9051) and/or any established wildlife monitors.

1.6.2. Initial Wildlife Impact Assessment

Husky Energy conducted an initial wildlife impact assessment of the Superior Refinery and adjacent properties on 2 May 2018. The assessment was completed by Husky personnel and oiled wildlife technical experts from wildlife response contractor Focus Wildlife. The purpose of the assessment was to document wildlife impacts from release of oil and to identify potential threats of additional oiling of wildlife from residual oil. The resultant information was then used to develop recommendations for mitigation strategies and tactics to minimize risk of additional wildlife impacts from the incident (see Table 1.7).

1.7.Summary of Threats and Mitigations

Below is a summary of threats observed during initial reconnaissance/threat assessment, and mitigations:

Area	Threat (Severity: taxa)	Mitigation
Tank 54 Drainage/ Containment area	Exposed Fuel Oil #6 on water within the tank secondary containment berm (High: deer, amphibians, avian species)	Immediate deployment of bird deterrents- pennant flagging and strobe/flood lights. Exclude deer from the oiled area with fencing and deterrents. Exclude amphibians from the area with fencing. Remove the oil as soon as possible, if residual oil, cover with sand until it can be excavated.
Asphalt Tanks	Exposed asphalt (Moderate: deer, amphibians, avian species)	Exclude deer from the area with fencing and deterrents. Exclude amphibians from the area with fencing. Evaluate covering the asphalt with 3-4" thick sand layer until it can be removed.
Ditch along Stinson Ave	Exposed oil remaining in isolated areas of the ditch system (Moderate: avian species)	Target for immediate clean-up.
Pond #4 Forebay	"Bathtub ring" of oil on shoreline, thin and 4-6" wide. (Minor: avian and muskrat)	None: geese and muskrat observed in the area were not oiled. Muskrat were exhibiting normal behavior. Oil does not appear to be causing an issue, and threat is expected to decrease to negligible with a few days as the oil weathers.
Pond #4	Submerged oil noted to be bubbling to surface, producing sheen which quickly dissipated. (Negligible: avian and muskrat)	None: risk is negligible.
Impoundment E of site	"Bathtub ring" of oil on standing and displaced/floating cattails, sheen within shoreline cattails. (Minor: avian and muskrat)	Priority target area for recovery. Recovery strategy to be determined by Operations/Planning Recovery Teams. Suggest slashing of cattails from boat (reduce "tramping in" of oil to shoreline sediment). Suggest skimming around area and at outfall during slashing as the actions may release entrained oil/sheen. Threat is expected to decrease to negligible within a week as the oil weathers.
Pond 2/3	Firefighting foam. (Negligible)	None: no observed impacts and threat expected to quickly dissipate.
Newton Creek	None- although foam was observed, believed to be natural organic foam. No oil observed. Surface water quality monitoring to date indicates no impacts.	None required.

