CRESTED AUKLET *AETHIA CRISTATELLA* AS A PREY ITEM IN AN INLAND GYRFALCON *FALCO RUSTICOLUS* NEST

BRYCE W. ROBINSON[1,2] & DAVID L. ANDERSON[2]

[1]*Raptor Research Center at Boise State University, 1910 University Drive, Boise, ID, USA (brycerobinson@u.boisestate.edu)*
[2]*The Peregrine Fund, 5668 W Flying Hawk Lane, Boise, ID, USA*

Received 26 April 2016, accepted 1 July 2016

SUMMARY

ROBINSON, B.W. & ANDERSON, D.L. 2016. Crested Auklet *Aethia cristatella* as a prey item in an inland Gyrfalcon *Falco rusticolus* nest. *Marine Ornithology* 44: 237–239.

We report Crested Auklet *Aethia cristatella* as a prey item of a Gyrfalcon *Falco rusticolus* nesting in inland western Alaska. This represents the first documented case as a Gyrfalcon prey item during the breeding season in North America, and the fourth documented case of inland movements of Crested Auklet. The presence of the auklet in the Gyrfalcon nest is notable due to the distance (105 km) to the nearest coastline. Weather likely caused the inland movement of the auklet. Because of the connection between weather events and inland movements of alcids, and the predicted increase and severity of weather due to climate change, continued reporting of inland movements may serve as a measure of change and its impacts on seabirds. Continued use of nest cameras to monitor raptor diet during nesting may also serve as a sampling tool for capturing similar instances of inland movements, and complement the use of eBird for sightings of live birds in understudied areas to gain a better understanding of the frequency of inland movements in the family Alcidae.

Key words: Alaska, *Aethia cristatella*, Crested Auklet, *Falco rusticolus*, Gyrfalcon, inland movement, predation

INTRODUCTION

The family Alcidae primarily inhabit coastlines and open ocean, remaining on saltwater for the majority of their lives. Only a few species, such as Kittlitz's *Brachyramphus brevirostris* and Marbled *B. marmoratus* murrelets, breed inland (Nelson 1997, Day *et al.* 1999). Alcids are highly specialized for a life on the ocean and rarely make inland movements; such movements are most often facilitated by mechanisms of vagrancy (Munyer 1965, Sealy & Carter 2004).

The Crested Auklet *Aethia cristatella* is an alcid that breeds on Bering Sea islands, wintering almost entirely in the Bering Sea and adjacent North Pacific Ocean (USFWS 2006).

A total of 43 nesting colonies are known, with highest numbers of breeding birds in the northern Bering Sea and the western Aleutian Islands (World Seabird Union 2016). Crested Auklets rarely wander, with relatively low numbers of documented vagrancy relative to other alcids (Weyman 1980, Sealy & Carter 2012). Inland movements of Crested Auklet have been reported in the literature on only three occasions, the most recent report being 64 years ago. On one occasion, a hatch-year bird wandered inland 130 km and struck an antenna near Nulato, Alaska, on the Yukon-Kuskokwim Delta in September 1937 (Geist 1939). On the second occasion, a dead bird was salvaged on a road about 160 km inland near Vance, Washington, on 29 June 1937 (Nickelsen 1942). On the third occasion, four adults were found grounded <2 km inland at Hooper Bay, Alaska, during a storm in June 1952 (Humphrey & Phillips 1958).

Here, we document an adult Crested Auklet as a prey item of an inland-nesting Gyrfalcon. This represents the fourth documented case of inland movements for this species, as well as the first documentation of Crested Auklet as a prey item for Gyrfalcon during the nestling period in North America.

