Deciphering the quacks: Exploring the differences in avian community composition in restored and natural wetlands

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Objective
To evaluate waterbird community composition in restored Parkland marshes through comparison with communities in natural wetlands spanning a gradient in agricultural disturbance.

Study Area
Parkland Natural Region, Alberta (Fig. 1)
- Northern extent of the Prairie Pothole Region
- Critical bird breeding habitat
- Highly productive marshes
- Variable permanence classes
- Agriculture is the main land use and is responsible for widespread wetland drainage

Site Selection
60 wetlands surveyed: 36 natural, 24 restored (>2 yr old)
Sampled between 2014 and 2015
- Natural Wetlands – Disturbance group based on landscape composition within a 500 m radius buffer
  - Low – 0 - 25 % non-natural land cover
  - Medium – 25 - 75 % non-natural land cover
  - High – 75 - 100 % non-natural land cover
- Restored Wetlands - on Ducks Unlimited properties
- Restoration completed from 2004 - 2013
- All sites restored by constructed ditch plugs

Field and Statistical Methods
- Wetlands visited twice during breeding season
  - 10 min visual survey from a point with view of entire wetland
  - 8 min, 100 m fixed-radius auditory survey from the wetland centre
- Abundance and richness in natural and restored wetlands compared by ANOVA1 (Fig. 2)
- Community composition
  - Compared by multi-response permutation procedure2 (MRPP)
  - Visualized with non-metric multidimensional scaling2 (NMS; Fig. 3)

Bird Abundance and Richness
- No significant differences in bird abundance (Fig. 2A) or species richness (Fig. 2B) were detected among natural wetlands of varying disturbance level and restored sites

Bird Community Composition
- Bird community composition differed significantly between the restored group and each of the three wetland disturbance groups (MRPP: A = 0.040, p<0.001)

Conclusions
- Restored wetlands supported the same species richness and total abundance of waterbirds as natural wetlands
- Restored sites do not support the same waterbird community as natural wetlands, even natural wetlands disturbed by agriculture
- Restored sites support more waterfowl and fewer passerines
- Low-disturbance natural wetlands:
  - Are shallower with more variable hydroperiods
  - Include more woody vegetation and less open water
  - Have less agriculture in the surrounding area

To replace the habitats lost by wetland drainage in agricultural landscapes, restoration should target less permanent marsh types with more woody vegetation. This should help attract appropriate waterbird communities.

References
[Provide references here]