

## **The Impacts of Canada Goose Feces on Water Quality in Lakes**

Several peer-reviewed papers have studied the effect of goose feces on water chemistry. Manny et al. (1975, 1994) was the first to assess nutrients contributions to lakes by geese. This group estimated that the total contribution to nutrient loading in a lake from geese was as high as 40% of the nitrogen and 85% of the phosphorous. Other researchers supported these findings.

However, research published in 2007 by Unckless and Makarewicz debunked most of these claims. Through direct mesocosm experiments where differing levels of goose feces were added and its affect on the water column measured, they suggested that goose feces was unlikely to have immediate impacts on chemical limnology, but that over time the buildup of nutrients in the sediment may have significant effects on the water body. They found that goose feces simply sank to the sediment where it eventually became part of the benthic detritus food web. They did allow that it could be cycled back into the water column during a mixing event and stated that greater research was needed to determine the fate of goose feces in the sediment. In shallow bodies of water where greater mixing occurs fecal-containing sediments may be adding to the amount of phosphorous available for algal growth. The overall impact of bird feces will depend on numerous factors including the size, depth and natural chemistry of the waterbody, avian populations and behavior, and the rate at which other nutrient sources enter the water body (Unckless and Makarewicz 2007).

### **References**

Manny, B, Johnson, W, Wetzel, R, 1994. Nutrient additions by waterfowl to lakes and reservoirs: predicting their effects on productivity and water quality. *Hydrobiologia* 279/280: pp 121-132.

Manny, B, Wetzel, R, and Johnson, W, 1975. Annual contribution of carbon, nitrogen, and phosphorous by migrant Canada geese to a hardwater lake. *Int. Ver. Theor. Angew. Limnol. Verh.* 19: pp. 949-951.

Unckless, Robert & Makarewicz, Joseph, 2007. The impact of nutrient loading from Canada geese (*Branta canadensis*) on water quality, a mesocosm approach. *Hydrobiologia* 586: 393-401.