Diets of walleye (*Stizostedion vitreum*) in the eastern basin of Lake Ontario, 1999 and 2000

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The abundances of two piscivores, walleye (*Stezostedion vitreum*) and double-crested cormorants (*Phalacrocorax auritus*), have increased in the eastern basin of Lake Ontario in recent years (NYSDEC and USGS 1999; Eckert 2000). At the same time, population levels of smallmouth bass (*Micropterus dolomieui*) and other warm-water fishes have declined (Eckert 2000). Since 1992, the NYSDEC and USGS have conducted numerous studies to assess the impact of double-crested cormorant populations on the abundance and age structure warm-water fish populations in Lake Ontario's eastern basin. Adams et al. (1999) and Lantry et al. (1999) reported that double-crested cormorants were negatively impacting survival of young smallmouth bass. Walleye diet studies were also conducted to determine if and to what extent walleye were preying on smallmouth bass and other warm-water fishes.

Diets of walleye collected from the eastern basin of Lake Ontario and by anglers during 1998 showed no evidence of smallmouth bass consumption and only infrequent occurrence of other warm water fishes (i.e. yellow perch [*Perca flavescens*]; Schneider et al. 1999). This report contains the results of diet analyses of walleye caught by anglers during 1999 and 2000.

Methods

During 1999 and 2000, stomach samples were collected from walleye caught by anglers in the eastern basin of Lake Ontario. The entire digestive tract from the gills to the vent was removed from each fish and placed in a zip-lock bag with a tag containing capture date and total length. All samples were frozen as soon as possible after cleaning to slow decomposition.

Stomachs were thawed at room temperature. Stomach contents were considered to be everything anterior to the pinch of the hindgut. Each stomach was classified as empty or containing food. The weight of the stomach contents for each sample was determined to the nearest 0.1 g. All prey items were enumerated and identified to species (fish and common invertebrates) or order (less common invertebrates). Well-digested contents were identified using fish skeletal remains. If unsure of the correct identification, remains were classified as "unidentifiable". Length (total or vertebral column) was measured to the nearest 1.0 mm for as many prey fish as possible. Vertebral column lengths of alewife were converted to total lengths by using a species-specific vertebral column length to total length regression equation developed by Elliott et al. (1996).

Monthly data summaries included: 1) length frequency distributions of sampled walleye and the consumed alewife; 2) frequency of empty stomachs; and 3) the percent frequency of occurrence for each prey type.

Results

No smallmouth bass and only one yellow perch (127 mm) were found in all stomachs examined from 1999 and 2000 collections. In 1999, nine walleye stomach samples were collected (two in April, six in May and one in August). One of two stomachs collected in April contained prey (two 99 mm alewife and one unidentifiable prey fish). Of the four non-empty stomachs collected during May 1999, 75% contained *Hexigenia* sp., 25% contained alewife (*Alosa pseudoharangus*) and 75% contained unidentifiable prey. The one stomach collected in August 1999 was empty.

From May through August 2000, 160 walleye stomach samples were collected. During May 2000, 150 stomach samples were collected from walleye 14 to 32 inches in length (see Figure 1, page 8-3). Twenty four percent of May samples were empty. *Hexigenia* sp. was found in 56% of the non-empty stomach samples (average of 24 *Hexigenia* sp. per stomach [$\pm$ 5.2]). *Hexigenia* sp. was the only prey species in 31.6% of the non-empty

stomachs (average of 25 *Hexigenia* sp. per stomach [± 5.2]). Alewife and unidentifiable prey were found in 34% and 36% of samples, respectively. Over 90% of alewife consumed by walleye during May 2000 were age 2+ (Figure 2). Other fish (yellow perch, slimy sculpin [*Cottus cognatus*], three-spine stickleback [*Gasterosteus aculeatus*], and brown bullhead [*Ictalurus nebulosus*]) and invertebrate (annalid, *Dreissena polymorpha*, Ondonata, and aquatic Lepidoptera) diet items were rare in May 2000 diets. Mudpuppy skeletal remains were found in one walleye stomach during May. Only 10 walleye stomach samples were collected from June through August 2000.

During June 2000, eight non-empty stomach samples were collected from walleye 24 to 31 inches in length. Fifty percent of these stomachs contained *Hexigania* sp., 75% contained alewife and 25% contained unidentifiable prey fish. As observed during May, the majority of alewife consumed by walleye in June 2000 were age 2+ . One walleye stomach collected in July contained the skeletal remains of one alewife. The only stomach collected during August was empty.

Discussion

Walleye diet information for this study was primarily limited to May 2000; however, it still does not appear that walleye are significantly impacting the smallmouth bass populations in the eastern basin of Lake Ontario. Similar to previous eastern basin Lake Ontario walleye diet studies (Schneider et al. 1999), there was no evidence of smallmouth bass consumption byu walleye during 1999 or 2000. The burrowing mayfly, *Hexigenia* sp., and alewife were the most important diet items for walleye during the spring period.

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Figure 1. Length frequency distributi