bioacoustic unit

Risk to Yellow Rails from oilsands mining

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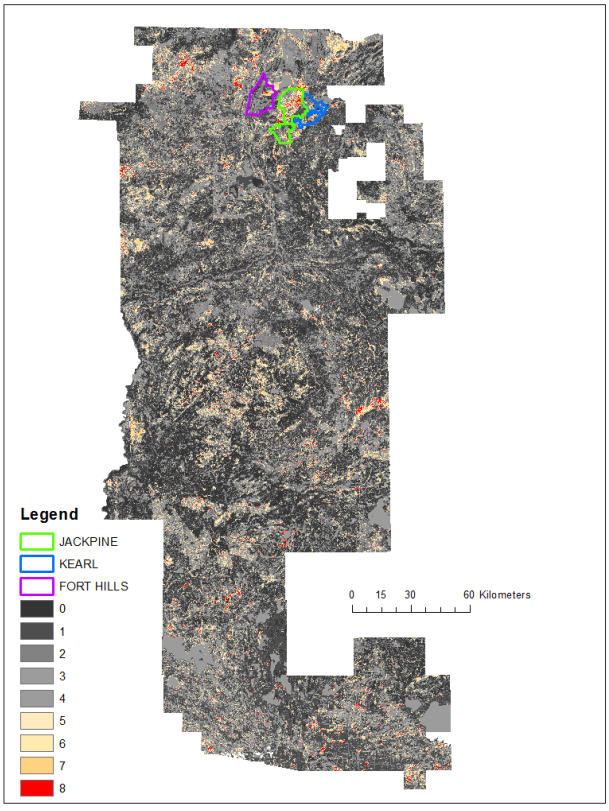
Objective:

Assess potential impacts of oilsands mining on habitat availability for the Yellow Rail, a federally listed species of concern.

Introduction: The Yellow Rail (YERA) is a small marsh bird found in grassy wetlands in the boreal forest. Despite a growing understanding of the vegetation & water conditions used by YERA, there have been no previous attempts to map their habitat selection. Current remote sensing products for the oilsands region vary in their categorization of the water & vegetation conditions where YERA exist. This has made estimation of risk from oilsands mining and other forms of human & natural disturbance difficult in the past.



Methods : We created a novel fusion approach to integrate information from four land-cover products to make an improved map that predicts the relative importance of different habitat conditions for YERA. Each area was assigned a score between 0 to 8.

An importance score of 8 indicates all land-cover products agree YERA select that habitat. A value of 0 indicates all land-cover products agree YERA avoid that habitat. Values from 1 to 7 indicate the land-cover products do not all agree whether YERA select, avoid, or are neutral to a particular habitat. Scores 5 to 8 include 85% of known YERA locations in the oilsands region. Current & proposed mine development plans were overlaid with the YERA habitat importance map to assess risk of habitat loss.

Results: The area in hectares for each YERA importance score are on page 2. Numbers in brackets are the predicted # of locations (~21 ha area sampled by an autonomous recording unit - ARU) where YERA might occur based on habitat conditions. Where we know the YERA to occur is labelled **Known Risk**.

Results (cont.):
12,700 hectares of category 5 to 8 habitat has been or could be lost to the oilsands mines shown in the map on page 1. This represents ~2.53% of available habitat in the mapped portion of the Lower Athabasca planning region.

An absolute population estimate is not possible with this model as we used presence data to build the habitat model & presence/absence data to compute modelled risk. YERA are estimated to occur at 4,416 locations in total & 3,360 locations in importance scores 5 to 8. Of the 203 locations where YERA are known to occur, 70 are within current or proposed footprint of the 3 mines shown in the map on page 1.

YERA Score	Fort Hills	Kearl	Jackpine Expansion	Regional Habitat Availability
0	2,476 (0)	1,499 (0)	900 (0)	758,689 (0)
1	3,335 (0)	2,556 (0)	3,344 (0)	1,289,994 (68)
2	5,391 (2)	2,425 (1)	3,715 (2)	893,530 (364)
3	3,764 (2)	2,409 (1)	4,355 (2)	768,965 (418)
4	1,195 (0)	1,225 (0)	3,019 (1)	610,017 (206)
5	447 (2)	679 (3)	2,498 (11)	228,682 (970)
6	551 (4)	731 (5)	2,710 (19)	169,619 (1176)
7	387 (3)	499 (4)	2,331 (21)	66,669 (595)
8	188 (3)	198 (3)	1,482 (24)	37,741 (619)
Modelled Risk	17,733 (17)	12,221 (18)	24,354 (80)	4,823,905 (4,416)
Known Risk	22	13	35	203

Take-home messages:

- The YERA is not as rare as thought. They have been observed in 18 large wetland complexes outside the mineable area & are predicted to occur in other locations.
- The mineable area contains a large amount of YERA habitat, both within & adjacent to proposed mine developments. Continued monitoring of YERA is needed to ensure compliance with EPEA[1] conditions in vegetated areas adjacent to mine boundaries.
- The fusion model identifies new locations where the species could occur. More locations should be surveyed to gain greater confidence in population estimates. Many locations are small patches of habitat that were not identifiable by previous mapping approaches & may not be suitable. Determining minimum patch sizes used by YERA is a monitoring priority.
- Large wetland complexes exist in remote locations within the modelled study area & outside. Areas not included in the habitat importance map that are likely to have YERA include the Peace-Athabasca Delta near Wood Buffalo National Park & Cold Lake Air Weapons range. Access constraints for monitoring & lack of land-cover products prevent the maps from being extrapolated to these potentially important areas.
- The risk to YERA in northeastern Alberta from oilsands mines varies based on whether known or modelled risk are used to assess impact (2.5% of modelled vs. 34.5% of observed YERA). Explicit statements from regulators about the area of concern are required to determine if this degree of loss exceeds desired thresholds. Proposed mine development is unlikely to remove 34.5% of the actual YERA in the study area. Only 1.7% of the total study area & 3.6% of YERA importance scores 5 to 8 have been surveyed by ARUs.
- As part of the monitoring program, information on local vegetation conditions & water levels have been tracked to provide information that will be used by industry to aid in reclamation planning for the YERA at the end of the mining cycle.

Acknowledgments: The YERA is monitored in Alberta's mineable oilsands region by a collaboration between the Bioacoustic Unit, Suncor – Fort Hills, Imperial - Kearl, Canadian Natural Resources, and the regional Oilsands Monitoring program. This work is part of conditions put in place by the Alberta Environmental Protection and Enhancement Act (EPEA) [1]. See //bioacoustic.abmi.ca/ for more details. Photo Credits: https://commons.wikimedia.org/wiki/File:Yellow_Rail & Bioacoustic Unit.