STUDY AREA AND METHODS

The study area consists of 14 150 km^2 of the Seward Peninsula, Alaska, described by Bente (2011). The landscape is Arctic tundra, dominated by low-lying vegetation in coastal and highland areas, and by dense willow *Salix* spp. and alder *Alnus* spp. thickets along riparian corridors. Topography consists of rolling tundra interspersed with mountainous terrain, numerous rock outcroppings, and cliff-lined river systems. The study area provides abundant nesting habitat for Gyrfalcons, with an annual mean of 35 (range 31 to 39) occupied breeding territories between 2005 and 2010 (Bente 2011). In summer 2015, we installed Reconyx PC800 motion-activated cameras at 13 occupied Gyrfalcon nests to monitor prey deliveries during the nestling period. Motion activation in the nest cameras was programmed at high sensitivity to take three rapid photographs, followed by a 15 s sleep period, and one motion-independent time-lapse photograph recurring every 15 min. All nest-camera photographs were automatically time-stamped with the local time (Alaska Daylight Time; AKDT). Observations detailed here focus on an inland nest located 105 km from the nearest coastline. The nest site is a small stick nest approximately 15 m above a slow-flowing river, surrounded by open grassy tundra and rolling hills.

RESULTS AND DISCUSSION

On 2 July 2015 at 17h14, a nest camera captured the delivery of a Crested Auklet to three nestlings 44 d old (Fig. 1). The presence of the Crested Auklet in the Gyrfalcon nest is peculiar, given the

distance of the Gyrfalcon nest to the nearest coastline (~105 km), and the further distance of the nearest auklet breeding colony (~160 km). Little is known about the hunting range of Gyrfalcon during nesting, apart from ranges of 15 km and 20 km stated in the literature (White & Cade 1971, Nielsen 2011). Either distance negates the possibility of a Gyrfalcon flying 105 km to the ocean to predate a seabird. It is more likely that the presence of the Crested Auklet in this Gyrfalcon nest was a result of the inland wandering of the auklet. However, it is still peculiar that a seabird with a breeding home range restricted to Bering Sea Islands would wander so far inland during the height of its breeding cycle.

The closest known location of a Crested Auklet colony is on King Island, a distance of approximately 160 km from the Gyrfalcon nest site (World Seabird Union 2016). Additionally, the Gyrfalcon nest was approximately 105 km from the nearest coastline. To gain a perspective on Crested Auklet movements in summer 2015, we investigated all eBird records from the southern Seward Peninsula during the summer breeding months. We found only one sighting of three birds at Nome Harbor in June 2015, which is 116 km south-southwest from the Gyrfalcon nest site and represents the only coastal sighting for the region in 2015 (eBird 2015). Other regional coastal eBird records include eight sightings (in 1993, and 2012 to 2013) 105 km southeast of the Gyrfalcon nest site, along the Safety Sound coastline on the southern coast of the Seward Peninsula.

Alcids have previously been documented in diets of Gyrfalcon during the breeding season (Nielsen 2003, 2011). Although Gyrfalcon is listed as a predator of Crested Auklet in the literature for North America, no accounts are cited, nor are any details provided (Jones 1993). Gyrfalcons are sympatric with Crested Auklet in Alaska during the nonbreeding season and have been documented hunting alcids in places of sympatry, such as Buldir Island on the Aleutian Archipelago (Byrd & Day 1986). However, there is no mention of Gyrfalcon predation on Crested Auklet during the breeding months (May to August) in North America, likely because the breeding ranges of the two species do not overlap. However, in Chukotka, Russia, directly west of the Seward Peninsula and the Bering Sea, Crested Auklet have been reported as frequent Gyrfalcon prey items (Konyukhov 1990).

Fig. 1. Crested Auklet (insert) in a Gyrfalcon nest, as captured by a motion-activated camera installed to record prey use during the nestling period, Seward Peninsula, Alaska, 2015. The Gyrfalcon nest is a stick platform located along a river, 105 km from the nearest open ocean and 160 km from the nearest known Crested Auklet breeding colony.

