

Lake States Fire Science Consortium

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MARSHBIRDS AND FIRE IN THE NORTHERN LAKE STATES

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In the northern Lake States emergent wetlands have been found to succeed to shrub-dominated wetlands over time in the absence of fire. Mechanical shearing or prescribed fires are sometimes used to remove shrub cover and create a more open condition. Populations of rare and secretive marshbird species that depend on emergent wetlands, such as the Yellow Rail (*Corturnicops noveboracensis*), have been in long-term declines. Encroachment of shrubs in wetland ecosystems is cited as one possible reason for these declines, and this encroachment is often due to a lack of periodic disturbance resulting in an associated decrease in open grass and sedge meadows. The two studies presented here look at the responses of different bird species to fire, other treatments, or lack of any treatment done to wetland ecosystems affected by shrub encroachment.

A study in northern Minnesota looked at breeding bird abundance and composition of emergent wetland sites managed with mechanical shearing or prescribed fire versus those that had not been managed. Shearing and prescribed fire treatments were done to prevent shrub encroachment in the hopes of benefiting such target species as: Sharp-tailed Grouse (*Tympanuchus phasianellus*), Yellow Rail, Upland Sandpiper (*Bartramia longicauda*), Sandhill Crane (*Grus canadensis*), Wilson's Phalarope (*Phalaropus tricolor*), Short-eared Owl (*Asio flammeus*), and Sharp-tailed Sparrow (*Ammodramus nelsoni*). The study took place over two breeding seasons (1996 and 1997) using unlimited radius point counts that were conducted on roadsides, ditches or trail edges. All birds seen or heard at an unlimited distance were recorded, and 14 other habitat variables were also measured.



MANAGEMENT IMPLICATIONS

- 1) Sites in northern Minnesota managed with prescribed fire or by shearing shrubs had fewer species of birds overall, but greater abundances of some open wetland species.
- 2) Yellow Rails at Seney NWR in Upper Michigan were found to occur more often at sites that had burned 2-5 years previously and with water depths up to 4 inches.

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Overall, 116 sites were surveyed in 1996 and 93 were surveyed in 1997. Data on management history were also collected.

Managed sites had more willow (*Salix* spp.) with shrubs distributed in clumps. Unmanaged sites had more alder (*Alnus* spp.) and snags, with taller and denser brush. Managed sites had fewer species of birds than unmanaged sites; however, species requiring open wetland habitat such as Sedge Wrens (*Cistothorus platensis*), Clay-colored Sparrows (*Spizella pallida*), and LeConte's Sparrows (*Ammodramus leconteii*) were all found to be positively associated with managed sites. Both time elapsed since the treatment and the management history of the site had little effect on species composition.

A species-specific study on Yellow Rails was conducted at Seney National Wildlife Refuge (NWR) over the 2007-2009 breeding seasons. This study looked at variables affecting Yellow Rail occurrence, including water depth, percent cover of fine-leaved graminoids, thickness of the senescent litter mat, vertical cover of woody vegetation, and fire return intervals. Fire history for each survey point was categorized as burning <1 year ago, 2-5 years ago, or >10 years ago. Overall, 64-68 points were surveyed each year using call-playback methods; 8 Yellow Rails were detected in 2007, 13 in 2008, and 15 in 2009. The dataset was reduced to detections that were made within 178 or 328 yards of the survey point. Logistic regression was done to model potential factors affecting Yellow Rail occurrence with Akaike's Information Criterion (AIC) used to evaluate candidate models.

Results suggested that the depth of water following spring flooding was important to Yellow Rail occurrence for detections within 178 yards of the survey point. Probability of Yellow Rail occurrence increased for water depths up to 4 inches, before decreasing at any greater depth. Results also suggested that fire history was important to occurrence of Yellow Rails for detections within 328 yards of the survey point. Sites that burned within 2-5 years had the highest probability of occurrence, followed by sites that burned less than a year previously. Sites that burned 2-5 years previously also had greater and more variable litter depths. Mean litter depth declined after that period likely because of compaction or partial decomposition. Overall, Yellow Rails occurred in areas with greater percent open area, lower shrub area and height, and fewer shrub patches, though no difference in shrub cover or height was detected among fire history categories. This was likely because most burns were characterized as low severity and likely had shrubs readily re-sprouting.

These studies suggest that for those species requiring open wetland conditions, prescribed fire or other treatments to prevent the encroachment of shrubs may be appropriate. In northern Minnesota it was found that these more open conditions yielded less species overall, but did increase abundances of open wetland species such as Sedge Wrens, Clay-colored Sparrows, and LeConte's Sparrows. Surprisingly, this study detected very few of the target species for which treatments were originally carried out. For Yellow Rails at Seney NWR, it was found that water depth and fire history were predictors of occupancy. Water depths up to 4 inches as well as sampling 2-5 years since fire resulted in the highest probability for Yellow Rail occurrence. It was also thought that water level conditions following fire could affect the recruitment of woody seedlings so that if water levels were high, fewer shrubs would be able to re-sprout following a fire.

References

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