Pembina Pipeline Corporation
Moosehorn Gathering Line Spill - WILDLIFE MANAGEMENT PLAN - (July 21/11)

Introduction

On July 19th, 2011 the discovery of an 8 inch pipeline release prompted a spill response at location ~ 11-6-67-9 W5M. The release reportedly forced an estimated 200m³ of liquid petroleum hydrocarbon into an unnamed creek. Following Pembina's request and in partnership with SWAT Consulting Inc. Eco-Web prepared this Wildlife Management Plan (WMP) to address wildlife management on site and outline wildlife response measures. As containment and cleanup of the spill continues and additional information are gathered from the field sections, this WMP may be amended to better tackle changing conditions of the site.

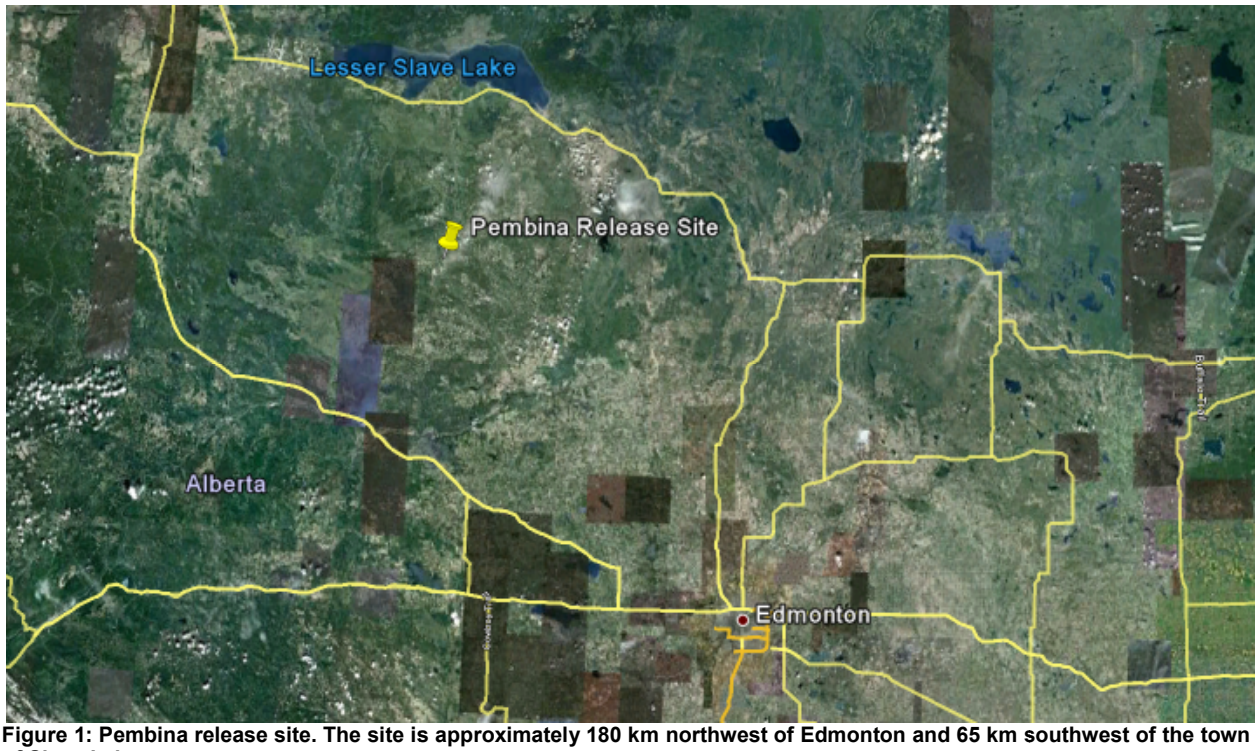

Figure 1: Pembina release site. The site is approximately 180 km northwest of Edmonton and 65 km southwest of the town of Slave Lake.

Spill Background

The spill occurred at approximately UTM 11 6070453N 605652E along a Pembina pipeline Right of Way (ROW). The resulting oil subsequently flowed northwest along an unnamed creek (~ 3.6 km). From this location the spill path continued east on the creek course and then north. The exact extent of the spill is currently being monitored.

