

2008

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Lewis, Thomas E. and Slack, R. Douglas, "Whooping Cranes and Human Disturbance: An Historical Perspective and Literature Review" (2008). *North American Crane Workshop Proceedings*. 182.
<http://digitalcommons.unl.edu/nacwgproc/182>

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WHOOPING CRANES AND HUMAN DISTURBANCE: AN HISTORICAL PERSPECTIVE AND LITERATURE REVIEW

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Abstract: Whooping cranes (*Grus americana*) generally are not tolerant of human disturbance. Much anecdotal evidence in the literature and recent studies has shown that human disturbances cause aversive behavior in whooping cranes. Herein, we review and summarize the long history of acceptance by researchers and managers that human disturbance impacts whooping cranes and support actions to minimize human disturbance to this critically endangered species.

PROCEEDINGS OF THE NORTH AMERICAN CRANE WORKSHOP 10:3-6

Key words: human disturbance, *Grus americana*, whooping crane.

For over 50 years the scientific literature has recognized that whooping cranes (*Grus americana*) were wary birds that did not tolerate human disturbance (Stevenson and Griffith 1946, Allen 1952, Blankenship 1976, U. S. Fish and Wildlife Service 1980, 1986, 1994). The U. S. Fish and Wildlife Service (USFWS) (1980) reported that whooping cranes avoided areas of human disturbance even when the habitat was otherwise suitable and declared that additional data were needed on the impact of increasing human activities in whooping crane habitat. Increasing demands for recreational tourism associated with this endangered species have raised concerns about the effects of these appreciative uses upon the well-being of the species (U. S. Fish and Wildlife Service 1994). Human disturbance to whooping cranes has been well documented and recent studies have quantified some of the impacts of disturbance (Mabie et al 1989, Irby 1990, Lewis and Slack 1992).

METHODS

We reviewed the literature for anecdotal and quantitative information on whooping crane reactions to human disturbances for the Aransas-Wood Buffalo population. We summarized the information by season (breeding, migration and winter) and general categories of disturbance (people on foot, vehicles, boats and aircraft).

We also report data from personal observations made at Aransas National Wildlife Refuge (ANWR). Finally, we suggest management alternatives that may help reduce the impacts of human disturbance on whooping cranes.

RESULTS AND DISCUSSION

We found 15 publications that suggested or stated directly that human disturbances impacted whooping cranes in some way. Few articles focused on human disturbance, but often discussed the topic as an aside to the main theme of the manuscript. Although several authors mentioned that certain

human activities have minimal impact, most articles reported general concern about the negative impacts that human disturbance has on whooping cranes. Few articles discussed the impacts of human disturbance during the breeding and migration seasons. However, many articles discussed concerns about human disturbance during the winter season when whooping cranes were most easily studied. Several articles discussed management options that may reduce the impacts of human disturbance. We discuss these and suggest other ways to reduce human disturbance to whooping cranes.

The Migratory Bird Treaty Act (MBTA) of 1916 assured legal protection for migratory bird species and provided a basis for preventing the hunting of species requiring complete protection like the whooping crane (U. S. Fish and Wildlife Service 1994). The MBTA reduced hunting mortality, obviously the most detrimental form of human disturbance to individual whooping cranes. The establishment of ANWR in 1937 protected whooping cranes from many forms of human disturbance by providing a winter sanctuary. ANWR and Matagorda Island National Wildlife Refuge (MINWR) provide habitat to the majority of whooping cranes that winter in Texas. Whooping cranes were officially listed as threatened in 1967 and then endangered in 1970. Listing added additional protections, but offered little protection from most non-lethal human disturbances.

In spite of endangered status, few studies have quantified the impacts of human activities on whooping cranes. The Whooping Crane Recovery Plan (U. S. Fish and Wildlife Service 1986) specifically identified the importance of determining the cumulative effects of human disturbance on whooping cranes. Several studies have documented that human activities impact whooping crane distribution and/or behavior during all seasons (Thompson and George 1987, Howe 1989, Mabie et al 1989, Irby 1990, Lewis and Slack 1992).

Disturbance During Breeding Season

Although few articles discussed the impacts of human activities during the breeding season, all evidence suggested that human activities have negative impacts on the species

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(Allen 1952, U. S. Fish and Wildlife Service 1980, 1994). The whooping crane is wary on the breeding grounds and will not remain near human activity (U. S. Fish and Wildlife Service 1994). The U. S. Fish and Wildlife Service (1994) states that the remote nature of the breeding grounds of the Aransas/Wood Buffalo flock of whooping cranes (Wood Buffalo National Park, Canada) further suggests that the cranes prefer areas with minimum human activities. The U. S. Fish and Wildlife Service (1980) also stated that the 1977 Whooping Crane Recovery Team considers enforcement of the prohibition of public access and low flying aircraft on the breeding grounds an important function of the Canadian Wildlife Service. The breeding area is designated as a "Special Preservation Area" and human access is prohibited from April 15 through October, except for park staff and scientists involved in whooping crane research (B. Johns, Canadian Wildlife Service, personal communication).