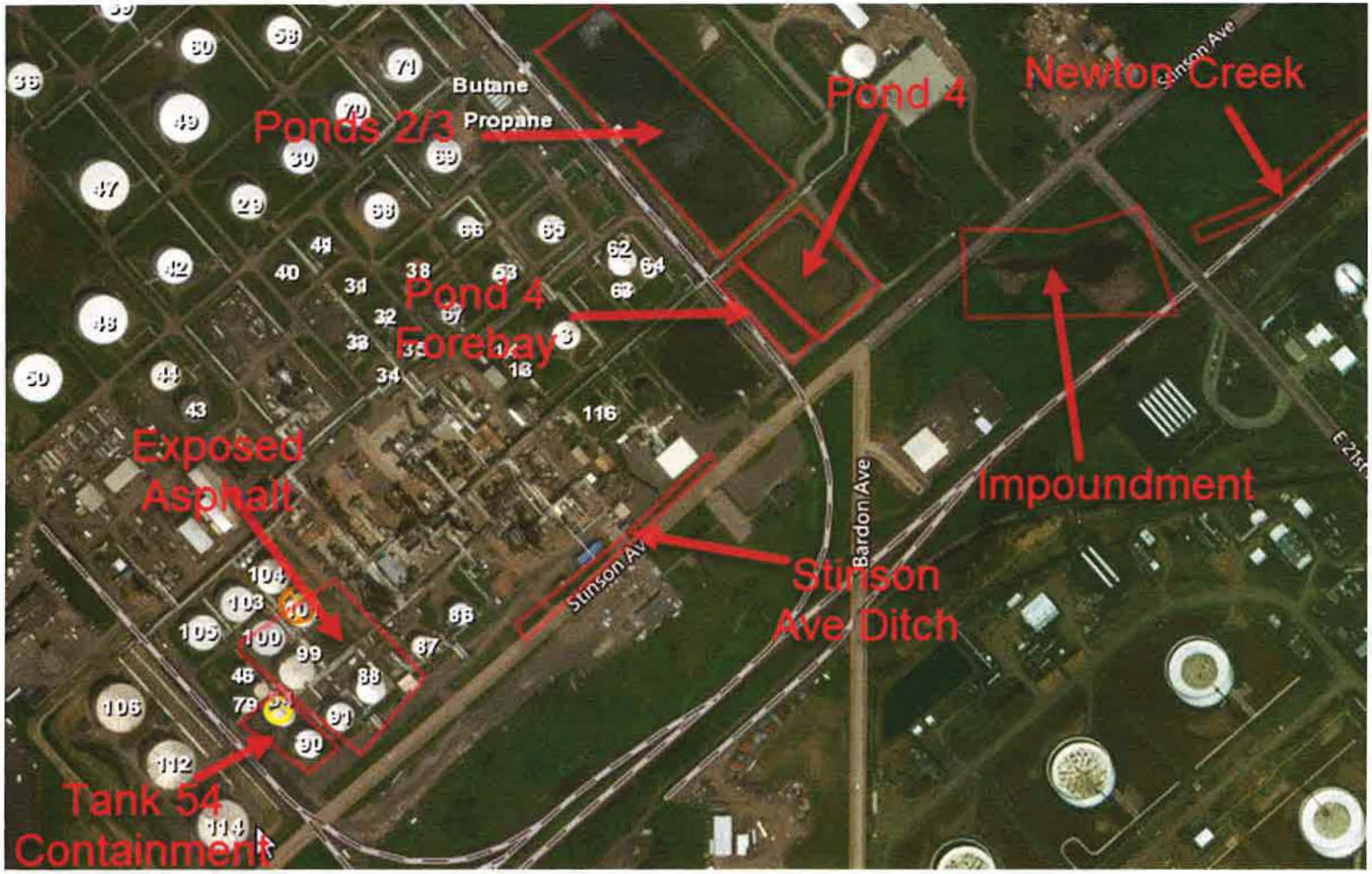

Figure 1: Areas of Wildlife Concern

1.8. Exposure Reduction and Contaminant Removal

Remediation at the site is outside the scope of the wildlife plan, however protection of wildlife is a key result. The most effective method for protecting wildlife is to reduce the potential exposure to contaminants. Therefore, a primary response strategy for wildlife protection is containing and removing source contaminants. Reducing the area of exposed hydrocarbon will immediately decrease direct impacts to wildlife. The No. 6 oil is the immediate target for removal, with this threat expected to be removed in the near future.

When the asphalt spill area is accessible, the response will evaluate applying a 3-4" cover of sand or other material over the exposed asphalt. This tactic has been employed in similar response situations in the past, with the effect of eliminating the oil contact pathway for avian species, small mammals, and amphibians. Although not eliminating it for ungulates, it may decrease the level of threat.

To exclude wildlife from the exposure area, the following tactics will be employed:

1. Employing a combination of fence 6 feet or greater in height and/or fence panels to exclude ungulates (deer). Fence panels block sight lines and can be employed in a series of lines and Ts to direct deer away from the impacted area.
2. A silt-fence tied in to the ground or bottom weighted to divert amphibians around the oiled area. Amphibians are in breeding season, as noted by calls and tadpoles observed. Following breeding season, adults and young of the year will travel from breeding to foraging habitat.
3. If practical, inert material will be applied in a 3-4" layer on top of exposed asphalt. This will be periodically monitored and reapplied to maintain thickness if the hydrocarbon remains a threat.

1.9. Deterrence: Reducing Wildlife Exposure to Affected Habitat

Cleanup operations will be ongoing but threats remain during the cleanup phase. As a result, secondary measures such as deterrence and hazing of wildlife from affected areas and monitoring for wildlife presence will be implemented until the risk has been appropriately mitigated. Placing deterrents is high priority as they will prevent oiling of species both currently in the area and sensitive species potentially coming through migration.

The following mechanisms will be employed to reduce the risk of exposure:

1. Human hazing of wildlife. Perhaps the most effective deterrent will be the 24 hour presence of response activities in the area.
2. The Wildlife field team will assess opportunities for utilizing effective deterrence techniques such as pennant flagging, mylar streamers, scare balloons, scarecrows or other avian deterrents around the highest risk areas.
3. Set-up strobe and/or flood lights near asphalt and #6 fuel oil tanks for overnight deterrence. Exposed, shiny oil can sometimes appear as a waterbody to birds flying overhead. Making this area unpleasant for birds will help prevent overnight landings.
4. Apply white reflectors to the ungulate fence. White-tailed deer as observed on site use the white underside of their tails as a warning/danger signal to each other. Therefore, the deer have an instinctual negative reaction to the white reflectors, if deployed at the right height. This will be applied to make the fence/panels more effective. Tarps and streamers will also be considered for potential application in this function.

Deterrent inventory will be deployed strategically, keying in on the highest risk areas. Key areas are access points where deer are known to enter the facility sites, and any locations of high wildlife or bird activity noted in the field. Wildlife behavior and deterrent placement will be continually evaluated depending on where wildlife is encountered as the cleanup operations proceed.

