2013

Oil Sands Bird Monitoring Plan[1]

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[1] This plan provides an updated protocol for previous plans by Ronconi (2011) and St. Clair and Loots (2012). Subsequent conversion to a peer-reviewed publication is planned.

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Documentation of Training

It is essential that all crew members are familiar with both the protocols and the procedural standards that support them.

- The Operator must provide a copy of this Plan to all personnel involved with implementing it. This includes individuals conducting both birds surveys and mortality searches. Both groups should be trained in protocols for incidental reporting.
- The Operator must ensure that all personnel have attended appropriate training in bird identification and have been supplied with proper equipment for recording bird observations and survey locations and routes.
- The Operator must ensure that all personnel must also be trained in the hazards and emergency procedures involved in working in the vicinity of tailings ponds in accordance with Operator Health and Safety standards.
- Any deviation from this SOP requires approval from ESRD in consultation with U of A
- Operators may choose to record and submit to U of A a list of the names of the individuals who participated in plan implementation and specifying that they have read the plan. These lists will be appended to annual reports.

Changes to the Monitoring Plan

2012 Protocol	**2013 Protocol**
Record data either using tablets or paper data forms.	Submit data only via tablets or web-based forms; use paper data forms ***only*** on an interim or emergency basis.
Conduct mortality searches twice weekly at each process-affected pond.	Conduct mortality searches at each process-affected pond once every 2 weeks. Plan a survey route and record the route that was completed.
Identify all birds with equal effort.	Identify birds initially by foraging mode, apply more effort to identifying target birds that dabble, dive or wade, and strive to identify all species with a risk designation.
Report birds heard during the pond inventories.	Do not report birds that are only heard as part of the bird surveys. Report species at risk that are heard in any location as an incidental observation.
Report all flyovers observed during bird surveys.	Report only those flyovers that occur within 100 m immediately above survey stations.

Analyses of the data collected with the 2013 Plan are expected to extend the monitoring program in four specific ways to advance bird protection via adaptive management.

1. Increase the rigour and comparability of all data collected under the plan.
2. Refine detectability functions for use in the oil sands and comparable industrial sites (e.g., similar to Buckland et al. 2001).
3. Use detectability-based extrapolations to estimate the total number of birds that contact process-affected water in the oil sands (e.g., similar to Camphuysen and Heubeck 2001; Wiese and Ryan 2003; Wiese and Robertson 2004; O'Hara and Morgan 2006).
4. Compare total estimates of bird contacts and mortalities by pond to evaluate the efficacy of current deterrent systems (e.g., similar to St. Clair *et al.* 2012).

All operators and government personnel associated with the Oil Sands Bird Monitoring Program were provided with an opportunity to review a draft plan that was submitted by plan authors on March 7, 2013.

Introduction

Avian Monitoring in the Oil Sands Region

This proposed monitoring program is the result of collaborative effort between oil sands mining industry members and academia (Ronconi 2011, St. Clair and Loots 2012). It is based on scientifically rigorous methodology, while recognizing operational constraints. This monitoring plan incorporates feedback provided by mine operators and government agencies including Alberta Environment and Sustainable Resource Development (AESRD) and Environment Canada.

Purpose

The purpose of the program is to document bird interactions with liquid storage facilities at oil sands mining facilities with methods that are robust and systematic. This program will ultimately provide site-specific guidance on bird deterrent strategies aimed at reducing bird contacts and mortalities.

Objectives

1. Provide an estimate of bird contacts and mortalities on ponds containing process-affected waters.
2. Provide an estimate of bird contacts on ponds containing fresh water;
3. Develop a standardized monitoring program for all oil sands mine operations to provide comparable data across ponds, sites, seasons, and years; and
4. Identify species at risk that have been affected through contact on ponds containing process-affected waters;
5. Provide direction on adaptive management for long-term monitoring and bird deterrent programs.

Scope

The ultimate purpose of the monitoring program is to support adaptive management of bird protection in the oil sands region. Doing so will require ongoing integration of monitoring results with deterrent practice, a process that began in the annual report for 2012. The protocols contained in this document refer to the monitoring of birds only and do not address the details of deterrent practice, which are contained in the Bird Protection Plans that are submitted to government by individual operators.

The monitoring program described by this protocol is designed to detect avian landings, injury and mortality, related to oil sands process-affected ponds and to do so in a standardized and rigorous way. This protocol does not address wildlife other than birds and even within birds, the plan is designed primarily for those species that that are more likely to come in contact with process-affected water or the shore areas it contacts. That focus is formalized in this 2013 plan by designating *target birds* as those that dabble, dive, or wade as a primary means of foraging. In contrast, *non-target birds* include those that forage primarily by pecking at the ground, gleaning fruit or insects from vegetation, or by flying (i.e., aerial insectivores), stooping (raptors), and scavenging.

