

**Comments on the Sahtu Land Use Plan – Draft 2  
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**Ducks Unlimited Canada**  
Conserving Canada's Wetlands

## USING INFORMATION ABOUT DUCKS AS A MEANS TO GUIDE SUSTAINABLE LAND USE

### *1 Ducks as indicator species*

Ducks represent a significant component of avian diversity in this region and elsewhere in the north. Ducks may also be unique “indicators” of local environmental quality, because they rely exclusively on wetlands to obtain food required for survival and reproduction (egg production, duckling growth and survival), but females typically nest in upland habitats. Thus, both wetland and upland habitat conditions contribute to successful reproduction, survival and hence local population trends. However, the aquatic environment is particularly critical because birds cannot breed or produce young if they are unable to sequester adequate aquatic food resources.

### *2 Effects of habitat changes on ducks*

Some types of industrial activity may reduce the abundance and quality of wetlands, either directly, by changing the physical characteristics of wetland themselves, or indirectly, by altering upland habitats in such a way that the flow of water or nutrients into downstream wetlands is reduced. These changes may reduce the amount of aquatic food resources available, leading to fewer ducks utilizing the area at all, fewer ducks attempting to breed, and fewer female ducks and ducklings surviving. DUC suggests that the largest threats to wetland abundance and quality are:

- a) Damming and direct wetland alteration or loss from roads and other infrastructure,
- b) Sedimentation from roads and other infrastructure,
- c) Altered water and nutrient yield from forest fragmentation, and
- d) Upland and wetland basin thawing induced by road and infrastructure development or forest fragmentation, plus possible interaction with climate change.

In general, DUC believes that maintaining hydrological connectivity on the landscape will maintain wetland health.

### *3 Predicted duck density in the Sahtu Settlement Area*

DUC has produced a map of predicted breeding duck densities for the Taiga and Boreal Plains ecozones (Figure 1). Duck data were collected by the United States Fish and Wildlife Service (USFWS 2006), and were modeled relative to land cover classes and abundance of water across the ecozone at one km<sup>2</sup> resolution. This map can be thought of similarly to the mineral or hydrocarbon potential maps as it shows general patterns of information on a large scale.

Analyses indicate that breeding ducks in these ecozones are regionally aggregated, which means that a relatively small amount of habitat supports a disproportionately high number of breeding ducks. Figure 2 illustrates this by identifying in red, areas that together, make up only 25% of the landscape, but contain 60% of the breeding duck population (Slattery, unpublished data).

