Options for Managing the Effects of Watercraft on Waterfowl

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Abstract

Several studies indicate that watercraft can have a negative effect on waterfowl. In response, various management strategies have been proposed in order to minimize the impacts of watercraft on waterfowl. Such strategies include: limiting numbers of boats; prohibiting boat-use in a body of water, or portions thereof; restricting boat-use at critical times of the year; restricting motor size; imposing speed limits; and restricting types of permitted watercraft. For this poster presentation, the effectiveness of the various management strategies is discussed within the context of a six-week field investigation on the impacts of watercraft on waterfowl in Wabakimi Provincial Park in Northwestern Ontario. The strategies that are more likely to be effective in protected areas are highlighted, along with topics for further investigation.

Introduction

Management strategies have the power to minimize the impacts of recreational use on a park's natural features. The objective of this study was to determine the effects of watercraft on waterfowl and to evaluate management strategies that have been proposed or implemented in areas where conflicts occur between recreational use and waterfowl conservation. It is our intent to provide park planners with options for managing water-based recreational activities to promote the conservation of waterfowl.

Methods

The researchers spent six weeks in Wabakimi Provincial Park in Northwestern Ontario studying the impacts of watercraft on waterfowl from mid-May to the end of June, 2000. The reactions of several species of waterfowl to motorboats and canoes with varying speeds, distances away from waterfowl, and motor sizes were recorded and categorised into a 5-point Likert scale of reactions from "no reaction" to "flew over 200 m away". The noise output of two different sized motors was tested at various speeds. Field data and existing literature were used to evaluate the effectiveness of several potential management techniques to minimise the impacts of watercraft on waterfowl.

Do nothing

The simplest approach to deal with conflict between recreational activities and waterfowl conservation is to do nothing, allowing water-based recreation to continue without regulation. While this option provides the most freedom for recreationists, frequent disturbances may diminish waterfowl reproductive success by interrupting courting rituals, altering energy budgets, reducing time spent on the nest, and increasing the vulnerability of young and adults to predation. Further, as tolerance levels to disturbances vary among species, increased water-based recreation may lead to reduced numbers of waterfowl, particularly of sensitive species, resulting in reduced waterfowl diversity. Thus, a list of alternative management strategies should be considered to ensure the compatibility of waterfowl protection and water-based recreation.

Instill temporal restrictions on boating

Waterfowl react differently to disturbances at different life stages, and the impact of disturbances varies throughout the year. Recreational disturbances tend to be most detrimental to wildlife during the breeding season. The creation of temporal refuges provides opportunities for water-based recreation at less critical times of the year, while protecting waterfowl at times when they are more vulnerable to disturbance.

The application of temporal restrictions during the breeding season is complicated by the coincidence of the start of the fishing season with the breeding season of most waterfowl. Hence, park managers may not have the full support of anglers if boating were completely restricted during waterfowl breeding times. For this reason, temporal restrictions may be more feasible if combined with other management strategies.

Restrict boat numbers

Maintaining the existing level of recreational watercraft use in a park may be acceptable if the level of boating traffic is not detrimental to waterfowl populations. Given the increasing popularity of water-based recreation, there will likely be a rise in demand for boating opportunities in protected areas in the future. Further research would be required to determine the acceptable number of motorized and non-motorized boats in a park in terms of waterfowl conservation.

Designate refuge lakes

An alternative to limiting boating throughout a park is to limit boat numbers in certain areas by creating waterfowl refuge lakes, which would be off-limits to motorized, and possibly non-motorized, boating traffic. Madsen (1998) shows that where refuge lakes have been created, waterfowl redistribute to these areas from areas with human disturbance. Management practices that create refuges for waterfowl may effectively concentrate the impacts of recreation on some lakes while providing areas free of human disturbance for waterfowl that are less tolerant of human disturbance.

Create refuge zones within a lake

Our findings suggest that distance is the most significant factor in predicting waterfowl reactions to boat disturbances. By increasing the distance between areas where boating traffic occurs and where waterfowl are found, the impacts of water-based recreation on waterfowl can be reduced. The following two management techniques may be applied to

create refuge areas within a lake.