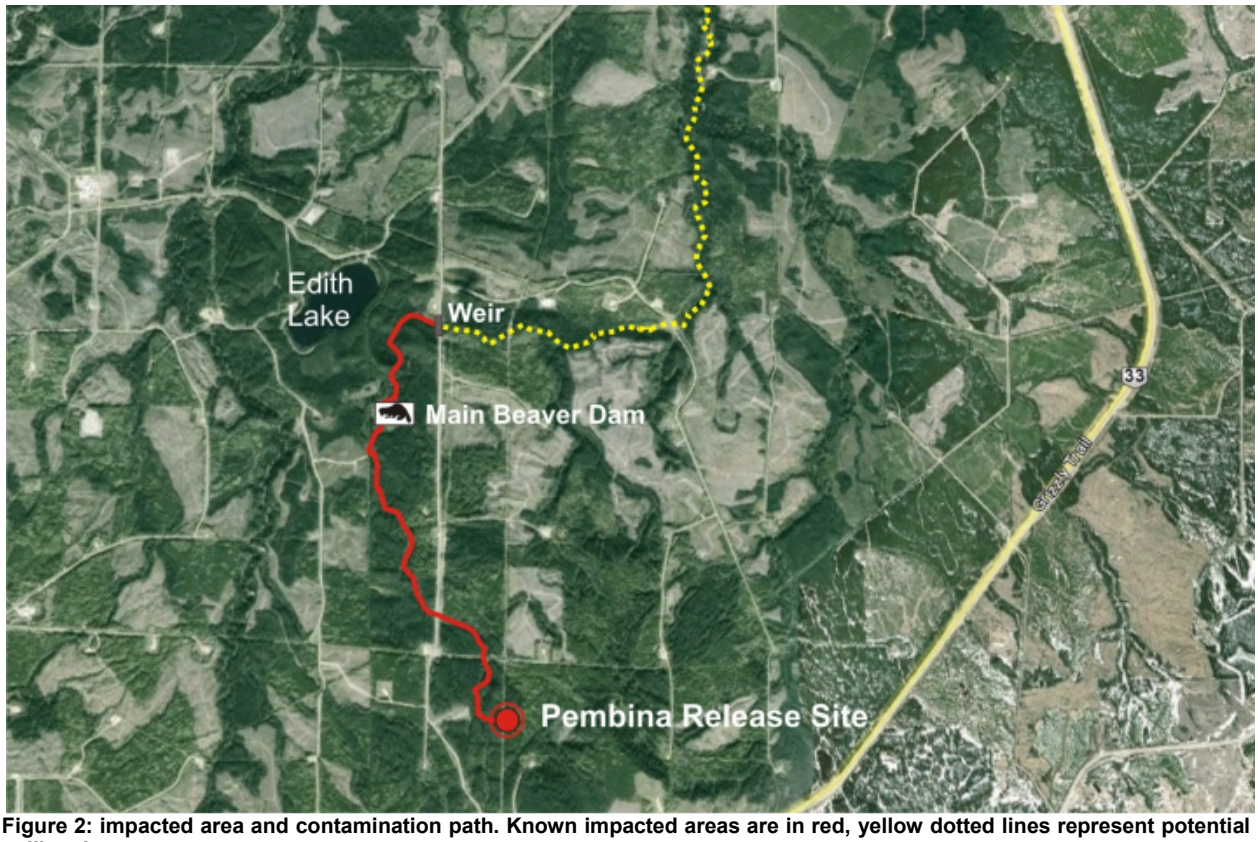

Figure 2: impacted area and contamination path. Known impacted areas are in red, yellow dotted lines represent potential spill paths

Environmental background

The release site is located approximately 180 km northwest of Edmonton and 65 km southwest of the town of Slave Lake. The site is within the *mixed boreal upland* ecoregion of northern Alberta and is part of the *Boreal Plains Ecozone*[1]. This area is characterized by predominantly cool summers and cold winters, and classified as having a predominantly subhumid mid-boreal ecoclimate. This ecoregion is part of the continuous mid-boreal mixed coniferous and deciduous forest extending from north-western Ontario to the foothills of the Rocky Mountains. Typical vegetation include medium to tall, closed stands of trembling aspen and balsam poplar interspersed with white and black spruce, and balsam fir occurring in late successional stages. Deciduous stands have a diverse understory of shrubs and herbs; coniferous stands tend to promote feathermoss. Cold and poorly drained fens and bogs are covered with tamarack and black spruce. Elevations range from about 400 to over 800 m ASL. Associated with rougher morainal deposits are a large number of small lakes, ponds, and sloughs occupying shallow depressions. Permafrost is very rare and found only in peatlands. Characteristic wildlife in the area includes moose, white-tailed deer, elk, black bear, timber wolf, lynx, snowshoe hare, beaver, and muskrat. Bird species include common loon, red-tailed hawk and neotropical migrants. Land use in the area includes

[1] [1] Ecoregion Summary retrieved July 22, 2011 from the *Ecological Framework of Canada – Ecoregions of Canada* (http://ecozones.ca/english/region/139.html).

oil & gas, forestry, agriculture, as well as recreational activities such as hunting, fishing and ATVing.

