## Birds and Tar Sands Tailings Ponds:

Ever Safe to Land?

## By Carolyn Campbell, AWA Conservation Specialist

ow that spring bird migration is well underway, hundreds of thousands of birds are again flying over oil sands mine tailings ponds in northeast Alberta. These industrial water bodies are located along the lower Athabasca River, where several major North American migratory bird flyways converge enroute to the Peace-Athabasca Delta, one of the world's largest freshwater deltas. The "ponds" covered 182 square kilometres of surface area as of 2011 and have been growing since then (no updated measures of their sprawl across the boreal are publicly available). According to 2012 data from the Oil Sands Regional Bird Monitoring Program, a significant proportion, some 40 percent of spring and autumn migrating birds observed during daytime in the vicinity of tailings ponds are landing on the ponds.

This 2012 monitoring program report, released in May 2013, is the latest available. Overall 70,000 birds were observed during the spring and fall 2012 monitoring sessions and 30,000 of them landed on mining process-affected [PA] tailings pond water. Seventy percent of the birds that landed on these polluted waters (about 20,000) were wading shorebirds or diving or dabbling (shallow feeding) waterfowl. These species are considered to be most vulnerable to tailings water toxicity. Observations were conducted once a day, for 30 minutes per large pond, preferably within six hours of sunrise, at stations that assessed about 10 percent of the total tailings pond area.

In contrast to the large number of birds observed landing on the PA water, the monitoring program detected very few bird mortalities during surveys. CNRL, Shell, Suncor, and Syncrude observers spent almost 4,000 hours in the same spring and fall period searching the perimeter and surface of ponds in twice-weekly afternoon mortality searches. They only found 88 dead birds. Operators reported another 51 dead birds in the incidental reports they must submit when dead or 'live oiled' wild animals are found on site.

The Oil Sands Regional Bird Monitoring Program is funded by the fines paid by Syncrude after it was found guilty of breaking federal and provincial environmental laws in the 2008 deaths of 1,600 ducks. These birds landed on Syncrude's Aurora mine tailings pond. AWA reviewed the 2011 Oil Sands Regional Bird Monitoring Program report from the program's first year (see the April 2013 Wild Lands Advocate). At that time, we concluded that more credible monitoring was needed because of wide discrepancies between data collected by University of Alberta (U of A) observers at local freshwater bodies and the industry's observers at their tailings pond sites, where U of A observers were not permitted.

There is still high variability in the 2012 detection rates between observers. There was an effort to reduce variation by improving observer qualifications, and by having U of A observers accompany most companies' observers several times to tailings ponds and then discussing their respective observations. More protocols to standardize training and equipment used by observers were put in place for 2013 monitoring. This is positive. But it would be even better if independent and highly qualified observers were at



all operators' sites.

Knowing that tens of thousands of birds come in contact with "process-affected" water is a convincing addition to the body of evidence showing that the array of visual and auditory bird deterrents used by companies do not effectively prevent birds from landing on tailings ponds. The report's authors are rightly concerned about the "known detrimental effects of chronic noise pollution" from the very loud warning devices used by several operators that "impose noise pollution that exceeds 80dB deterrent standard for several km beyond pond perimeters." The report contains several sensible recommendations such as reducing the presence of bird attractants in tailings ponds - islands, floating vegetation, and sloping 'beach' shores - and investigating how artificial lighting can be better managed to deter birds from landing on PA ponds. The authors also recommend greater efforts to contain highly lethal floating bitumen into smaller areas with intensified deterrents. In light of the ineffectiveness of visual and acoustic deterrents, it would make more sense to recommend prompt and complete removal of floating bitumen from ponds.

Because the observations indicate that birds land on local freshwater ponds roughly ten times more often than on PA ponds, the authors suggest increasing the attractiveness of the freshwater ponds by using aerators to extend the open water season of the ponds or by adding decoys. We think the emphasis should be on much stronger regulations that would see the long-overdue removal of legacy tailings from the landscape. As well, the outstanding McClelland Lake wetland com-



Given past research on harmful impacts of even a light oil sheen on water birds, it's premature to conclude that brief landings on most areas of bitumen mine tailings ponds are not harmful to birds. Much more emphasis should be placed on removing these giant hydrocarbon-laced wastewater bodies from one of North America's most important migratory flyways. They covered 182 square kilometres as of 2011. PHOTO: © C. WEARMOUTH

plex, threatened by Suncor's Fort Hills mining project, and other natural water bodies and wetland complexes remaining in and near the mineable oil sands region, should be left intact.

A major flaw of the report may be how the authors have interpreted the low numbers of bird mortalities reported. "[A]ssuming mortality searches were comprehensive, fewer than 1% of the live birds we detected died as a result of that contact. The resulting inference, that brief landings on PA water are not harmful to birds, is consistent with toxicological measures following repeated exposure of captive ducks to PA water." As a result of this inference, mortality searches were reduced in 2013 to certain transects on ponds, to be visited every two weeks in the afternoon.

AWA believes it's premature to suggest that contact with tailings ponds or any PA water harms very few birds. The report's authors state that because data adjustments and analyses continued until shortly before the final draft was due, "it has left the authors without time to offer much synthesis of these results with the available literature." This is a significant shortcoming given previous research on the effects of various contaminants on birds. For example, a 2010 Canadian Wildlife Service study found that even a barely visible oil sheen greatly altered the feather structure of marine birds. US Fish and Wildlife scientist Pedro Ramirez Jr. has widely published on the harmful effects to birds of even a light oil sheen on open oil field wastewater pits.