Allen (1952) reported that one of the reasons for the decline of whooping cranes was agriculture reducing the number and quality of wetlands in the northern Great Plains of the United States and Canada. The U. S. Fish and Wildlife Service (1994) reported that settlement of the mid-continental and coastal prairies and "mere human presence", as opposed to alteration of the habitat, may have interfered with the continued use of prairie and wetlands by breeding whooping cranes. This suggests that human disturbance on the former southern breeding grounds contributed to the decline of breeding populations and may hinder future recovery in areas with high levels of human activity or presence. Managers should take this into consideration when planning restoration programs.

Disturbance During Migration

We reviewed two articles that discussed human disturbance to whooping cranes during migration. Howe (1989) reported that whooping cranes tended to be wary during migration and found that the mean distance of whooping crane migration stopover roost sites from the nearest road and human habitation was 0.5 km and 1.3 km, respectively. Howe (1989) also reported that cranes usually ignored fixed-wing aircraft, but reacted with alarm to a helicopter. The U. S. Fish and Wildlife Service (1994) reported that although whooping cranes will use a variety of habitats for foraging and roosting during migratory stopovers, they seem to prefer isolated sites away from human activities. These articles suggest whooping cranes avoid areas close to human activity during migration.

Disturbance During Winter

Whooping cranes are more easily and predictably studied on the wintering grounds than at any other time in the life cycle of this migratory species. Although the impact of human

disturbance on whooping cranes is the main emphasis of few articles, many authors felt it necessary to mention their concerns about human disturbance in articles on other topics. Stevenson and Griffith (1946) found it difficult to study whooping crane behavior because of the bird's wariness and the desire to keep it so. Allen (1952) considered the unnecessary disturbance of the natural isolation of the cranes the best policy. Hunt and Slack (1989) stated disturbance is one of many factors influencing the availability of crane food on ANWR. Irby (1990) felt that private ownership and regular patrol strongly influenced levels of human disturbance resulting in no long-term or frequent disturbances to whooping cranes on his study site.

Disturbance to whooping cranes on the wintering grounds is increasing and has been a concern for many years (T. V. Stehn, U. S. Fish and Wildlife Service, personal communication). Stevenson and Griffith (1946) reported that disturbance of whooping cranes has been kept to a minimum and a large feeding and resting area was available for their use. However, more recently Irby (1990) expected wintering whooping cranes to encounter an increasing intensity of human disturbances.

Studies have demonstrated that human disturbances frequently impacted whooping cranes by altering behavior and displacing whooping cranes from desired habitats (Thompson and George 1987, Mabie et al 1989, Irby 1990, Lewis and Slack 1992). Studies also document that disturbances cause flight in many instances (Bishop 1984, Mabie et al 1989, Irby 1990).

Boats. Whooping cranes winter along the Texas coast. Wintering sites include ANWR, MINWR and adjacent private lands. The Gulf Intracoastal Waterway (GIWW) bisects coastal marshes and facilitates boating through whooping crane critical habitat. Stevenson and Griffith (1946) expressed that the use of areas near the GIWW was dangerous and exposed the cranes to the potential of being shot. The GIWW experiences some of the heaviest barge traffic of any waterway in the world and there is great potential for acceleration in traffic and the probability of a significant spill of contaminants in the future (U. S. Fish and Wildlife Service 1994). In 1970, one tour boat offered weekend day-trips to view whooping cranes from the GIWW. By 1990, five boats offered this opportunity, spanning every day of the week (U. S. Fish and Wildlife Service 1994). Chavez-Ramirez (1996) suggested that significant differences in whooping crane time activity budgets between whooping cranes on the mainland and those on MINWR, including increased alert behavior at ARNW, could be attributed to greater frequency and intensity of human activities on ANWR vs. MINWR.

Stevenson and Griffith (1946) reported that the birds only allowed approach by motor boat to within 300-400 yards without disturbing them. Blankenship (1976) felt that at present levels sport fishermen and bird watchers posed no serious disturbance as long as they stay in boats, do not harass cranes

