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The Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) is a small, secretive marsh bird that was listed as threatened under the Endangered Species Act in November 2020 (85 Federal Register 63764). Nebraska was included in the species' geographic range in this recent listing. As a result of the federal listing, the species also automatically became state listed as threatened under the Nebraska Nongame and Endangered Species Conservation Act (§37-801-811), as that statute requires all federally listed species to also be state listed.

By all accounts, the Black Rail's status and distribution is poorly known, especially in the interior of North America where it occurs sparingly and locally (Kane 2011, Eddleman et al. 2020). Many purported sightings are brief glimpses of flushed birds or involve instances where a bird is heard calling. Many reports are erroneous due to misidentification or confusion with other species. Other observations have no or limited supporting information which makes discerning their credibility challenging. At the same time, the species is undoubtedly overlooked and undetected where it does occur because of its secretive nature.

In Nebraska, various authors (Bruner et al. 1904, Johnsgard 1980, 2018, Bray et al. 1986, Sharpe et al. 2001, Smith-Patten and Patten 2012, and Silcock and Jorgensen 2021) have reviewed the Black Rail's status, which is confused and controversial. Johnsgard (1980, 2018) considered it "apparently very rare spring and fall migrant and a possible breeder". Others have generally been more conservative and only used reports with extant documentation. In their revision of Sharpe et al. (2001), Silcock and Jorgensen (2021) accepted only two records: audio recordings of calling birds in Knox County 25 May 1986 (Brogie and Brogie 1987) and at Harvard Waterfowl Production Area, Clay County 16 June 2016 (McGregor et al. 2016). The two records are also the only ones accepted by the Nebraska Ornithologists' Union Records Committee (NOURC; Mark Brogie, chair, personal communication). Along with the accepted records, there are about two dozen other reports, several of which are very suggestive and/or reported by experienced observers.

The U.S. Fish and Wildlife Service (USFWS) has only contributed to the confusion regarding the species' status in Nebraska because of their inconsistent treatment of data. The Black Rail Species Status Assessment (SSA; USFWS 2018), which is the document on which the federal listing decision was based, relied heavily

on an extensive literature review by Smith-Patten and Patten (2012) and Watts (2016) in describing the Black Rail's status in the interior United States (pages 26-27). In Nebraska, Smith-Patten and Patten (2012) reviewed eighteen Black Rail reports and accepted one, the Knox County record cited above, rejected five reports and listed the remaining twelve reports as hypothetical. This review occurred prior to the 2016 Clay County record. The SSA (page 72), though, shows eight reports from Nebraska as "credible" without providing justification, thus apparently accepting reports as valid which other authors, including Smith-Patten and Patten (2012) and the NOURC, set aside. Unlike Nebraska, the USFWS chose to follow decisions of South Dakota Ornithologists' Union's Records Committee in the SSA (USFWS 2018, pgs 26-27). The SSA also does not mention Wyoming even though there is a May 2010 record near Laramie accepted by the Wyoming Bird Record Committee (Andrea Orabona, Wyoming Game and Fish Department, personal communication).

The uncertain status of the Black Rail in Nebraska is problematic. Different authors have interpreted existing reports differently resulting in varying conclusions about the species' status. The exercise of deciphering the limited details of existing reports and litigating their credibility is of little value. The Black Rail is now a threatened species and there is almost no published information on whether it occurs regularly in Nebraska. Furthermore, the species has not been searched for in any consistent form or systematic manner. Without information and understanding about the species' occurrence, taking actions to benefit and protect this species will undoubtedly be difficult for government and non-governmental agencies or for interested individuals who want to do so.

Since 2013, the Nongame Bird Program at the Nebraska Game and Parks Commission has conducted surveys focused on secretive marh birds throughout the state. Although up to eight species were targeted in these specialized surveys, a primary objective was to determine the presence/absence and/or abundance of Black Rails. Here, we report the results from our survey efforts to detect Black Rails in Nebraska.

METHODS

We conducted surveys in multiple years (2013, 2016, 2017, 2018, 2020, and 2021) and our methodology and effort varied from year to year. The majority of our surveys were designed and conducted following methods outlined by Conway (2011) and modified by Harms and Dinsmore (2012, 2013, 2014).