Between 2011 and 2013, and at the invitation of government and operators, the University of Alberta has led several aspects of the Oil Sands Bird Monitoring Program. They have refined monitoring protocols, received raw data from operators, and prepared annual reports. U of A support of a standardized monitoring program is mandated under and funded by the court order for the *Research on Avian Protection Project* (RAPP) following the conviction in *R. vs. Syncrude (2010)*. That project will end in spring, 2014, and a new arrangement will be needed to support the continuation of the Oil Sands Bird Monitoring Program.

Regulatory Framework

Oil sands operations are required to operate facilities in a manner that minimizes the possibility of birds coming into contact with harmful or hazardous substances. This requirement is formalized in three pieces of legislation:

> Section 5.1 (1) of the Migratory Birds Convention Act, 1994, *No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area*.
>
> Section 155 of the Alberta Environmental Protection and Enhancement Act, 2010, *A person who keeps, stores or transports a hazardous substance or pesticide shall do so in a manner that ensures that the hazardous substance or pesticide does not directly or indirectly come into contact with or contaminate any animals, plants, food or drink*.
>
> Section 32 (1) of the Species at Risk Act (2002), *No person, shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species.*

Although all three Acts are relevant to this program, the monitoring plan is primarily regulated under the provincial Environmental Protection and Enhancement Act (EPEA) (2010). The following conditions appear, with minor variations, in each of the oil sands mines EPEA approval:

> *The approval holder shall submit a Waterfowl Protection Plan to the Director by Month,Date,Year, unless otherwise authorized in writing by the Director.*

> *The Waterfowl Protection Plan shall include:*
>
> *(a) techniques and procedures for a comprehensive bird deterrent program for all tailings, consolidated tailings and waste ponds which minimizes avian mortality from the ponds;*
>
> *(b) a comprehensive program for monitoring and documenting avian mortality, timing of incidents, and bird species affected; and any other information as required in writing by the Director.*
>
> *The approval holder shall implement the Waterfowl Protection Plan as authorized in writing by the Director.*

Each operator implements their own deterrent programs as described in their unique Waterfowl Protection Plan (a). The monitoring component of these plans (b) however is to be conducted in coordination with all other oil sands mine operators. This regional approach was confirmed in a letter from the designated Director of EPEA approvals to operators in the spring of 2011. It stated that:

> *We find that this plan [the Oil Sands Bird Contact Monitoring Plan] meets the requirements of Subsection X.X.XX (b) of your EPEA Approval. Please proceed with the implementation of the Oil Sands Bird Contact Monitoring Plan for 2011 in accordance with subsection X.X.XX of your EPEA Approval.*

The regional Oil Sands Bird Contact Monitoring Program is now in its third year of implementation.

Responsibilities

Regulators are responsible for:

- Inspecting sites for compliance with plan
- Reviewing reports for compliance with legislations and regulations
- Providing guidance to operators for adaptive management

The University of Alberta is responsible for:

- Housing and managing data records
- Developing and leading the 2013 training component;
- Writing the 2013 Annual Report
- Participating in 2 Workshops with Regulators and Operators annually

Operators are responsible for:

- Implementing the Oil Sands Bird Monitoring Plan
- Hiring and training Observers
- Obtaining Annual Research Permits and Collection Licenses;
- Providing access to U of A team;
- Reporting observations as per the Reporting Requirements

Observers (Operators and UofA) are responsible for:

- Adhering to protocols
- Entering data precisely to ensure data is of a suitable quality for analysis

Reporting Requirements

Operators are responsible for reporting wildlife occurrences detected through this program as follows:

Receiving Agency	Content	Deadline	Regulatory Tool
JSG – F&W Officer; & ESRD - Area Biologist	Species-at-risk mortalities	Immediately	Research Permit and Collection License
JSG – F&W Officer; & ESRD - Area Biologist	Injured wildlife	Immediately	Research Permit and Collection License
JSG – F&W Officer; & ESRD - Area Biologist	Wildlife mortalities [2]	Monthly	Research Permit and Collection License
ESRD – Area Biologist	Wildlife observations, including mortalities in FWMIS loadforms[2]	Annually – March 31	Research Permit and Collection License