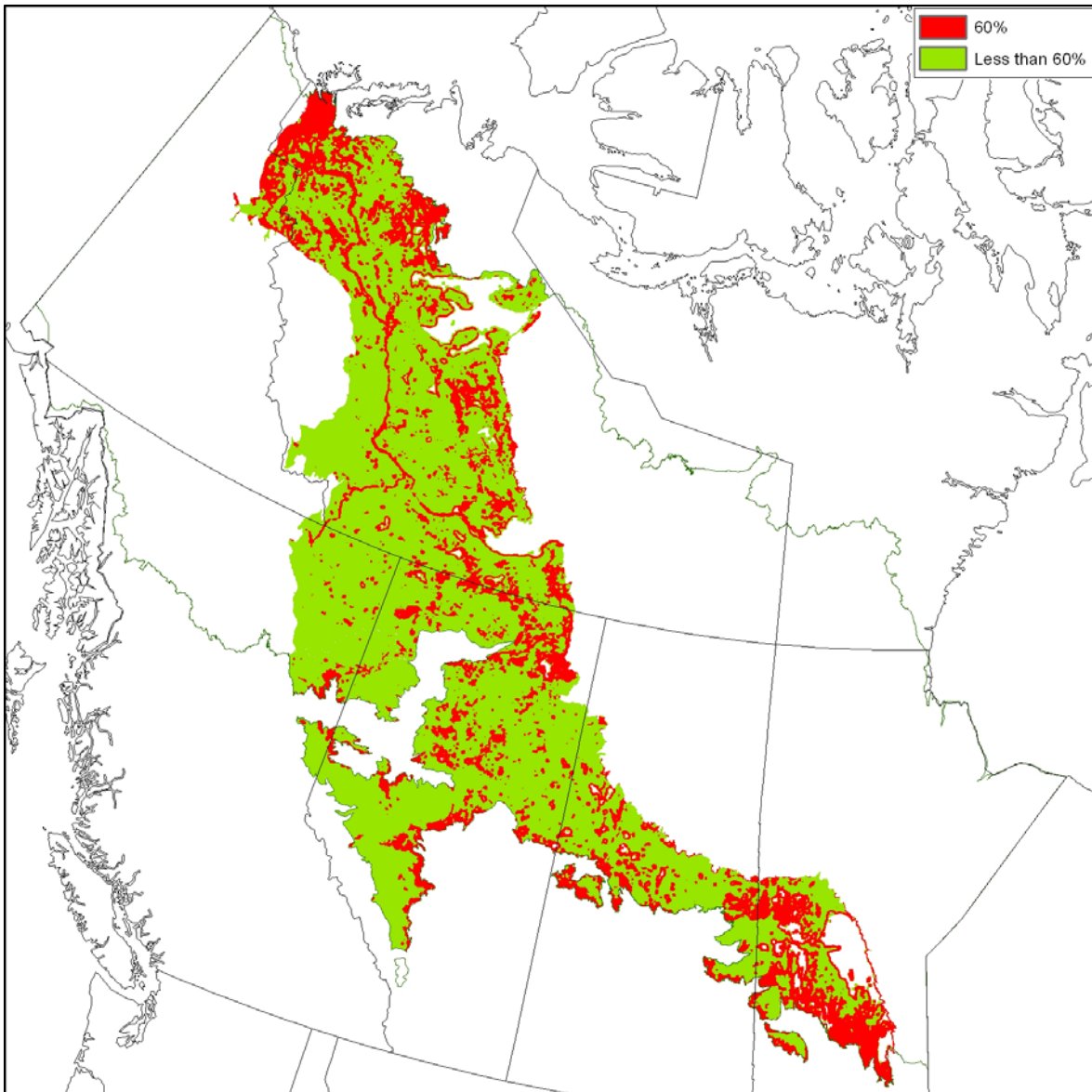


Figure 1. Predicted duck breeding pair densities for the Taiga and Boreal Plains. 60% of the total breeding waterfowl population in the Taiga and Boreal Plains are contained within the red areas. Duck density in these areas ranges from 10.9 ducks per square mile to 250.9 pairs per square mile.

***4 Including important duck areas in conservation zones and proposed conservation initiatives***

Areas supporting higher densities of breeding waterfowl likely represent important habitat and DUC believes that efforts should be made to ensure they are not adversely affected by industrial development. For this reason we are pleased that the following higher density waterfowl areas have been included as proposed conservation initiatives or conservation zones:

- Ts'ude niline Tu'eyeta
- Willow Lake
- Kelly Lake and Lennie Lake
- Lac Belot
- Anderson River
- Maunoir Dome
- Lac de Bois
- Doctor Lake
- Mahoney Lake
- Oscar Lake
- Stewart and Tate Lake
- Whitefish River
- Johnny Hoe Fishery
- 3-Day Lake