Study area and site selection

Nebraska was our overall study area but we focused on three major wetland complexes; the Eastern Saline Wetland (ESW) complex primarily in northern Lancaster and southern Saunders Co, the Rainwater Basin (RWB) in south-central Nebraska, and the Sandhills in north-central Nebraska (Figure 1). To simplify access for surveys, only wetlands on publicly owned lands were considered (Harms and Dinsmore 2012). We used ArcGIS (ESRI Inc. 2013-20, Version 10.2-10.8, Redlands,

CA, www.esri.com), the National Wetlands Inventory (USFWS 2009) and the RWB Wetland Vegetation Map (Nugent et al. 2015) to select our sites. Only palustrine wetlands, which are usually marshes with emergent vegetation, (Cowardin et al. 1979, LaGrange 2005) were included in our selection process as these are the wetland classes that possess habitat (used by Black Rails and other marsh birds (Harms and Dinsmore 2012). Following recommendations by Conway (2011), we created random survey point locations in ArcGIS within wetland areas and these were located at a minimum of 400 m apart.

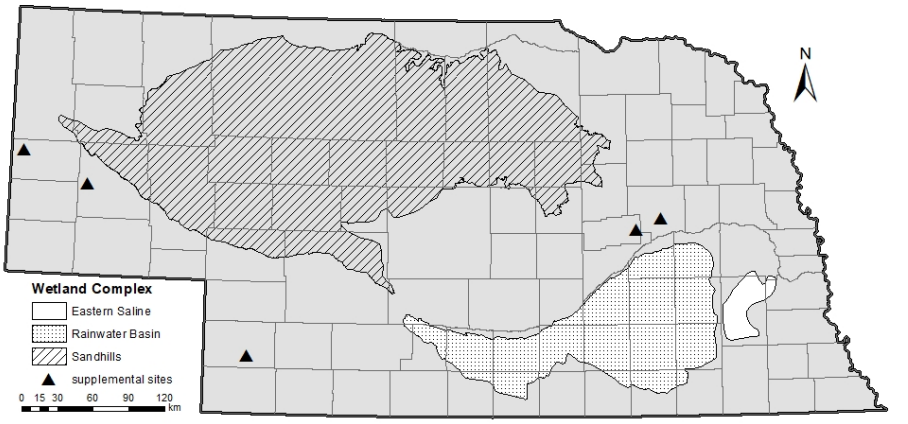

Figure 1. Location of major wetland complexes plus supplemental sites where Black Rail surveys were conducted in Nebraska 2013-2021.

In 2013, we surveyed available public sites in the ESW complex. In 2016-17, we conducted surveys in all three major wetlands complexes and randomly selected sites using four size classes: 1) ≤15 ha, 2) 16 – 60 ha 3) 61 – 150 ha, and 4) >150 ha. We attempted to select an equivalent number of points from each size class but were forced to select higher proportions of some size classes when others were not available. Survey site size classes were determined by calculating the total area of wetland habitat (including only wetlands within the lacustrine and palustrine systems) within each survey site. In 2020-21, we only conducted surveys in the RWB. In 2020, we randomly selected sites that possessed > 35 ha of palustrine wetland. In 2021, we again surveyed sites that were used in 2016-17. In 2016, 2017, and 2021, the majority of points were surveyed twice: once from 15 May to 14 June and again from 15 June to 15 July. In 2013, a minority of points were surveyed twice. All points were only surveyed once in 2020.

In addition to public sites within major wetland complexes, supplemental surveys were conducted at the following sites: Fleisbach Wildlife Management Area (WMA) in Morrill County, Don Dworak WMA in Nance Co, Wilkinson WMA in Platte County, Enders WMA (upper end of Enders Reservoir) in Chase County and Kiowa WMA in Scotts Bluff County. These sites were selected because they possess wetland habitat similar to those sites in the major wetland complexes.