Project Manager (UofA)	Digital maps of survey and deterrent locations[2]	Annually - April 15[3]	Oil Sands Bird Monitoring Plan
Project Manager (UofA)	Bird observations, including mortalities at ponds[2]	Monthly	Oil Sands Bird Monitoring Plan
ESRD - EPEA Director	Results of Monitoring Program	Annually – March 15	Oil Sands Bird Monitoring Plan: Annual Report
ESRD - EPEA Director	Wildlife Incidents & Mortalities on site	Annually - April 15	EPEA Approval: C&R Report

Operational Constraints

Oil sands process-affected ponds occur on large industrial sites that impose significant constraints on workers that are not typically encountered when monitoring wildlife in other contexts. It is important to recognize these constraints and how they will impact the implementation of monitoring activities related to bird contacts and mortalities. Most of the constraints are related to human health and safety concerns, which must not be compromised. Such issues include both chronic risks (e.g., hearing damage from deterrents) and acute risks (e.g., accidents related to working at night, over water, or on unstable pond shores). Whenever possible, operators are to overcome operational constraints that would otherwise negatively impact the quality of the data collected under the monitoring plan. To support this requirement, protocols include several specific suggestions for the oil sands context on the training of personnel, placement of survey stations, timing of observations, and recording of data.

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[2] These should include shapefiles of ponds, base layers that are georeferenced as air or satellite photos, and UTM locations for and information on deterrents in the associated spreadsheet (Table 2) in the 2012 report.

[3] For the purposes of the 2013 report, these should be updated at the end of the season (e.g., October 31). Major changes in deterrent type, placement or deployment method should be documented whenever they occur.

Materials

Each simultaneous crew will require the following equipment.

Bird Survey

- Electronic device (i.e., a tablet computer) for recording data, determining GPS position, automating a date and time stamp, and providing a timer
- Bird identification tools, e.g. field guides (see section 8.2)
- Binoculars (10x magnification)
- Range finder (range of at least 500 m; may be integrated with binoculars)
- Tripod with panning head
- Spotting scope (60x or greater magnification)
- Clip board with datasheets (as backup to electronic data collection device)
- Digital camera (to photo document where necessary)
- A timer with an audible alarm
- Compass with clinometer and declination settings (set to +14° or 14° East)
- Miscellaneous additional equipment such as portable waterproof casings for cameras, extra batteries or battery banks, extra memory cards for cameras
- Hearing protection for surveys conducted near audible deterrents

Mortality Search

- Boats, where necessary
- Binoculars (10x magnification)
- Range finder (range of at least 500 m; may be integrated with binoculars)
- Clip board with datasheets (as backup to electronic data collection device, if used)
- Digital camera (to photo document where necessary)
- Gloves, bags, and labels for collection of dead birds
- Handheld GPS

- Miscellaneous additional equipment such as portable waterproof casings for cameras, extra batteries or battery banks, extra memory cards for cameras

Related Documents

Electronic forms and backup datasheets that accompany survey protocols include the following.

- Avian Monitoring Program – 2013 Bird Survey Form
- Avian Monitoring Program – 2013 Mortality Search Form
- Avian Monitoring Program – 2013 Incidental Observation Form
- Alberta Environment form for reporting "Avian Incidents"

Definitions

Contact	The presence of a bird on a pond. Including birds landed on the pond, diving under the water surface, foraging in the water, mating on the water, and birds on the vegetation on the pond.
Deterrent	Instruments stationed beside or on a tailings pond to deter birds. Includes both audio (e.g. propane cannons, phoenix wailers, speaker systems, long range acoustic devices) and visual deterrents (e.g. human effigies, peregrine effigies, lasers).
Flyover	One or more birds flying over a pond during an observation period. The term may apply to migrating flocks or individuals and can include migratory flights, foraging flights, and predator evasion.
Freshwater pond	Ponds not involved in the waste of the bitumen mining process and used in the standardized monitoring of birds in the area to survey species that may be found on ponds during migration periods.
Incident	Observations of birds where harm or danger to a bird has occurred or had the potential to occur.
Incidental Observation	Any detection of a bird that occurred randomly without following any particular survey methodology.
Landing	A bird coming into contact with the pond, the shore, or the inside of the dyke.

Non-target bird	Birds that scavenge, fly, glean, stoop, and peck for food as their primary means of foraging .
Process-affected water	Water that has come in contact with the processes associated with the extraction of bitumen and plant operations.
Species at Risk	Species listed as threatened, endangered, or of special concern under the Alberta Wildlife Act or the federal Species at Risk Act.
Target bird	Birds that dabble, dive, or wade for food as their primary means of foraging. These birds are targeted by the program because they have a greater likelihood of contacting process-affected water or its residue.

