Waterfowl Populations on Swan Lake
Grand Teton National Park

Lin Havighurst
Colorado College

Waterfowl using Upper and Lower Swan Lake in Grand Teton National Park were censused regularly from 30 June 1969 to 18 August 1969. Differences in numbers and species of ducks using the two connecting lakes were noted. Factors affecting the lakes, sewage pollution, beaver dam location, natural succession and disturbances caused by horses and people were investigated. Although it is impossible to assign one factor as the most important cause of species differences on the two lakes, the relative importance of all influences is estimated. Further fall observation of migrating flocks of common mergansers and subsequent comparison of this point with Huckabee's (1965) data may give some index with which to compare present and past duck populations.

Approaches and departures were made as unobtrusively as possible with a pair of 9x36 binoculars for describing species and age classifications of the ducks. The size of the lakes made realistic identification in some areas impossible and consequently many ducks were only counted. Observation periods lasted until all visible ducks were classified or counted and an equal amount of time had been spent at both lakes. The time of the day of the visits was not specific. Early morning periods allowed undisturbed watching, while those after eight o'clock a.m. involved the additonal influences of people and horses. An equal number of both situations were considered.

The average number of waterfowl seen per visit were: 21 in lower Swan Lake, 5 in upper-middle Swan Lake and 1 in upper-upper Swan Lake. Eighteen different species were observed. The most common species on lower Swan Lake were mallard, green-winged teal and American widgeon; on upper-middle, ringnecked duck, mallard and Canada goose; on upper-upper, ringnecked duck and mallard.

A distinction between upper-middle and upper-upper Swan Lake is made because an area of lily pads divides the two, the upper-upper portion serving as a receptacle for raw sewage from Colter Bay. A chemical analysis of nitrates and phosphates in the three divisions indicated that the lily pads prevent homogeneous mixing of the sewage. Following is a tabulation of NO_2 and PO_4 found in different regions of Swan Lake and Third Creek (the stream serving as inlet and outlet):

	NO_2 (ppm)	PO_4 (ppm)
Lower Swan Lake	.02	.11
Upper-middle Swan Lake	.008	1.5
Upper-upper Swan Lake	.123	6.1
Upper Third Creek (inlet)	.023	.03
Lower Third Creek (outlet)	.05	.37
Junction of lower and upper lakes	.012	.67

Thus the distinction is important in judging the relative effect of increased sewage on waterfowl usage. Rodhe (1948) found that amounts of phosphorus as small as one ppm inhibit the reproduction of some algae but generally increased algae production is proportional to increased amounts of phosphorus. Hutchinson (1957) describes phosphorus as most indicative of the productivity of a biological system. Indeed, the upper-upper division has considerably more phosphorus than the inlet streams. Nitrate concentrations are very similar. However, in comparing the numbers of waterfowl using the upper-upper division to those using the upper-middle portion of Swan Lake, no appreciable differences in waterfowl usage appear. Of course feeding and nesting habits may be affected. Perhaps a noticeable difference will be evident this fall when fish-eating mergansers normally arrive at the lakes. Present pollution levels, however, do not correlate with waterfowl usage of the three divisions.

Beaver activity in inlet and outlet streams may profoundly influence waterfowl activity. If beavers build less dams in inlet streams, less spring water from snow and rain will be collected and the overall water level of the recipient lake will be less (Henderson and Craig, 1932). The creation of mud flats might be favorable as feeding areas for waterfowl provided the pond does not become completely dry. In the past 10 years, beaver dams have become less numerous in Upper Third Creek in part, at least, due to their destruction. A discontinuation of this practice would definitely produce a more stable aquatic environment for waterfowl.

The last unnatural factor to consider is the influence of people and horses on shy birds. One day, August 5, 1969, was spent surveying the numbers of visitors, which lakes they visited and what disturbance, if any, they caused in waterfowl populations. From 7:05 a.m. to 2:00 p.m. 9 people visited Lower Swan Lake and 6 visited Upper Swan Lake. In addition, a record of visitors seen during regular observation periods was kept. The differences in numbers of visitors to the two parts of Swan Lake was not appreciable. Often no waterfowl were visible on Upper Swan Lake for visitors to disturb, thus making an approximation of this influence difficult. In the consideration of this problem, however, one difference is obvious between the two lakes. The trail by Lower Swan Lake is located on a hill some 50 feet away from the east shore. On only one occasion did the approach of loudly talking people result in waterfowl immediately taking flight. In contrast, the trail by Upper Swan Lake is blatantly in the open about 10 feet from both shores. Certainly this must affect waterfowl nesting preferences and overall habitat selection. Relocating the Upper Swan Lake trail a few feet back in the woods--as part of it is now--would discount this hypothetical problem. Lower Swan Lake seems short-lived, successionally. Upper Swan Lake could be made a more enticing substitute for future waterfowl populations if visitor influences were at least obscured.

Osprey and marsh hawks were seen hunting in Lower Swan Lake and belted kingfishers in Upper Swan Lake. Great blue herons roosted in trees in both areas and were seen wading in the lower lake. These birds

indicate that both areas are relatively productive ecosystems. Perhaps the simple location of trails explains the large differences in waterfowl populations. Perhaps it is only a question of vegetation differences and food preferences. Further studies may credit man's contributions of pollution and beaver dam tampering as accelerating influences on the natural succession of this area.

Literature Cited

Henderson, F. and Craig, E. L., 1932. Economic Mammalogy. Charles C. Thomas, Springfield, Illinois, 397 pp.

Huckabee, J. W., 1965. Waterfowl Population Study in Jackson Hole, Wyoming. Master's Thesis, University of Wyoming, June 1965.

Hutchinson, E. G., 1957. A Treatise on Limnology: Vol. I, Geography, Physics, and Chemistry. John Wiley & Sons, Inc., New York. 1015 pp.

Rodhe, W., 1948. Environmental requirements of freshwater plankton algae. Symbolae Botan. Upsalienses, 10, No. 1, 149 pp.

Supported by National Park Service.