or try to approach too closely. Blankenship (1976) also stated that disturbance was not of great overall importance, but could be critical in particular locations, such as along the GIWW. Blankenship (1976) reported that barge and recreational boat traffic and the associated disturbance to whooping cranes had greatly increased on the GIWW. Bishop (1984) reported that more often than not, airboats flushed whooping cranes and displaced cranes from their location for anywhere from 15 minutes to several hours. Thompson and George (1987) reported that aerial survey data indicated some temporary changes in whooping crane use which could be attributed to hunter presence and airboat activity. Mabie et al (1989) detected a change in alert behavior (defined as cranes avoiding or flushing from disturbance) of family groups of whooping cranes caused by airboat activity. Blankenship (1976) and the U. S. Fish and Wildlife Service (1994) reported that whooping cranes showed little concern for barges in the GIWW, however Irby (1990) reported whooping cranes walked away to avoid the wakes of passing vessels and heavy commercial barge traffic. Lewis and Slack (1992) found whooping cranes reacted strongly to airboats and tour boats when the activity is less than 1000 m away with flushing rates of 38 and 24%, respectively. As boat traffic increases, there will likely be a corresponding increase in disturbance and its associated impacts.

People on Foot. Bishop (1984) reported that whooping cranes will not tolerate human activity on the uplands and it was seldom possible to approach on foot and remain within one-half mile of the birds without alarming them. Blankenship (1976) felt that the major concern of disturbance from hunting was the displacement of cranes from their feeding areas. Although sample size was small, Irby (1990) also noted that hunters emerging from waterfowl blinds caused whooping cranes to flush and fly long distances. Chavez-Ramirez (1996) stated that whooping cranes were more social in uplands so more birds were potentially disturbed.

Vehicles. Stevenson and Griffith (1946) reported that whooping cranes allowed approach by auto to within 300-400 yards without disturbing them. Bishop (1984) stated that similar to people on foot whooping cranes in uplands will not tolerate vehicular traffic.

Aircraft. Stevenson and Griffith (1946) reported airplanes used in training Army and Navy flyers caused disturbance to whooping cranes with dispersal to other areas in some circumstances. Allen (1952) stated low-flying planes were sometimes a hazard to whooping cranes. Similarly, Irby (1990) observed an ultra-light craft noticeably disturbed whooping cranes and they flushed a half mile and then continued to walk away for 11 more minutes. Lewis and Slack (1992) noted helicopters less than 1000 m away caused flushing rates of 50% to whooping cranes.

MANAGEMENT IMPLICATIONS

Management options should be considered to minimize impacts of human disturbance to whooping cranes. Management scenarios could include visitor education, monitoring, area closures and establishing buffer zones. The isolation and protection of the current breeding habitat prevents much human disturbance, but managers should be vigilant in ensuring that human activity outside of Wood Buffalo National Park does not encroach into the area. During migration, education has been effective in the past and efforts should continue (Allen 1952). Education is a management tool that achieves positive results and is usually well accepted by the public.

Due to proximity to humans the season when human disturbance has the most impact on whooping cranes is winter. Allen (1952) reported on the merits of establishing the closure of Mustang Lake to fishing over fifty years ago. Recently, six narrow openings into the marshes of ANWR have been closed seasonally to boats (T. V. Stehn, U. S. Fish and Wildlife Service, personal communication). However, no widespread closures of important whooping crane use areas have been proposed even though the merits of such closures are recognized (U. S. Fish and Wildlife Service 1980). A study could be designed to determine if closures would be beneficial. To reduce disturbance to water birds, Ding Darling NWR has closed the auto tour route on certain days (Klein 1993). Indeed much of ANWR uplands were closed to the public, and considering the importance of wetland areas to the survival of the cranes, closing access to additional wetlands should be seriously considered. These closures could be seasonal or daily in nature.

Minimum buffer zones of 100 m have been suggested for water birds (Rodgers and Smith 1995, 1997, Erwin 1989). Indeed, the Canadian Wildlife Service has established buffer zones for summering sub-adult whooping cranes (Scobie and Faminow 2000). Future studies should determine the mean flushing distances for whooping cranes and determine appropriate buffer zones for other important situations, especially on the wintering grounds.

The visitor center at ANWR provides information to many refuge visitors, but the refuge should consider educational exhibits to target people not coming to the visitor center. Irby (1990) recommended development of signage to inform area users as to what whooping cranes look like and restrictions to potential disturbances. Kiosks could be located at docks where tour boats operate and at local boat ramps. Irby (1990) also recommended contacting owners of helicopters and ultra-light aircraft to seek cooperation to reduce disturbances to whooping cranes. Local airports might be another place that informational literature or displays could be effective at reducing disturbance to whooping cranes.

Review of the whooping crane literature showed that whooping cranes were documented to be wary birds that

tend to not tolerate human disturbance. Researchers and managers have reported the impacts of human disturbance on whooping cranes both anecdotally and quantitatively for many decades. Managers should consider ways to regulate human activity to lessen the impacts of human disturbance on whooping cranes.

ACKNOWLEDGMENTS

We wish to thank T. Stehn and D. Ellis for suggesting submission of this paper. We also thank T. Stehn and B. Johns for editorial comments that improved the paper.

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