Monitoring Protocols

Setup

1. Designate survey stations and transect routes (April 1 - April 15 and July 1 - July 25)

a) Identify appropriate survey stations according to criteria listed below for each pond. Position stations:

- that offer the best vantage for observation, ideally in an elevated area on a peninsula (Figure 1);
- as close to shore as can be achieved safely that maximize visibility when the sun is close to the horizon (i.e., on north and south ends);
- with as much distance between stations as possible; and
- if possible, so that observations can be conducted from within a vehicle or by using the vehicle as a wind break.

b) Designate the planned routes for mortality searches, but retain the ability to adjust these routes to the areas with the highest likelihood of containing dead birds.

- Small ponds and their shores are to be scanned completely with binoculars and all mortalities reported. If possible, walk the perimeter of the pond.
- For larger ponds, designate routes for belt transects that are 100 m long and 20 or more m wide (depending on visibility context). Conduct the same number of transects as there are survey stations (i.e., 2, 3, or 4 as for stations below).

- Position transects in the areas that are most likely to accumulate mortalities. Typically, these areas will be wherever bitumen accumulates: on the downwind sides of ponds, in bays, near shore-based or floating vegetation, and near outflow pipes.

Pond Size (km^2)	**Number of stations**	**Criteria for station locations**
< 1.5	1	Best location for viewing entire surface area
1.5 - 5	2	Placed on opposite ends of the pond (e.g., north and south ends)
5 – 10	3	Divide the perimeter into thirds and place one station in each ensuring they are at least 2 km apart
> 10	4	Divide the perimeter into quarters and place one station in each ensuring they are at least 2 km apart

b) The following information is to be provided to the U of A for each pond as soon as possible after the start of the spring monitoring season (and by April 15)

- Pond identification
- Station identification
- GPS location of each survey station.

c) Obtain a bar code and flag for each survey station from the U of A.

d) Designate each survey station with a visible, semi-permanent marker that provides the name of the station in text, bar code, and flag.

e) If possible, place visible, shore-based distance markers 500 m from the survey station plus a single floating maker 500 m at the median of the survey span.

f) If the designated survey station is made unavailable by mine activity, choose an alternate site. Be ***sure*** to record the location of this site with a GPS and indicate by email to U of A the need to add it to subsequent location options on the tablet. Operators that know a survey station will become unavailable part way through the season should designate an alternative survey site in advance.

g) Identify planned transect routes at each pond for mortality searches (above) ***and*** record the actual transects with GPS.

h) Visit all process-affected ponds every 3 days until tailings ponds are > 25% thawed or first birds are detected on ponds, whichever occurs first.

i) Once each pond is >25% thawed or birds have been observed, initiate daily bird observations (2013 Bird Observation Form) and mortality searches once every two weeks (2013 Mortality Search Form).

2. Record pond deterrent configuration (April 1 - April 15 and July 1 - July 25)

a) Record the configuration of the deterrents set up at each pond prior to the first round of pond inventories.

b) Provide to the U of A spatial data that depicts the:

- Pond identification;
- Date when deterrent was set up;
- Type of deterrent device;
- Specifications of acoustic and visual deterrent
- GPS location of each deterrent device

c) Record and report to the U of A the configuration of the deterrents set up at each pond prior to the second period of survey inventories, if changes to the configuration have been made.

3. Record pond characteristics (April 1 - April 15 and July 1 - July 25)

a) Measure characteristics of each pond prior to the first round of pond inventories.

b) Provide to the U of A the following information for each pond:

- Purpose of the pond;
- Estimation of the surface area of water associated with the pond;
- Shore-based distance (m) between each survey station; and
- Estimation of the shore area with a slope gentle enough to permit walking by wading birds;
- GPS location of discharges into the pond, separated by type;

- GPS location of booms or other bitumen containment devices; and

c) Measure and report to the U of A the characteristics of each pond prior to the second round of pond inventories, if changes have occurred.

Bird Surveys (2013 Bird Survey Form)

The purpose of bird surveys is to generate a reliable estimate of bird contacts and flyovers on ponds containing processed-affected or fresh water. Reliable estimates can only be generated if there is a strict adherence to these protocols. If it is not possible to concentrate surveys in the morning, it is imperative that their timing be altered so that all ponds are sometimes surveyed in the morning.

1. Conduct bird surveys during spring and fall migration periods (April 16 – July 6 and July 25-October 31)

a) Visit each survey station in accordance with inventory frequency and timing requirements:

- Visit each survey station at process-affected ponds daily.
- Visit each survey station at freshwater ponds twice weekly.
- Aim to begin daily monitoring within approximately one hour of sunrise (see table below). Observers should anticipate and overcome predictable delays in start time owing to access permissions, organizational meetings, etc. If possible, observations on process-affected ponds should occur in the morning.