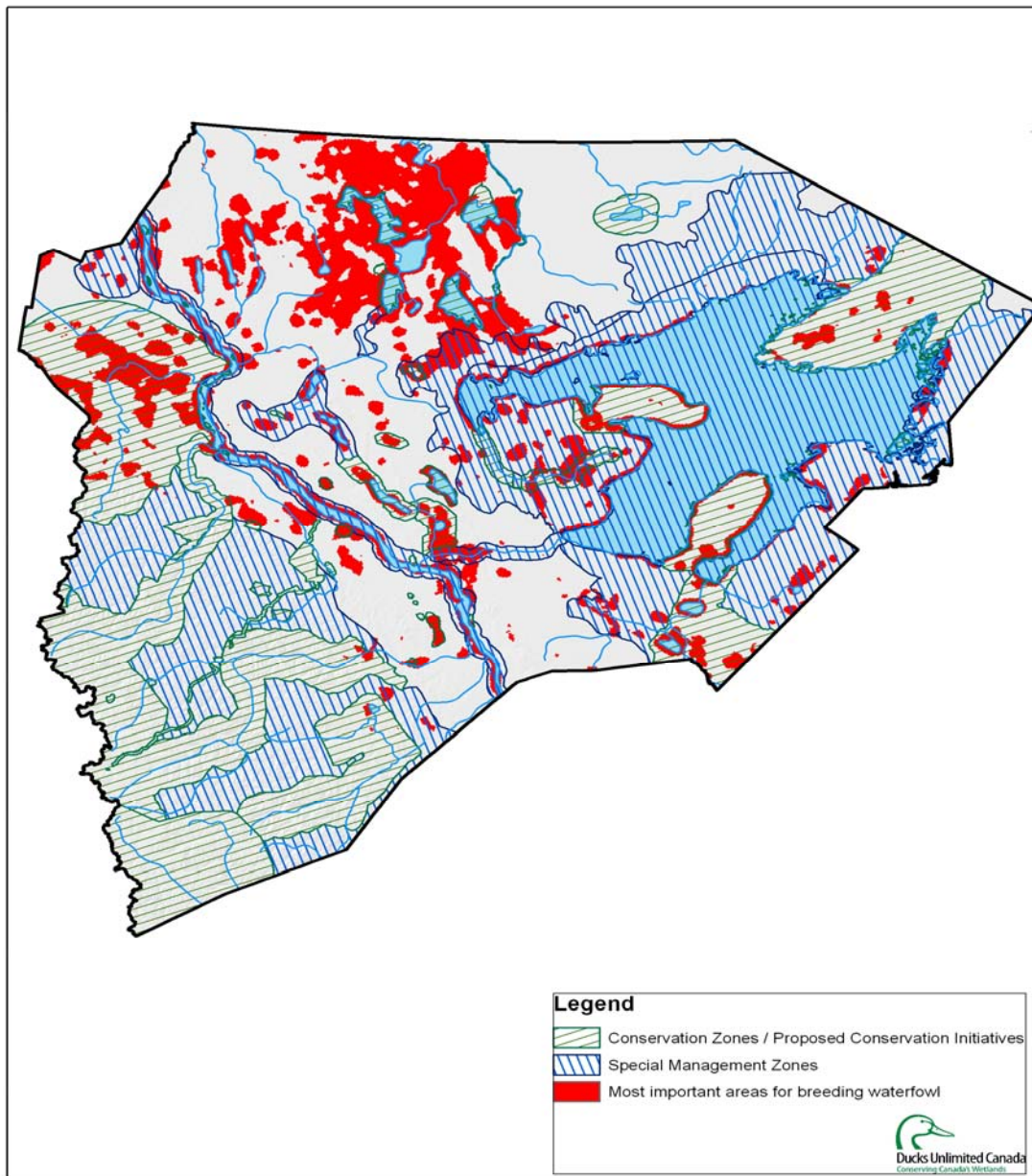


Figure 2. Important breeding duck habitat in relation to proposed conservation initiatives, conservation zones and special management zones as identified in Draft 2 of the Sahtu Land Use Plan.

However, it is clear that a significant number of ducks rely on habitat in the Colville Hills to breed. Our data indicate that the most important duck areas in the Colville Hills (Figure 2) represent approximately 1.1% of the entire landscape in the Taiga and Boreal Plains, and support approximately 3.7% of the total number of breeding pairs in these ecozones. DUC recommends that the SLUPB consider increasing the size of the currently identified conservation zones in this area to safeguard a larger portion of the Sahtu Settlement Area's breeding duck population. A sufficiently large conservation zone in this area could be used as a benchmark and could be monitored to compare the impacts of industrial activity on the surrounding landscape.