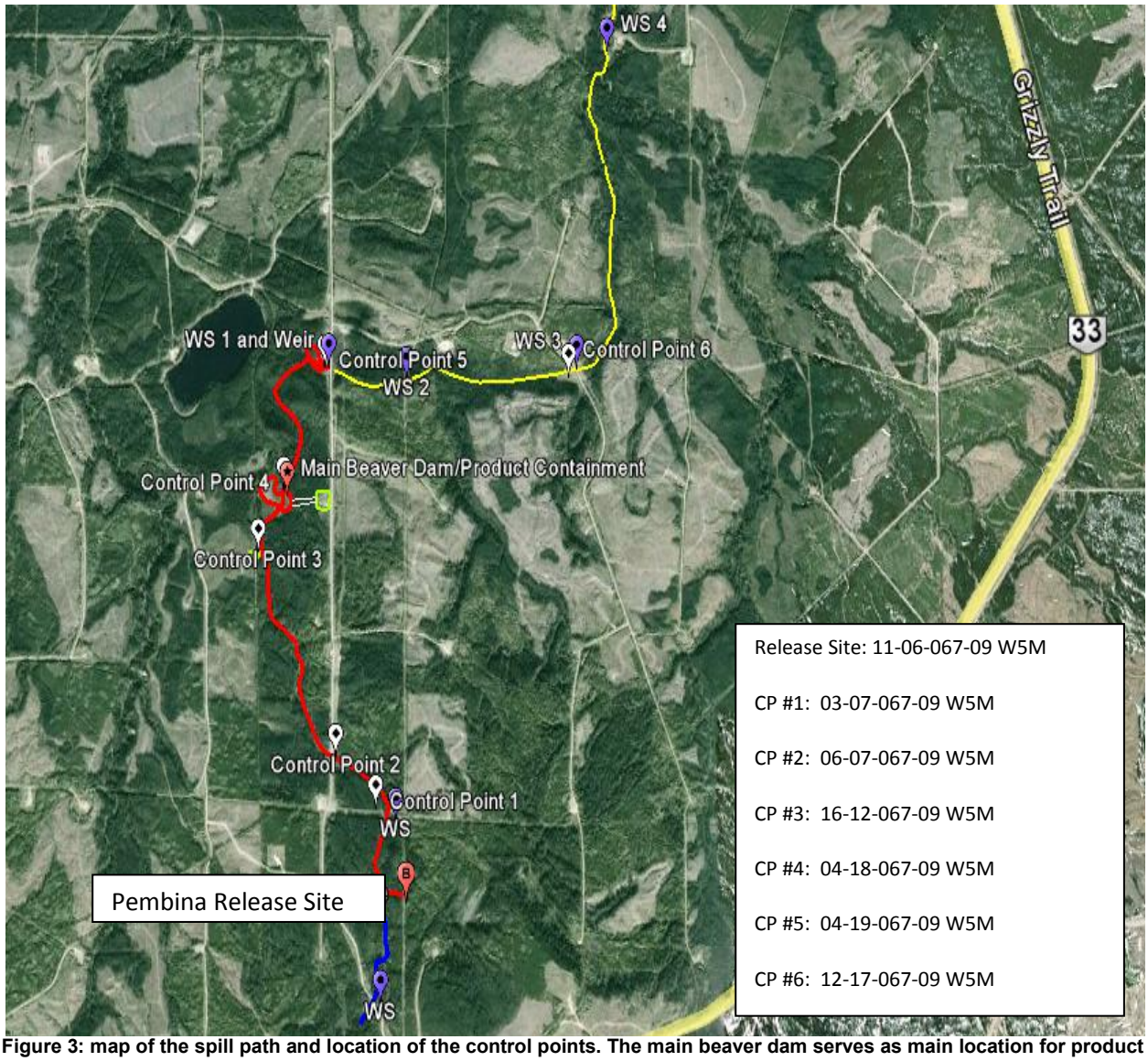

Figure 3: map of the spill path and location of the control points. The main beaver dam serves as main location for product containment.