Surveys

We used call broadcast point counts focused on up to eight marsh bird species that included Black Rail. Other species surveyed included Virginia Rail (*Rallus limicola*), King Rail (*Rallus elegans*), Sora (*Porzana carolina*), American Bittern (*Botaurus lentiginosus*), Least Bittern (*Ixobrychus exilis*), Common Gallinule (*Gallinula galeata*), and Pied-billed Grebe (*Podilymbus podiceps*). Broadcasting the calls of species increases detection probabilities for these secretive species (Conway 2011). At each survey point, we conducted a 13-minute call broadcast sequence provided by the North American Marsh Bird Monitoring Program coordinator (Conway 2011). Calls were broadcast using a compact speaker (e.g. JBL Flip 5 blue-tooth speaker) held approximately 1 m from the ground. The call broadcast sequence consisted of a 5-minute silent listening period followed by 30 seconds of calls and 30 seconds of silence for each focal species. Although our surveys involved multiple species, we are only reporting our results for Black Rail here. We were prepared to record all Black Rails detected (visually and aurally) during each one-minute interval throughout the entire 13-minute survey sequence. Surveyors were instructed to record vocalizations or photograph, if possible, any Black Rails detected. All surveys were conducted either in the morning, 30 minutes before sunrise to three hours after sunrise, or in the evening, three hours before sunset to 30 minutes after sunset (Harms and Dinsmore 2012, 2013, 2014). All surveys were conducted between 15 May-15 July. We did not conduct surveys during periods of sustained rain, heavy fog, or when wind speed was greater than 12 mph as recommended by Conway (2011).

For supplemental surveys, we surveyed wetlands using only a Black Rail call and listened for responses. We deliberately walked short distances (< 20 meters) during 30 seconds of silence and then stopped during the 30 seconds of Black Rail call playback or used continuous call playback and listened for a response. At some sites, we also stopped at specific point locations and played Black Rail calls and also listened for responses. All supplemental surveys were conducted between 15 May-15 July and during the same daytime periods as call broadcast point count surveys.

RESULTS

We completed 1,354 call broadcast marsh bird and eight supplemental surveys across Nebraska from 2013-2021 (Table 1). A majority (54%, n = 735) of call broadcast point counts were completed in 2016-17. A majority (68%, n = 928) of the point counts were conducted in the Rainwater Basin. Supplemental surveys were completed at Fleisbach, Don Dworak and Wilkinson WMAs in 2016. In 2018, only one supplemental survey was conducted at Enders WMA. In 2020, supplemental surveys were completed at Fleisbach and Kiowa WMAs. Supplemental surveys were completed twice at Kiowa WMA in 2021. We detected only a single Black Rail during all surveys across all years. This documented detection consisted of a single bird that called in response to call-playback at Harvard Waterfowl Production Area on 15 June 2016 and is previously described in McGregor et al. (2016) and discussed above.

Table 1. Number of call broadcast point counts (CBPCs) and wetland sites (parenthesis) surveyed, as well as supplemental surveys, completed by year and by wetland complex in Nebraska 2013-2021. A proportion of points and wetlands were surveyed multiple times so totals do not represent a sum of unique points/wetlands.

Year	ESW	RWB	Sandhills	Total CBPCs	Supple-mental
2013	24 (17)			24 (17)	
2016	30 (4)	186 (22)	163 (24)	379 (50)	3 (3)
2017	25 (4)	147 (20)	184 (24)	356 (48)	
2018					1 (1)
2020		297 (52)		297 (52)	2 (2)
2021		298 (27)		298 (27)	2 (1)
Total	79 (25)	928 (121)	347 (48)	1354 (202)	8 (7)

DISCUSSION

Although Black Rails have been reported on multiple occasions since 1873 (Silcock and Jorgensen 2021) and occurrences have been documented twice in Nebraska over the past 35 years, the species status has been unclear. Our focused survey efforts in Nebraska over a nine-year period represents the first large-scale directed effort to detect Black Rail in the state. Our results, and especially our detection rate when compared to survey effort, indicates Black Rails rarely occur in the state during the breeding season. Furthermore, we found no evidence that Black Rails occur regularly anywhere in Nebraska. The specific point and site (Harvard WPA) at which a Black Rail was detected was surveyed multiple times following the detection in 2016 and Black Rails were not detected again. Our surveys did not encompass spring and fall migration periods so we are unable to make conclusions about the species occurrence during those periods. However, Nebraska does not lie between any known breeding and wintering areas (Eddleman et al. 2020), so regular migrants are not expected.