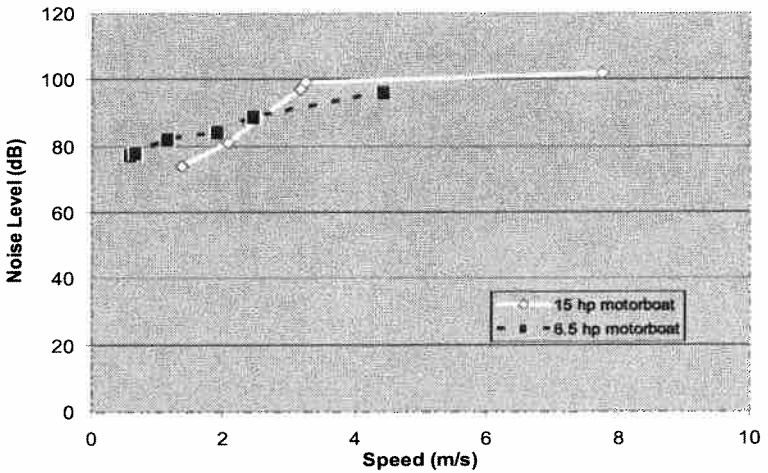
First, critical habitat such as nesting sites and feeding areas can be zoned as 'off-limits' to fishing and other recreational activities. These spatial refuges could be marked by buoys or ropes, which would deter the close approach of boats to important waterfowl habitat.

Second, boat traffic could be concentrated along specific routes, which would be chosen to avoid critical waterfowl habitat. For instance, in the northeast end of Smoothrock Lake, in Wabakimi Provincial Park, there are three channels through which boaters could navigate. By concentrating boating traffic to the channel with the least desirable waterfowl habitat, the impact of watercraft disturbances in the other two channels with better quality habitat could be minimized.

Restrict boat type

One factor that was influential in determining waterfowl reactions in our study was the type of boat causing the disturbance. The mean distance at which canoes could approach waterfowl without causing a disturbance was 73.1 m (n=9) versus 83.7 m (n=14) for motorboats. Thus, waterfowl are more tolerant of canoes than motorboats at a given distance. In areas of critical waterfowl habitat, management strategies that delimit boat type in favour of canoes rather than motorboats may reduce the frequency and severity of waterfowl reactions.

Figure 1. *Noise output versus speed of two different sized motors. The boat with the higher horsepower motor in this case was quieter at low speeds and the most noise-efficient at maximum speed than the boat with a lower horsepower motor.*



Restrict motor size

A commonly used management strategy is to restrict the size of motors allowed on boats within a park. This strategy has also been proposed as a means to alleviate social conflicts among water-based recreationists. Our data, however, suggest that to minimize the effects

of boating disturbances on waterfowl, motor size restrictions may not be as effective as expected. While canoeists and kayakers may dislike noise emitted by motorboats, our data showed no significant correlations between waterfowl reactions and noise levels. Furthermore, the relationship between motor size and noise level is not as straightforward as one would expect. Figure 1 illustrates that at lower speeds, the 15 horseppwer (hp) motorboat was actually quieter than the 6.5 hp motorboat.

At higher speeds, however, the reverse was true; the 6.5 hp motorboat was quieter than the 15 hp motorboat. At the maximum speed of the 15 hp motorboat, the noise efficiency (i.e., the noise output per metre per second) was maximized. Therefore, boats with smaller motors are not necessarily quieter. However, a more comprehensive study involving the measurement of noise output of motors of different sizes and brands at various speeds should be conducted to verify this finding.

In areas such as Wabakimi Provincial Park, where the majority of motorboat users are anglers who use the boats at maximum speeds for travelling or at low speeds for trawling, the 15 hp motor may be a better choice in terms of reducing noise output. Because waterfowl reactions did not show a significant correlation with noise, and because lower horsepower motors are not necessarily quieter, motor size restrictions may not be the most appropriate management technique for minimizing waterfowl disturbances.

Speed limits

Boat speed limits are difficult to enforce. In addition, our data suggest that speed is not a primary factor in determining waterfowl reactions to boat disturbances. Thus, speed limits may have limited value in minimizing waterfowl disturbances by motorboats. However, speed limits are useful in that they may reduce motorboat wake. Strong wakes erode vegetation and banks, which are important for waterfowl habitat (Liddle and Scorgie, 1980).

Combinations of management strategies

Although many of these management strategies could be effective on their own, combining two or more of them may increase the freedom afforded to recreationists while still protecting waterfowl populations. For example, managers at Ruby Lake National Wildlife Refuge in Nevada attempted several different combinations of management strategies to promote the coexistence of waterfowl and water-based recreation. One effective combination involved both temporal and motor size restrictions: access by non-motorized boats and boats with electric motors was permitted from June 15 to December 31 and motorboats of less than 10 hp were permitted also from August 1 to December 31 (Bouffard, 1982). This combination of motor size restrictions and temporal restrictions enabled the fulfilment of the refuge's primary purpose of wildlife protection, while providing opportunities, albeit limited, for water-based recreation.

Evaluation

Regardless of what management strategy or combination of strategies is adopted, the effectiveness of the approach should be monitored. Prior to implementating any of the

above strategies, park managers must identify their management objectives. Managers must have a clear understanding of the status of a waterfowl population prior to implementing management strategies. Thus, an initial survey of the waterfowl population to be managed should be undertaken to provide a benchmark for subsequent surveys. Ongoing monitoring of waterfowl populations is vital to evaluating the effectiveness of management strategies.

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