Wildlife Management Framework

As a result of this incident, there is a likelihood that wildlife associated with the pond and wetland habitat may come into contact with the released product, especially between the soil and water interface and on the surface of the water.

The timing of the release in the latter part of July is at a less sensitive but still critical timeframe for most species known to reside in the area as outlined within this wildlife management plan. In regards to migratory birds and waterfowl likely to inhabit this area, it is within the tail end of the breeding bird season (May 1st to July 31st). Many birds will have fledged or are in the process of fledging, so the potential of impacting juveniles is

quite high. Breeding adults and non-breeding adults may still be present in the project area, but large migratory groups are not anticipated. Based on the overlap with the breeding bird season, one of the key components of wildlife to be affected are fledging water fowl and migratory birds, in particular juveniles which may be limited in their mobility at this stage.

Potential impacts to aquatic life (ie: fish species and other aquatic organisms) will be assessed once the product has been recovered and if available historical fish distribution data can be obtained on the subject drainages. Additionally, there is concern for the immediate impacts to the local resident wildlife populations within the ponds and drainage system (i.e. beavers, amphibians, reptiles). Large ungulates (deer, elk and moose) are more likely to be secondarily affected or displaced due to site activities which can deter them based on noise and other human activity.

Predators are also present (bears, wolves, coyotes, and lynx) and can be impacted when they prey upon or scavenge impacted animals, or are moving through the area due to regular movement patterns or out of curiosity of the activity (i.e. potentially attracted by smell and noise). Small mammals (red squirrel, rabbits, muskrat, beaver, pine marten, weasels, mink, mice, and voles) are also prevalent in the area and resident in good numbers. These small animals are potentially impacted by contact and foraging in contaminated vegetation and saturation of their burrows, dens, middens. Small mammals may also be affected where their movement patterns intersect the affected areas, but are considered more mobile and able to avoid the area. Amphibians are going to be present at the adult, tadpole and two-leg stage, which will make some of these juvenile life stages highly susceptible to contamination impacts. Frogs in particular are very susceptible to impact by hydrocarbons due to the absorption through their skin of these components in aquatic environments.

Key Considerations

Key considerations for this wildlife management plan consist of:

- Ensure the safety of the workforce;
- Reduction of surface impact and removal of product;
- Prevention of impacting wildlife (recovery and processing of wildlife that becomes impacted);
- Coordinating with local government agencies for handling any impacted wildlife.

Reduction of Surface Impact

The most effective method for protecting wildlife is to reduce potential exposure to surface impact and dissolved hydrocarbons within the water course. Therefore the primary response strategy for wildlife protection emphasizes on controlling the release and spread of spilled product at the source to prevent or reduce contamination of potentially affected species and/or habitat.

The primary response strategy includes the removal of oil from on top of the water and away from the soil/water interface particularly contaminated food sources, and nesting material both on water and on land.

Reduction of oil accumulation on the surface of the water will:

- Decrease impacts to avian and terrestrial wildlife;
- Decrease bank impacts and reduce bank cleanup activities that may be harmful to the environment/habitat, and limit disruption of food sources.

Deterrent

Deterring wildlife from entering the impacted area should be carefully planned and executed. The late breeding season is a sensitive period for most avian species, as egg tending at nesting sites, hatching and fledging of young is ongoing. Many nests fail at these later stages, or increased predation or mortality of juveniles can occur from excess activity within the breeding area.

Suggested hazing or deterrent techniques for this spill may include the following measures:

For Amphibians and Small Mammals

Due to the summer months amphibian species are going to be wide spread throughout the pond and wetland area. The tadpoles and two-leg stages will be particularly susceptible, as they are restricted to the water areas and contact with hydrocarbons will result in mortality. Therefore the recovery efforts will focus on keeping adults and emerging juveniles from entering the impacted area. A 90 cm silt fence will be erected along the perimeter of beaver ponds, in areas deemed sensitive by the onsite biologist, and in locations where oil collection threatens to expand the impacted area. The fence will be installed with the bottom foot buried into the surface organics/soils to prevent surface contaminants from spreading. Capture traps (pitfall traps and funnel traps) will be installed at regular intervals/key areas to collect any amphibians where sign and likelihood of presence is determined by the project biologist. These species will be catalogued and individuals that have not been contaminated will be moved to another area of equal habitat quality, in consultation with Alberta Fish and Wildlife staff. Any oil impacted amphibians that may be found in the traps will be presented to Fish and Wildlife Officers.