Our surveys in 2016-17 also included wetland sites within Crescent Lake National Wildlife Refuge (CLNWR) where there were multiple Black Rail reports in 1995-96. We completed 108 total call broadcast point counts during those years with most points being surveyed four times. These surveys followed targeted searches at Goose Lake, within the CLNWR, in 1997 and 2001 (Silcock and Jorgensen 2021). Thus, the evidence available at this time does not indicate Black Rails occur at CLNWR or at wetlands in the western Sandhills in the summer. Like many Black Rail reports in the state, we are unable to judge the validity of the earlier reports in 1995-96 because of the lack of extant documentation. Thus, these reports are of limited value.

Although the use of call-playbacks greatly increases the probability of detecting Black Rails, its use does not ensure birds present will be detected (Legare et al. 1999). Detection rates are affected by environmental variables such as wind speed, cloud cover and moon phase (Legare et al. 1999, Tolliver et al. 2019). Detection rates of Eastern Black Rails has been estimated in a range of 0.19-0.20, meaning a single survey only has approximately a 20% probability of detecting a Black Rail if present (Legare et al. 1999, Butler et al. 2015, Tolliver et al. 2019). Furthermore, Tolliver et al. (2019) showed that the survey effort required (number of surveys to have a 0.95 probability of detection the species) was 8 surveys on the Gulf Coast of Texas. However, given that only one Black Rail was detected during all of our surveys, it would appear that continuing to survey for breeding Black Rails in the state is unnecessary and will be unproductive unless additional evidence is obtained suggesting the species may be regularly present at sites or specific habitats in the state.

Black Rails do regularly occur and presumably breed as close to Nebraska as central Kansas (Thompson et al. 2011) and southeastern Colorado (USFWS 2018), but they are only casual transient and accidental summer visitors in Missouri (Robbins 2018). Black Rails are considered accidental in Iowa (Kent and Dinsmore 1996) and Minnesota (Janssen 2019), and there is one record from southern Wyoming mentioned above. There are no accepted records for South Dakota (Tallman et al. 2002, USFWS 2018) or North Dakota (Stewart 1975; Sandra Johnson, North Dakota Game and Fish Dept, personnel communication). Thus, this is additional evidence Nebraska is primarily north and west of the regular breeding range of this species.

Black Rails generally occupy wetland areas of dense vegetation, such as spikerush, sedges and grasses, that are < 1 m tall (Eddleman et al. 2020, USFWS 2018). In central Kansas, southeastern Colorado and western Oklahoma, Black Rails regularly use sites with cattails (USFWS 2018). However, Black Rails are sensitive to water levels, generally preferring wetland areas with persistently moist soils to shallow water < 3 cm deep with scattered deeper pools (USFWS 2018, Atlantic Coast Joint Venture 2020, Eddleman et al. 2020). Most of Nebraska wetlands, such as those in the RWB, are dynamic and water levels are variable (LaGrange 2005). Many wetlands in the state, such as those associated with riverine systems and which are influenced by water tables, also have altered hydrology (LaGrange 2005). Thus, Nebraska may generally lack adequate suitable habitat for the species. Extensive wetland areas in the western Sandhills, such as sites within CLNWR where the species was reported in the 1990s, that possess short vegetation and relatively stable water levels seemingly appear to meet the basic habitat requirements for the species, but other variables may preclude Black Rails from occupying these habitats.

The USFWS has listed the Black Rail as threatened and included Nebraska as part of the species' geographic range, even though the species is not known to occur regularly in the state. This study provides additional support that the species does not regularly breed in the state and only occurs in Nebraska as a casual migrant or vagrant. Until there is evidence suggesting or indicating Black Rails occur anywhere in Nebraska regularly, it seems the probability of anyone or any entity impacting this

species, either negatively or positively, is next to nothing. Therefore, at this time, we do not see any justification for the Black Rail to be a conservation priority in Nebraska.

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LITERATURE CITED

Atlantic Coast Joint Venture. 2020. Eastern Black Rail Conservation Plan for the Atlantic Coast. www.acjv.org

Bray T, Padelford BK, Silcock WR. 1986. The birds of Nebraska: a critically evaluated list. Published by the authors, Bellevue (NE).

Brogie MA, Brogie EM. 1987. Black rail in Knox County, Nebraska. NBR 55:40-41.

Bruner L, Wolcott RH, Swenk MH. 1904. A preliminary review of the birds of Nebraska, with synopses. Klopp and Bartlett, Omaha (NE).

