ABSTRACT
Drawdown is a common lake management technique, which involves a controlled water level reduction. I studied the effects of a six vertical feet drawdown on the Hanover Pond ecosystem in Meriden, CT, where a new hydroelectric dam was being installed. Abiotic and biotic data were collected in the form of water quality measurements and avian community observations. The water quality measurements focused on conductivity and salinity, and avian community data comprised species richness and species abundances of year-round birds.

I found that during drawdown, conductivity and salinity increased, and species abundance and richness decreased. What was particularly interesting was the significant change in water quality within a short time span of 4 months. This finding alone emphasizes the potential temporary negative effects that drawdown may bring on a freshwater ecosystem.

INTRODUCTION
Water level drawdown is a lake management practice widely used across the world for the construction/repair of hydropower apparatus, to control invasive plants, protect shorelines from erosion, and many other reasons (1). Drawdown is the process of lowering the water level of a lake through means of opening a dam or gates. The potential effects of drawdown can be changes in water quality, and major fluctuations in wildlife and aquatic life populations due to temporary habitat loss (1).

Drawdown was used in Hanover Pond—a 70 acre man-made pond that is a part of the Quinnipiac River watershed—in Meriden, CT (Fig. 1). It is inhabited by many species of birds, drawing the attention of many birders. In September 2016, six vertical feet of water were drawn out of the pond via the opening of a dam, for the purpose of a hydropower project (Fig. 2). Concerns were voiced by the community about potential harm to wildlife that inhabit the pond.

Working with the Quinnipiac River Watershed Association and Cheshire Land Trust, I assessed the impacts of drawdown on abiotic (water quality) and biotic (avian community structure) aspects of the pond. I predicted that the drawdown would cause a decrease in water quality and a decrease in the number and abundance of birds using the pond.

METHODS
• Study was conducted at Hanover Pond (Figs. 1 & 2) from September to December of 2016.
• Data were collected before the drawdown (Sept 13), twice during the drawdown (Sept 22, Oct 12) and once after water levels returned (Dec 4).
• Data were recorded at 3 different locations (Fig. 1): south side, center of the pond, and north side.
• During each survey period and at each survey location the following data were collected:
  o Water quality—conductivity, salinity, pH, DO, and water temperature were recorded using a YSI meter (Fig. 2).
  o Avian community—10 minute point count survey was conducted in which species and relative abundance was recorded for year-round birds (excluding songbirds; Fig. 5).

WATER QUALITY RESULTS
• pH remained unchanged with readings ranging from 8.72-8.79.
• Dissolved oxygen decreased sharply from 13.70 mg/L (Sept 13) to 7.38 mg/L (Sept 22) shortly after the drawdown, but increased with time to 11.99 mg/L (Dec 4).
• Conductivity increased shortly after drawdown, but decreased with time (Fig. 3a).
• Salinity increased during drawdown as well (Fig. 3b; note: large jump in salinity at point 3 may be due to road salts from nearby parking lot); salinity not recorded in December.

AVIAN COMMUNITY RESULTS
• Shortly after the drawdown, species abundance was at its highest, but declined over time (Fig. 4a).
• Species richness also decreased with over time (Fig. 4b).

REFERENCES

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