Weather is generally considered the primary cause of inland occurrences of alcids and is the most likely explanation of the occurrence of the Crested Auklet as a prey item in an inland Gyrfalcon nest (Geist 1939, Sealy & Carter 2004, 2012). We accessed local weather conditions for the date the Crested Auklet appeared in the Gyrfalcon nest to investigate whether weather was the likely cause of the inland movement. Nome weather data indicated a peak wind speed for 2 July of 33.84 km/h from a direction of 240° (southwest) for the day of the auklet prey delivery (Menne *et al.* 2016). Data also indicated fog and precipitation of 0.5 mm. We also checked nest-camera images from other Gyrfalcon nests nearest to the coast for 1 July and 2 July to elucidate the coastal conditions near to the nest of the observation. Nest-camera images from a nest approximately 23 km from the nearest coastline and 98 km from the nest of the observation indicate wind, precipitation, and fog for the day before and the day of the Crested Auklet delivery. Additionally, nest-camera images from the nest nearer to the coast show an adult female Gyrfalcon brooding nestlings 22 d old, an uncommon behavior at this stage of nestling development, which further supports the severity of the weather for these dates. It has been suggested that seabirds survive storms by staying on the wing; they are carried through dense fog and rain, which may disorient them, resulting in accidental inland movements (Geist 1939). Weather—likely a combination of precipitation, fog and moderate winds—as the proximate cause of disorientation is the most likely explanation of the inland wandering of this auklet.

The report of this Crested Auklet 105 km inland is notable for two reasons. First, the observation was documented by camera monitoring of a Gyrfalcon nest, without which the auklet would have gone undetected. Continued monitoring of raptor diet during nesting in this region can provide a tool for capturing inland movements in an understudied area, allowing further insight into similar instances of vagrancy. Second, we found only three previously published records of inland movements by Crested Auklet: one instance of four birds occurred 2 km inland, and the other two occurred >100 km inland. Our observation thus represents only the fourth published record of this species occurring inland, a peculiar observation for a pelagic bird during the nesting season.

Global predictions include increases in climate variability and changes in the frequency and strength of severe weather events (Easterling 2000, Smith 2011, Vose *et al.* 2014). These predictions have recently received increased attention because they may represent some of the most important aspects of global change impacts on ecosystem structure. Connecting novel weather events or disturbances in the regular weather regimes with their effects on bird life is important in fully understanding the impacts of global change. For alcids, the frequency of inland movements may serve as one measure of the effects of increased weather events on population dynamics and stability. The frequency of inland windblown or disoriented birds may increase with the frequency and severity of weather events due to climate change. Along with continued and increased camera monitoring in raptor nests, the use of resources such as eBird will undoubtedly aid in recording inland movements of alcids. However, in instances of mortality such as this report, eBird submission is inappropriate. Therefore, published documentation is necessary and may facilitate a complete picture of

irregular movements in areas that receive relatively little attention from birders and field biologists.

ACKNOWLEDGEMENTS

We thank the Alaska Department of Fish and Game, including Peter Bente and Travis Booms, for their support. Thanks to Ellen Whittle for her help conducting field work and to John Earthman for support with field logistics. We thank David Ainley and an anonymous reviewer for helpful comments and suggestions that improved the manuscript. We also thank the Eppley Foundation for Research for providing necessary funding for this study.

REFERENCES

BENTE, P.J. 2011. Abundance and multi-year occupancy of Gyrfalcons (*Falco rusticolus*) on the Seward Peninsula, Alaska. In: WATSON, R.T., CADE, T.J., FULLER, M., HUNT, G., & POTAPOV, E. (Eds.) *Gyrfalcons and Ptarmigan in a Changing World*. Boise, ID: The Peregrine Fund. pp. 296-306.

BYRD, G.V. & DAY, R.H. 1986. The avifauna of Buldir Island, Aleutian Islands, Alaska. *Arctic* 39: 109-118.

DAY, R.H., KULETZ, K.J. & NIGRO, D.A. 1999. Kittlitz's Murrelet (*Brachyramphus brevirostris*). In: POOLE, A. (Ed.) *The Birds of North America Online*. Ithaca, NY: Cornell Lab of Ornithology. [Available online at: http://bna.birds.cornell.edu/bna/species/435. Accessed 15 February 2016]. doi:10.2173/bna.70.

eBird: An online database of bird distribution and abundance [Online]. Ithaca, NY. [Available online at: http://www.ebird.org. Accessed 10 February 2015].