Inventory Period	Recommended Start Time
April/May	06:00
June – Early July	05:00
Late July – September	06:00
October	07:00

- Alter the order of pond and survey stations daily. This must occur to avoid systematic biases between location and start time.
- Driving efficiency could be supported by using similar routes, but reversing their order as long as some ponds are not restricted to mid-morning sampling.

- Conduct observation sessions at each survey station for 10 minutes at ponds smaller than 1.5 km^2; 30 minutes for all others

2. Observe the pond during arrival to the site and record incidental detections

a) Count the birds that flush as you arrive and before you get out of the truck. Record these ***only*** as incidental observations in Form 3.

b) Birds can be recorded in the designated observation session if they subsequently land or fly over the survey area during the session

c) Bird observers should not be responsible for hazing birds and hazing should not occur while a monitoring session is in progress ***unless*** a species at risk appears to be in imminent danger.

3. Park at survey station and prepare equipment

a) Set up the spotting scope on a tripod or window mount at the designated survey station.

b) Turn off motor if observing from the truck. Note that a compass will not work from within or very close to a metal truck.

c) Ensure each piece of equipment is ready for use (binoculars, range finder, compass, tablet, notebook, bird guide).

4. Initiate a data session by completing the station characteristics[4]

a) Scan the bar code to register pond name and survey station ID.

b) Record the date and observers via drop down menus.

c) Record weather variables via drop down menus.

d) Record visibility and bitumen coverage via drop down menus.

5. Initiate bird observations by indicating a start time

[4] In 2012, there were separate forms for site characteristics and bird observations. Later these forms were combined by concatenation of "Pond name"+"Date"+"Time of day". In 2013, we will use a single form by making redundant use of site characteristics to reduce problems involved in joining data types.

a) Set timer for the intended duration (10 or 30 minutes).

b) Stop observing when the timer ends and indicate an end time then.

6. Conduct a surface and shoreline scan

a) Scan the water surface, adjacent shorelines, and air above the survey station systematically with imaginary transects that travel up and down or side to side.

b) Complete a "bird observation" for each bird or bird group detected. A bird group is a group of birds of the same species that appear to be traveling together.

c) Identify birds with as much detail as possible by classifying the bird via the following critera (Table 2) using the drop-down menus on the tablet.

    a. Target (target, non-target, don't know)

    b. Foraging mode (dives, dabbles, wades, flies, scavenges, gleans, stoops, pecks)

    c. Foraging mode subgroup (e.g. large wader *vs*. shorebird both fall under wades)

    d. Species (e.g. lesser scaup or unknown scaup)

d) For each identified bird or bird group, record its position with a distance and direction.

    a. Indicate whether the bird is flying or landed. A bird is only entered as flying if it never lands.

    b. If the bird is landed, use a range finder on a target of a similar distance to estimate distance (in meters).

    c. Use a compass (with a declination set to $+14^{o}$ or 14^{o} East) to describe its direction from the survey station.

    d. Record birds in the air only if they are within 100 m elevation and within the survey area.

    e. Survey area includes the water, shore that could be reached at any time of the year by changing water levels and air below 100 m within a 500 m radius of the survey station. Do not record birds that are farther than 500 m or above 100 m as part of the observation session; they may be recorded as incidentals (below).

        i. Record each bird or bird group as a new entry in the datasheet.

        ii. It is imperative that observers also document monitoring activity on days when no birds are recorded (i.e. "zero" data).

7. Close the observation session when the designated amount of time has elapsed

8. **Submit data to the U of A at least monthly, preferably daily, and *only* on designated forms via tablets or the internet.**

Pond inventories should be completed on tablets, which upload data via the 3G network immediately. In case of tablet or network failure, data can be entered on paper and then input into comparable web-based data forms. This should occur on the same day as data collection and no more than one week after collection to maximize accuracy of entry.

Staffing Requirements

Surveys may be conducted in teams of one, two, or more individuals. Bird observers must not be required to simultaneously deter birds from process-ponds.

Duties while conducting Step 6 above may be divided as follows depending on the number of observers available as long as the number of minutes spent watching for birds is standardized at either 10 or 30 minutes

One Observer:

- Observer records their observations by voice and transcribes observations afterwards onto tablets. If there is a single observer who is also recording data, there ***must*** be a system to ensure standardization of observation time at either 10 or 30 minutes such as using a stop watch and stopping the observation clock whenever the observer looks down to record data, starting again when observations resume.