AWA corresponded with the report's lead author, University of Alberta biologist Dr. Colleen St. Clair. Dr. St. Clair is well aware of scientific literature citing many potential adverse effects of oil sands PA water based on the toxicity of its individual components. In her view, some PA water ponds have lower concentrations of these harmful components, which makes them much less dangerous to birds than the areas that contain bitumen and fresh tailings. In October 2010 a storm forced many migrating birds to land on mine leases and tailings ponds. Hundreds died. Dr. St. Clair studied these deaths and in November 2011 she reported that "several experienced toxicologists have told me that the process-affected water on the surface of tailings pond water has negligible effects on birds that land for short periods, provided that the effluent was deposited at least 24 hours previously and that the birds do not come in contact with bitumen and other hydrocarbons. The mixing with air that occurs near the pond surface oxidizes the PAHs (polycyclic aromatic hydrocarbons) that are otherwise highly toxic to birds (Hwang and Cutright 2004, Albers 2006)." With operators' varying practices for bitumen booming and skimming on tailings ponds, these seem to be large provisos to us.

Dr. St. Clair notes that a relevant literature review is included in a recently-sub-

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mitted M. Sc. Thesis by her student, who undertook the 'captive duck and PA water' research referred to in the 2012 monitoring report. The thesis, which will be available in late April, will outline how the PA water in that experiment was obtained, how it compares to representative samples of PA water from tailings pond observation sites, and how that research accounted for differences between captive, lab-reared ducks and wild birds migrating under far different food, physical and environmental conditions. It would have been better if this pertinent information had accompanied the suggestion that PA water is not harmful to birds.

Another concern is that on-site mortality searches may have occurred too late after stormy weather. Ducks and shorebirds migrate more often at night than daytime, often staying at high elevations except when severe weather events force them to land. Mortality searches should be conducted "as soon as possible following storms (typically within 2 days)". But in this time lag, landings and on-site mortalities could be missed as oiled and waterlogged birds can quickly sink below the water's surface and remain undetected. From Dr. St. Clair's 2011 study of the 2010 storm mortalities, she hypothesized that storm-related mass mortality events only occur when a rare combination of factors is present, including strong unfavorable winds, poor visibility, industrial lighting attractants, and presence of bitumen mats. In the coming years, she will further assess this hypothesis.

The monitoring program for the tailings ponds has a striking, substantial knowledge gap. It doesn't assess polluted water-related injuries, disorders, or deaths associated with birds that fly away after landing on the ponds. Dr. St. Clair agrees this issue needs to be assessed.

AWA asked Alberta wildlife biologist Sarah Hechtenthal, M.Sc., P.Biol, about the effects of hydrocarbons and other contaminants on birds. In 2007, Sarah specialized in oiled bird rehabilitation while working in California with the International Bird Rescue and Research Center. She also spent a month in the summer of 2010 working as a rehabilitation manager in Louisiana at the rescue centre for oiled birds caught in the BP Deepwater Horizon spill in the Gulf of Mexico.

In Sarah's experience, even small spots of oil can interfere with a waterbird's intricate feather structure that insulates and waterproofs them. Alberta's diving birds, such as grebes and scaups, are especially vulnerable to impacts from contaminant-caused changes to feather structure and loss of insulation because the increased water pressure from diving forces water to penetrate their feathers, allowing it to reach their skin. Once cold water bypasses the waterproof insulating layer, birds get water logged and/or lose ability to thermoregulate. Sarah cautions: "Just because the bird is able to fly away, does not mean it was not impacted in some way. But the impact may not be immediately detectable to an observer. It is well documented that even a tiny spot of oil may eventually lead to mortality due to hypothermia - especially in northern climates. But this may take hours, days or weeks to occur." She also notes that there can be behavioural changes, such as excessive and persistent preening, from even a small amount of oil or other contaminants that result in poor body condition, loss of reproductive output, or mortality. Even landing in hyper-saline water, which leaves salt crystals on feathers that birds must preen off, can cause salt toxicity from ingestion leading to brain impairment or death. Sarah believes: "At a minimum, we should explore this issue further prior to making unsubstantiated assumptions."

Sarah's other recommendations for future tailings pond-bird contact monitoring include ensuring fully independent observers are present during the annual migratory seasons at all mine sites, providing a third-party review of results, and reporting that specifies how industry operators are integrating existing research, recommendations, and knowledge into their adaptive management plans.

In AWA's view, it makes sense to significantly strengthen efforts to remove floating bitumen and bird attractants on or around ponds and to reduce the use of harmful, ineffective deterrents. But the 2012 monitoring observations offer far from sufficient proof to conclude that birds are safe in most areas of oil sands tailings ponds. Much more emphasis should be on removing these giant industrial blights from one of North America's most important migratory flyways.

The Wild Lands Advocate doesn't have any photographs to show you what happened to the waterfowl that landed in a Syncrude mine tailings pond in April 2008. Readers who want to see video footage of struggling waterfowl may do so at the following site: http://www.cbc.ca/news/canada/edmonton/images-show-dead-ducksin-syncrude-pond-1.974150

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