The small mammals, such as rabbits, weasels, muskrat, beaver and squirrels can become impacted through direct exposure at the soil water interface, as they move through contaminated areas or through drinking impacted water. The same silt fence will serve to restrict access to relevant sections of the spill footprint.

Fish and Wildlife officers (Provincial and Federal) will be contacted and responsible for the capture of live oiled wildlife found at the site. There will be on-site provisions under

the direction of SWAT (Spill response specialist) and Eco-Web (Biologists) for the capture and care of wildlife, until ASRD personnel arrive.

Any deceased wildlife found by project staff and/or their contractors and representatives will be reported to the wildlife monitors, who will complete a chain of custody process (bagged and labelled appropriately (location, time, and date)) and turned over to Fish and Wildlife Officers (within 12 hours of collection) as further direction is provided by Alain Fontaine, Senior Area Wildlife Biologist, Fish and Wildlife Division, ASRD.

For Water Fowl and Birds

The nesting of waterfowl is currently ongoing and as stated above this represents a particularly sensitive timeframe for these species. Feeding adults will be looking to forage at large open waterbodies, while breeding pairs would be present and on their nest sites. The large number of water bodies in the surrounding area provides some relief to these impacts as there is adjacent quality habitat available.

Deterrent measures will consist of the following:

- Human effigies – 150m apart
- Bird of prey effigies –150m apart
- The use of Mylar tape – on effigies and on rope system
- Scary Eyes – at 150m intervals
- Flagging within small water bodies – 3m apart spanning the water body (as safety and access permit)
- Audio deterrent in the form of a Bird Gard – around water bodies as practicable
- Audio deterrent such as air horns – around water bodies where human presence and designated personnel can watch for birds continuously.
- Audio deterrent such as zon guns (coverage of water bodies if fire hazards can be fully mitigated).
- Human presence – larger water bodies.

An assessment of bird species in the area will be undertaken regularly and a wildlife sighting card program will document all wildlife observations.

For Large Mammals

In order to mitigate the large mammal impact, impacted hydrological features such as beaver dams and areas deemed sensitive by the biologist onsite will be fenced with a 6' high orange safety fence with a top string of rope and flagging to prevent movement into the spill footprint. At major game trails (as encountered) additional visual deterrants and higher fencing will be erected to prevent habitual inadvertent movement of ungulates into the spill area. Due to site activity the likelihood of large mammals entering the spill site is very low and is mainly mitigated by the ongoing activity on a 24 hour basis.

All wildlife activities noted above will be monitored on a daily basis. Wildlife sightings will be documented and as directed above impacted and/or dead animals will be reported/provided to Fish and Wildlife Officers.

Additional Mitigation Measures

Further mitigation measures will be implemented by the wildlife management team as required to respond to site-specific concerns within the impacted area. As additional data about the site and the extent of the impacted area is collected, this WMP will be amended to include closure strategies.

Summary

On July 19th, 2011 the discovery of an 8 inch pipeline release prompted a spill response at location ~ 3-6-67-9 W5M. Following Pembina's request and in partnership with SWAT Consulting Inc. Eco-Web prepared this WMP to address wildlife management on site and outline wildlife response measures. As a result of the incident, there is a likelihood that wildlife associated with the pond and wetland habitat may come into contact with the released product. Deterring wildlife from entering the impacted area should be carefully planned and executed. Hazing or deterrent techniques for this spill contained in this plan consist of site-specific measures tailored for large and small mammals, amphibians, water fowls and birds.

Closure

Eco-Web Ecological Consulting Ltd. has prepared this report for the exclusive use of Pembina Pipeline Corporation.

The material contained in this report reflects Eco-Web's best judgment in light of the information available at the time of preparation. Eco-Web has relied upon comments and opinions of persons contacted during the preparation of this report. The accuracy of these representations and opinions will affect the accuracy of this report.

Any use which a third party makes of this report or any reliance on, or decisions to be based on this report, are the responsibility of such third parties. Eco-Web accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Sincerely,
ECO-WEB ECOLOGICAL CONSULTING

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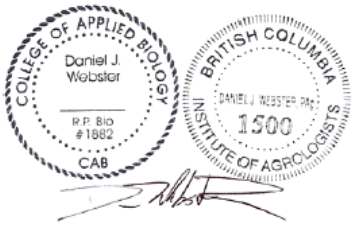

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