Two Observers:

- First observer scans the water, the shore and the air with binoculars and uses the spotting scope to identify difficult or distant birds
- Second observer records the data as dictated by the first observer and assists with identification and location details to ensure observation time is not lost

Three Observers:

- First observer scans with binoculars
- Second observer uses a scope and provides identification and location details for the first observer's observations
- Third observer records the data dictated by the first two observers

Mortality Searches (2013 Mortality Search Form)

The purpose of mortality searches is to generate a minimum estimate of known mortalities associated with designated areas for each pond. These estimates will be extrapolated to estimate annual mortality in areas that are not searched. Standardized information about mortalities will identify the species most at risk of mortality and support adjustments to deterrent systems within and among ponds.

1. **Conduct mortality searches during spring and fall migration periods (April 16 – July 6 and July 25-October 31)**

    a) Visit each designated mortality transect at each process-affected pond once every two weeks.

    b) Where applicable, mortality searches can be conducted in the afternoon to support morning attention to pond inventories.

2. **Within each pond, follow designated survey routes as closely as is practical**

    a) Search both pond surfaces and shorelines for bird mortalities.

    b) When a dead bird is detected, record the distance between the observer and bird. This will make it possible to determine effective transect widths later.

3. **Indicate precise start and stop times for searches and separately for different modes of transportation (e.g., by foot, by truck, by boat).**

    On small ponds, surveys of both water surface and shore areas should be possible from shore; large ponds will require boats.

4. **Indicate the route traveled with a hand-held GPS or by map description**

5. **Describe the birds found on the mortality data sheet.**

    a) Label bird with the information below. Designate a bird expert on each crew that invests in learning to identify birds, even when they are heavily oiled. Oiled bird guides could be used to aid in identification and have been ordered by U of A.

    b) Classify the bird via these criteria in the following order (Table 2)

        a. Target (target, non-target)

        b. Foraging mode (dives, dabbles, wades, other)

        c. Foraging mode subgroup

        d. Species, if possible

    c) Indicate the location where the dead bird was collected.

a. Surface: pond or shore

b. Potential attractants: vegetation, anthropogenic light

c. Any other relevant information

d) Indicate the amount of oiling on the bird using the categories provided on the data form.

6. **Collect bird remains in accordance with provincial requirements and safety standards.**

a) Label bird with the date, time, location, and as much identifying information as possible.

b) Provide a unique ID (DD-MMM-YYYY-001) for the bagged bird and indicate this number on the data sheet.

c) Store bagged birds in the freezer until they are inspected by AESRD.

7. **Enter data on the web-based form within 1 month of data collection; immediately for a designated species at risk.**

8. **It is imperative that searchers also document mortality searches on days when no birds are recorded (i.e. "zero" data).**

Incidental Observations (2013 Incidental Observation Form)

The purpose of incidental observations is to provide a record of opportunistic observations of birds made at or near process-affected or freshwater ponds. These records will supplement those collected during the pond inventories and mortality searches, but they will not be used to quantify bird use of lease sites. Some discretion is needed to know which incidental observations should be recorded and which can be safely ignored.

In general, observers should use incidental observations to record (a) any 'new' species that have not been detected previously in standardized bird surveys, (b) every sighting of a species at risk that occurs outside an observation system, (c) species that are abundant on site, but appear under-represented at surveys and (d) any unusual behaviours or sightings that attract observer interest. Keen observation of rare sightings has much potential to advance bird protection in the oil sands region.

Incidental observations may be collected via tablets with automated data upload, or on paper. Paper-based records will ideally be transferred to web-based forms on the day of their collection or within one week to preserve details that are reliant on memory.

1. **No standardized search protocol is required** and operators may record data in the field using either a paper form or the tablet-based form provided by U of A. Observers should carry a paper form for recording incidentals when the tablet is already in use for a bird survey.

2. **For each observation, record the date, time, location and species details** (species, number). If the tablet form is used, multiple options for recording location will be available.

3. **Complete additional forms if they are required.** Birds that contact process-affected water are to be documented as incidents using the standardized reporting form provided by AESRD for wildlife sightings and incidences for submission in the annual conservation and reclamation report.

4. **All incidental detections of dead birds should be documented and collected** as per mortality protocols.

Species At Risk

Both provincial and federal regulations require operators to report contact by species at risk with the surface or margins of ponds containing process-affected waters. Margins are shore areas that could come in contact with process-affected water via wind or wave action or changing water levels. By definition, species at risk are rarely seen and special training effort is required to ensure they are identified accurately when they are encountered. The protocols above are not designed explicitly to detect rare species. This section refines information on the risk status of species that might occur in the oil sands region (Table 2) and identifies the species that require extra attention (Table 3)

Observers should be able to identify all 45 of the species at risk with a designation of sensitive and above in Alberta (Table 3), particularly those in the target foraging guilds of dabbling, diving and wading. The term 'sensitive' is used by the Government of Alberta to describe species that might have vulnerable populations in Alberta as listed under the General Status of Alberta Wild Species, which is reviewed each 5 years (Government of Alberta 2010). Extra care should be taken to detect and accurately identify the 34 species listed as sensitive (Table 3) and these species should always be recorded as incidentals whenever they are detected on mine sites. They are also to be recorded as part of routine bird surveys and mortality searches, but no further action needs to be taken if they are detected as part of these processes.