### ***5 The need to manage habitat outside of conservation zones***

If the vast majority of the breeding duck population present in the Sahtu Settlement Area relies on habitat outside of conservation zones and (Figure 2), DUC advises that impacts of any development on wetlands and the subsequent impacts on duck populations be carefully monitored. Many studies looking at effects of land use practices in the boreal forest indicate there is a need to establish and enforce meaningful conditions and/or thresholds where development does occur to ensure animal populations are not adversely affected. DUC has been pleased to support the SLUPB in their efforts to learn about applying targets as we believe this may be the most effective way to limit impacts of development on the landscape. We will provide comments specifically on the most recent ALCES report separately. Additionally, DUC hopes to acquire a better understanding of the specific nature of waterfowl – habitat relationships and the impacts of industrial development on waterfowl populations as described in Section 2 over the next two to three years. As we do, we will share this information with the SLUPB and recommend that it be considered as a basis for targets in the future.

### ***6 The need for adaptive management***

DUC believes that the Plan should be flexible enough to add more detailed and appropriate conditions where development does occur in the future, so that as more information becomes available, it can be applied immediately. The science community does not have a thorough understanding of the effects of habitat disturbance at different spatial scales (local, landscape, and regional) or on the interactions of these effects. Even the baseline ecological information available about bird-habitat relationships in the boreal forest, particularly with respect to wetlands and wetland boundaries, is very limited (Whitaker and Montevocchi 1997, Schieck and Song 2006, but see Kirk et al. 1996), especially in the Northwest Territories.

All management plans face changes in technology, knowledge, social perception, economic opportunity, and ecological conditions (Lovell et al. 2002). According to University of Alberta's Natural Sciences Engineering and Research Council (NSERC) Chair of Integrated Landscape Management, the success of any management plan requires an adaptive management framework to address these uncertainties over time. Three main components are essential to any adaptive management framework: flexibility

to make changes over time, monitoring, and research to acquire new knowledge (Gaines et al. 1999). Traditional ecological knowledge (Berkes et al. 2000) combined with western science can also contribute to monitoring strategies and thus to an adaptive management approach for the Plan.

## **7 Recommendations**

- Maintain the conservation zones and proposed conservation initiatives encompassing important waterfowl habitat.
- Increasing the size of the currently identified conservation zones or include a new conservation zone in Colville Hills region to safeguard a larger portion of the Sahtu Settlement Area's breeding duck population.
- Establish and enforce meaningful conditions and/or targets where development does occur, especially around wetlands, to ensure bird and other wildlife populations are not negatively affected.
- Include a recommendation that research be planned and implemented to inform the development of appropriate Special Management Zone conditions and best practices where development does occur.
- Include a provision in the Plan for an adaptive management framework that includes the flexibility to make changes over time, monitoring, and research to acquire new knowledge.

## **8 Literature Cited**

Berkes, F., Colding, J., and Folke, C. 2000. Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* 10: 1251-1262.

Gaines, William L., Harrod, Richy J., and Lehmkuhl, John F. 1999. Monitoring biodiversity: quantification and interpretation. Gen. Tech. Rep. PNW-GTR-443. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 27 p.

Kirk, D.A., Diamond, A.W., Hobson, K.A., and Smith, A.R. 1996. Breeding bird communities of the western and northern Canadian boreal forest: relationship to forest type. *Canadian Journal of Zoology* 74: 1749-1770.

Lovell, C., Mandondo, A., Mandondo, A., and Moriarty, P. 2002. The question of scale in integrated natural resource management. *Conservation Ecology* 5: Article 25.

Schieck, J. and Song, S.J. 2006. Changes in bird communities throughout succession following fire and harvest in boreal forests of western North America: literature review and meta-analyses. *Canadian Journal of Forest Research* 36: 1299-1318.

Whitaker, D.M. and Montevecchi, W.A. 1997. Breeding bird assemblages associated with riparian, interior forest, and nonriparian edge habitats in a Balsam fir ecosystem. *Canadian Journal of Forest Research* 27: 1159-1167.