Maintenance of existing deterrents (monitoring for effectiveness, moving locations, varying techniques) must be conducted as soon as possible after placement, and continue at least weekly until the threat is no longer present. This will help prevent wildlife acclimatization to the deterrents and maintain effectiveness.

1.10. Resident Canada Goose Management

There is a large population of resident Canada geese on site. These geese are entering breeding season and within a few weeks to a month would be expected to produce goslings. The unpredictable goslings and protective parents present a threat of disrupting cleanup activities and increase the risk of wildlife impacts. Population management techniques including limiting egg fertility will be employed to mitigate this threat. Population management activities will be conducted by the wildlife field teams in accordance with written protocols to be developed by the Environmental Unit. All applicable State and Federal permit requirements will be followed to enable this activity.

1.11. Recovery and Rehabilitation of Impacted Wildlife

Where required, strategies will be developed to capture and recover animals on a case-by-case basis. Capture and recovery strategies target capturing impacted animals only (i.e. Impact Level 2-3).

Focus Wildlife will manage the capture, recovery and treatment of impacted wildlife. If an animal is captured, it will be assessed for oiling and transported to a local wildlife rehabilitation center or veterinary facility where the health of an individual may be assessed and treatment options determined in coordination with Focus Wildlife and consultation with trustee wildlife agencies. Euthanasia of select species and oiling impact levels will be considered in consultation with trustee wildlife agencies.

The capture, collection, and stabilization of oiled wildlife should only be undertaken by experienced professionals and should follow internationally established protocols:

- *Best Practices for Migratory Bird Care During Oil Spill Response* (US Fish and Wildlife Services 2003)
- *Key Principles for the Care, Protection and Rehabilitation of Oiled Wildlife* (IPIECA 2017)
- *Minimum Standards for Wildlife Rehabilitation (NWRA/IWRC 2012)*

Inexperienced or unskilled personnel can be seriously injured or can cause harm to the wildlife they are seeking to help. If clearly oiled wildlife is present, general safe handling guidelines should be followed. Wildlife should be placed in a carrier, in a warm, quiet environment. Consultation with Focus Wildlife is recommended prior to capture.

1.12. Permitting

Focus Wildlife carries a US Fish and Wildlife Migratory Bird Rehabilitation Permit under the Migratory Bird Treaty Act for the capture and recovery of oiled migratory birds. Permit #MB-1811245. US Fish and Wildlife has been notified of the incident and will be notified of any animals captured or carcasses recovered, in keeping with the conditions of the permit.

State permits will be obtained as required. See Section 1.1.2.2.

Any carcasses recovered will be maintained under chain of custody protocols and requirements from wildlife trustee agencies.

1.13. Monitoring

Regular monitoring is required to evaluate the threat level and location of the exposed oil, to monitor the status, location, species and behavior of wildlife in the area, and to monitor and maintain effectiveness of mitigations (barriers and deterrents). Given the limited geographical scope of the threat areas, two individuals are recommended for initial daily monitoring. The monitoring intensity or frequency should be reevaluated on a continuous basis. Monitors may be drawn from local refinery operations staff, and will be trained by wildlife spill response experts from Focus Wildlife.

1.14. Reporting

The Environmental Unit will collect data daily on wildlife activities conducted onsite including species observed, impacted, and mortalities. A standardized reporting format will be developed and utilized by the wildlife monitoring team.

If any impacted wildlife are observed, they will be reported to Husky within one hour and reported to Wisconsin DNR and the US Fish and Wildlife Service immediately upon notification if they are a sensitive species listed in Section 1.3.4.

1.14.1. Contact Numbers for Reporting Environmental Emergencies (24 HOURS)

Wisconsin Department of Natural Resources- John Sager 1 (715) 490-0123

Wisconsin Department of Natural Resources- 24 Emergency Hotline..... 1 (800) 943-0003

US Fish and Wildlife Service- Annette Trowbridge 1 (612) 713-5104

CONTACT NUMBERS FOR SPECIALISTS

Focus Wildlife 1 (800) 578-3048

Charlie Hebert 1 (503) 901-0924

Jenny Schlieps 1 (360) 391-7777

2. References

USFWS, 2003. Best Practices for Migratory Bird Care During Oil Spill Response, can be accessed by the following link: https://www.fws.gov/wafwo/publications/best_practices.pdf

IPIECA, 2014. Wildlife Response Preparedness: Good Practice Guidelines for Incident Management and Emergency Response Personnel can be accessed at the following link: http://www.ipieca.org/resources/good-practice/wildlife-response-preparedness/.

IPIECA, 2017. Key Principles for the Care, Protection and Rehabilitation of Oiled Wildlife can be accessed at the following link: http://www.ipieca.org/resources/awareness-briefing/key-principles-for-the-protection-care-and-rehabilitation-of-oiled-wildlife/.

NWRA/IWRC , 2012 Minimum Standards for Wildlife Rehabilitation, 4th Ed. Can be accessed at the following link: https://theiwrc.org/wp-content/uploads/2011/05/Standards-4th-Ed-2012-final.pdf.