Additional reporting requirements apply to the 11 species that have been reviewed and designated for a listing status by either federal (Committee on the Status of Endangered Wildlife in Canada) or provincial (Endangered Species Conservation Committee) evaluation (Table 3). If a species with these legal designations is detected landing on a process-affected pond or as a dead bird anywhere on a mine site, it must be reported immediately to AESRD and recorded as an incidental report. Of these 11 species, only 4 exhibit the target foraging guilds of dabbling, diving, or wading (trumpeter swan, whooping crane, yellow rail, red knot). Of these four, only the whooping crane is federally endangered. If this species is detected, it must be reported to AESRD immediately if it is detected anywhere on a lease site. Sightings of any of these four species are unlikely, but possible.

In summary, species at risk should be recorded as part of the Monitoring Program as follows:

1. **No standardized search protocol is required** and operators may record data in the field using either a paper form or the tablet-based form provided by U of A. Observers should carry a paper form for recording incidentals when the tablet is already in use for a pond inventory.

2. **Determine if immediate reporting to regulators is necessary (Table 3).**

3. **Record sighting in appropriate form.** Sensitive species detected during regular observations sessions are recorded in the Bird Survey Form; a species with any risk designation should be recorded as an Incidental Observation whenever it is seen or heard on lease sites. Additional reporting requirements apply to federally or provincially-listed species.

4. **Collect and document any incidental dead birds as per mortality protocols**. Mortalities can be recorded via tablets with automated data upload, or on paper. Paper-based records must be transferred to web-based forms, ideally on the day of their collection, but at least within one month.

Procedural Standards

Important procedural standards apply to every aspect of the Bird Monitoring Program and data collected for it will be limited as much by adherence to these standards as by completion of protocols. In addition to the details provided in the introduction and protocol, the following standards will support the program. It is imperative that those conducting observations and especially those designating observation sites and search routes read, understand, and implement these standards.

Staffing and Training

Crews responsible for conducting bird surveys and bird deterrence should be distinct. This will limit the disruption to monitoring and increase its standardization. It will also increase the efficiency of deterrent and hazing activity.

Observers conducting bird surveys (Bird Survey Form) require training in bird identification, the monitoring protocol, and proper completion of data forms. To improve the standardization of data collection, U of A has developed a training seminar that it will offer in early April, 2013. This session will connect participants via conference call and support them with a presentation that will be shared in advance. It will be complemented by visits by U of A observers to each operator at least twice in each of the spring and fall migration periods. Training will address bird identification, monitoring protocols, and data recording via paper and tablet-based platforms. Questions about the protocol and associated methodology can be directed to the U of A by anyone involved in the monitoring program at any time.

Observers will be trained to identify landed birds to foraging guild (e.g., waders, dabblers, divers), to know the characteristics for species identification for some of the most common birds as well as the designated species at risk (Table 3), and to enter data completely and accurately on data forms. Training will also include setting-up, using, storing, and protecting optical equipment including binoculars, spotting scopes, range finders, and compasses.

Observation protocols have been adjusted to focus on target birds (i.e. more likely to come in contact with process-affected water) and designate them using an ecological, rather than taxonomic, description in the form of primary foraging mode. Training will reinforce this hierarchical method of identifying birds via webinars, on-site training, and on-going practice by observers. Additional identification and reporting requirements apply to birds designated with a risk status.

Training will cover bird observation protocols with particular focus on overcoming challenges of observations beside process-affected ponds. Observers will be taught the techniques for searching via systematic scans with binoculars and scopes trained on the air above survey stations, the surface of ponds, and the shore adjacent to ponds. Observers need to know how to determine or estimate flock size, flight direction, and altitudes above vs. below 100 m. Although some simulation of field settings is possible in the classroom and via the web, field-based training and practice will be essential to mastering all three protocols.

Data entry and management

Refinements in the forms on hand-held data recording devices will streamline training in data entry in 2013. The U of A team welcomes suggestions for adjustments to tablet forms from users at any time, but will make adjustments to templates only after discussion with multiple operators and government.