EASTERLING, D.R. 2000. Climate Extremes: Observations, modeling, and impacts. *Science* 289: 2068-2074.

GEIST, O.W. 1939. Sea birds found far inland in Alaska. *Condor* 41: 68-70.

HUMPHREY, P.S. & PHILLIPS, R.E. 1958. The odor of the Crested Auklet. *Condor* 60: 258-259.

JONES, I.L. 1993. Crested Auklet (*Aethia cristatella*). In: POOLE, A. (Ed.) *The Birds of North America Online*. Ithaca, NY: Cornell Lab of Ornithology. [Available online at: http://bna.birds.cornell.edu/bna/species/070. Accessed 15 February 2016]. doi:10.2173/bna.435.

KONYUKHOV, N. 1990. Crested Auklet. In: FLINT, V.E. & GOLOVKIN, A.N. (Eds.) *Birds of the USSR: Auks, Alcidae*. Moscow, Russia: Nauka. pp. 112-121.

MENNE, M.J., DURRE, I., KORZENIEWSKI, B., ET AL. 2016. Global Historical Climatology Network — Daily (GHCN-Daily), Version 3. [Available online at: http://doi.org/10.7289/V5D21VHZ. Accessed 27 February 2016.]

MUNYER, E.A. 1965. Inland wanderings of the Ancient Murrelet. *Wilson Bulletin* 77: 235-242.

NELSON, S.K. 1997. Marbled Murrelet (*Brachyramphus marmoratus*). In: POOLE, A. (Ed.) *The Birds of North America Online*. Ithaca, NY: Cornell Lab of Ornithology. [Available online at: http://bna.birds.cornell.edu/bna/species/276. Accessed 15 February 2016.] doi:10.2173/bna.276.

NICKELSEN, H.C. 1942. Crested Auklet reported taken in Washington. *Murrelet* 23: 82.

NIELSEN, Ó. 2003. The impact of food availability on Gyrfalcon (*Falco rusticolus*) diet and timing of breeding. In: THOMPSON, D.B.A., REDPATH, S., FIELDING, A.H., MARQUISS, M., & GALBRAITH, C.A. (Eds.) *Birds of Prey in a Changing Environment*. The Natural History of Scotland series. Edinburgh, UK: The Stationery Office. pp. 283-302.

NIELSEN, Ó.K. 2011. Gyrfalcon population and reproduction in relation to Rock Ptarmigan numbers in Iceland. In: WATSON, R.T., CADE, T.J., FULLER, M., HUNT, G., & POTAPOV, E. (Eds.) *Gyrfalcons and Ptarmigan in a Changing World*. Boise, ID: The Peregrine Fund. pp. 21-48.

SEALY, S.G. & CARTER, H.R. 2004. Inland occurrences of Dovekies in September in northeastern North America. *Northeastern Naturalist* 11: 375-382.

SEALY, S.G. & CARTER H.R. 2012. Rare inter-ocean vagrancy in Crested Auklet and Parakeet Auklet. *Waterbirds* 35: 64-73.

SMITH, M.D. 2011. The ecological role of climate extremes: Current understanding and future prospects. *Journal of Ecology* 99: 651-655.

WESTERN SEABIRDS UNION. 2016. North Pacific Seabird Data Portal. [Available online at: http://axiom.seabirds.net/portal.php. Accessed 10 February 2016].

UNITED STATES FISH AND WILDLIFE SERVICE. 2006. Crested Auklet. [Available online at: http://www.fws.gov/alaska/mbsp/mbm/seabirds/pdf/crau.pdf. Accessed 10 February 2016].

VOSE, R.S., APPLEQUIST, S., BOURASSA, M.A., ET AL. 2014. Monitoring and understanding changes in extremes: Extratropical storms, winds, and waves. *Bulletin of the American Meteorological Society* 95: 377-386.

WEYMAN, F.O. 1980. Crested Auklet found in California. *Condor* 82: 472.