Butler CJ, Tibbits JB, Wilson J. 2015. Assessing black rail occupancy and vocalizations along the Texas coast: final report. Texas Parks and Wildlife Department, Austin, USA.

Conway CJ. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319-346.

Cowardin LM. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, US Department of the Interior, Washington (DC).

Eddleman WR, Flores RE, Legare M. 2020. Black rail (*Laterallus jamaicensis*), version 1.0. In Birds of the World (Poole AF, Gill FB, Editors). Cornell Lab of Ornithology, Ithaca (NY). https://doi.org/10.2173/bow.blkrai.01

Harms TM, Dinsmore SJ. 2012. Density and abundance of secretive marsh birds in Iowa. Waterbirds 35:208-216.

Harms TM, Dinsmore SJ. 2013. Habitat associations of secretive marsh birds in Iowa. Wetlands 33:561-571.

Harms TM, Dinsmore SJ. 2014. Influence of season and time of day on marsh bird detections. Wilson Journal of Ornithology 126:30-38.

Janssen RB. 2019. Birds in Minnesota. University of Minnesota Press, Minneapolis.

Johnsgard PA. 1980. A preliminary list of the birds of Nebraska and adjacent Great Plains states. Published by the author, University of Nebraska, Lincoln (NE).

Johnsgard PA. 2018. The Birds of Nebraska. Zea E-Books. 65. https://digitalcommons.unl.edu/zeabook/65

Kane SA. 2011. Breeding habitat structure and use by Kansas-occurring black rail. Master's thesis, Ft. Hayes State University, Hayes (KS).

Kent TH, Dinsmore JJ. 1996. Birds in Iowa. Published by the authors, Iowa City and Ames (IA).

LaGrange T. 2005. Guide to Nebraska's wetlands and their conservation needs. Nebraska Game and Parks Commission, Lincoln (NE).

Legare ML, Eddleman WR, Buckley PA, Kelly C. 1999. The effectiveness of tape playback in estimating black rail density. The Journal of Wildlife Management 63:116-125.

McGregor C, Bruster E, Brown MB, Dinan LR, Jorgensen JG. 2016. A documented occurrence of black rail (*Laterallus jamaicensis*) in Nebraska. NBR 84:132-137.

Nugent E, Bishop A, Grosse R, Varner D. 2015. Rainwater Basin 2012 wetland vegetation map. Rainwater Basin Joint Venture, Grand Island (NE).

Robbins MB. 2018. The status and distribution of birds in Missouri. University of Kansas Biodiversity Institute, Lawrence (KS). https://kuscholarworks.ku.edu/handle/1808/26287, accessed 22 July 2021.

Sharpe RS, Silcock WR, Jorgensen JG. 2001. The birds of Nebraska: their distribution and temporal occurrence. University of Nebraska Press, Lincoln (NE).

Silcock WR, Jorgensen JG. 2021. Black rail (*Laterallus jamaicensis*), Version 1.0. In Birds of Nebraska — Online. www.BirdsofNebraska.org.

Smith-Patten BD, Patten MA. 2012. Interior black rail literature compilation. University of Oklahoma - Oklahoma Biological Survey, Norman (OK).

Stewart RE. 1975. Breeding birds of North Dakota. Tri-college center for environmental studies, Fargo (ND).

Tallman DA, Swanson DL, Palmer JS. 2002. Birds of South Dakota. South Dakota Ornithologists' Union, Aberdeen (SD).

Thompson MC, Ely CA, Gress B, Otte C, Patti ST, Seibel D, Young E. 2011. Birds of Kansas. University of Kansas Press, Lawrence (KS).

Tolliver JD, Moore AA, Green MC, Weckerly FW. 2019. Coastal Texas black rail population states and survey effort. The Journal of Wildlife Management 83:312-324.

United States Fish and Wildlife Service [USFWS]. 2009. National Wetlands Inventory. www.fws.gov/wetlands/Data/wetlandcodes.html, accessed 6 Aug 2009.

United States Fish and Wildlife Service [USFWS]. 2018. Species status assessment report for the eastern black rail (*Laterallus jamaicensis jamaicensis*), Version 1.2. June 2018. Atlanta, Georgia, USA.

Watts BD. 2016. Status and distribution of the eastern black rail along the Atlantic and Gulf Coasts of North America. College of William and Mary/Virginia Commonwealth University, Williamsburg (VA).