Tablets have proven to be reliable and efficient aids for the collection of data for the Oil Sands Bird Monitoring Program. However, there is always the possibility that they will fail to operate. To ensure comparable data collection can occur, observers must ***always*** carry a clipboard or binder with paper versions of all data sheets. GPS and time stamps that are provided automatically by the tablets will need to be provided manually and a smart phone or hand-held GPS should be carried for this purpose. Later, these data sheets can be entered on the web with forms comparable to the tablets forms. This should be done on the same day as data were collected and never more than a week later to retain memory-based support. Data should be entered by an individual who participated in data collection. To protect data consistency, U of A will only accept data entered via tablet or web-based forms. Because of past problems, it will not be possible to submit data as independent spreadsheets or to append data directly to the master database.

Between 2011 and 2013, data from the Oil Sands Bird Monitoring Program have been or are being provided by industry to the University of Alberta as a requirement of government-mandated participation in the Oil Sands Bird Monitoring Program. Those data are housed, along

with several other resources associated with bird protection in the oil sands region, on servers that are backed up automatically and daily. After review by government and operators, summaries of these data are contained in annual reports of the Oil Sands Bird Monitoring Program that are made available to the public in accordance with the requirements of the court order that supports the *Research on Avian Protection Project (RAPP).* Public access to this information will continue beyond the duration of the RAPP project via links via the home page of the principal investigator, Colleen Cassady St. Clair and, potentially, other sources.

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Tables and Figures

Table 1. Summary of procedural standards

Summary of procedural standards for each of two protocols, pond inventories and mortality searches. Standards apply to the scheduling and spatial placement of surveys, the recording of pond characteristics, and to the staffing, training and equipment provided for observers.

Procedural standards	**Pond Inventories**	**Mortality Searches**
Schedule of activities	• Spring (16 April – 6 July) and Fall (25 July – 31 October) • Daily at process-affected ponds • Twice weekly at freshwater ponds • Beginning at 5:00 – 7:00 AM according to sunrise with alternating order of visits	• Spring and fall migration • Once every two weeks
Designation of survey stations and transects	• Up to four stations per pond • Equally spaced around perimeter • Survey area has a maximum radius of 500 m and a maximum elevation of 100 m	• Standardized transects via foot, truck or boat that are both planned (via GIS) and recorded (via GPS) • Between 1 and 4 transects (depending on pond size) that are 100 m long and with a width that will be determined by site-specific visibility
Site identification	• Designate sites with semi-permanent markers containing bar codes	• Provide markers to standardize survey routes
Pond characteristics	• Record pond characteristics at the beginning of each spring (April) and Fall (October)	• Designate transect-based searches where mortalities are most likely and record the actual routes covered.
Staffing and Training	• Ideally two observers (one to record and one to observe) in designated	• At least two observers for safety

	observation sessions • Each operator designates an expert to ensure adequate training and communication of protocols • U of A provides a standardized webinar for training and scheduled visits to foster standardization	• Requires appropriate training and certification for boat use (i.e., often hazing, not observation, crews) • Training in distance estimation and bird detection
Equipment	• Use of quality binoculars (10 x 50) and spotting scopes (70 times magnification) • Use of laser range finders and declination-capable compass for positions • Use of electronic devices for data entry on standardized forms	• Use of quality binoculars (10 x 50) • Tools for bird recovery and identification? • 2013 Adoption of web-based entry of mortality searches following paper-based recording in field

Table 2. Species attributes

Attributes of species detected in the Oil Sands Bird Monitoring Program in 2012. Bird type identifies target birds as those with foraging modes of dabbling, diving, or wading because they are more likely to come in contact with process-affected water. Within groups, birds are ordered taxonomically with the number assigned by the American Ornithologists' Union. Common names are given for families and species and risk status refers to provincial and federal standards.

Table 3. Species at risk

Summary of listings for species at risk as designated by the *Committee on the Status of Endangered Wildlife in Canada* (Federal Legal Status), the *Endangered Species Conservation Committee* (Provincial Legal Status) and the Government of Alberta's *General Status of Alberta Wild Species* (2010) with associated reporting requirements for Alberta Environment and Sustainable Resource Development (AESRD).

Figure 1. Positioning of survey stations

Example of optimal positioning of survey stations at Suncor's pond 2/3. Pond surface area is approximately 2.7 km^2 and circles illustrate a 500 m radius from each survey station, which is depicted with a green dot. Approximate pond area is given by the purple line and shows how pond surface area changes over time.

Appendices

Appendix 1 – Forms

Forms are available for download on tablets and updates will be provided as soon as they are available

Appendix 2 – Training seminar

Several powerpoint presentations were provided by email 5 April 2013 in four pdf documents