



The New R/V Kaho – Lake Ontario

The USGS Great Lakes Science Center is dedicated to providing scientific information for restoring, enhancing, managing and protecting living resources and their habitats in the Great Lakes region.



The Center is headquartered in Ann Arbor, Michigan, and has biological stations and research vessels located throughout the Great Lakes Basin.

Background

The new R/V *Kaho* (built in 2011) is replacing the original R/V *Kaho* (built in 1961). The replacement vessel is funded from the American Recovery and Reinvestment Act (ARRA).

The original R/V *Kaho* has been the workhorse of the fisheries research fleet in Lake Ontario for over three decades. The vessel was built in 1961 by Hansen Welding Company in Toledo, Ohio, and since it was assigned to the Lake Ontario Biological Station in 1977, the *Kaho* has participated in long-term population studies of important prey fish and in long-term studies aimed at evaluating the performance of stocked lake trout used in the bi-national restoration program. Current information on prey fish populations is used by resource agencies to manage stocked predator populations and population models built from the long-term data are used to anticipate future changes in the prey fish community.

In addition to lake trout restoration research, the *Kaho* has participated in tightly focused short-term studies designed to determine the effect of invasive species on the Lake Ontario ecosystem. Such studies included documenting changes in the food web and in fish distribution associated with establishment of invasive species. Studies conducted aboard the *Kaho* documented the spread of zebra and quagga mussels across the lake bottom and the concurrent decline of the burrowing amphipod, *Diporeia*, an important food for many fishes. The *Kaho* is also used to collect fish and

environmental samples for a wide spectrum of studies, including the Great Lakes Fish Contaminants Monitoring Program in cooperation with U.S Environmental Protection Agency.

Specifications

There are two washrooms (one with a shower), and a full galley, including an electric range, microwave, refrigerator, and dining area. The R/V *Kaho* has the ability to be at sea for 5 days with sleeping accommodation for 6 people.

Length: 70 ft.

Beam: 18 ft.

Draft: <6 ft.

Displacement, Lightship: 121,254 lbs (55 LT)

Displacement, Full Load: 143,300 lbs (65 LT)

Propulsion: Two 965 bhp engines

Maximum speed: 15 knots

Range: 600 nm @ 12 knots

Fuel Capacity: 3000 gallons

On-board Equipment

The new R/V *Kaho* is designed with state-of-the-art industrial systems to support the widest possible range of scientific sampling activities. The main winch system allows deployment of multiple towed gears (trawls, sonar devices, gliders, plankton nets, etc.) using centerline or double-warp configurations. It allows for precision fishing at specified depths via an integrated net mensuration system, line counters, and tensiometer. An A-frame provides options for stern gear deployment and lifting, and a knuckle crane facilitates the transfer of large loads and specialized sampling needs. The ship also has a hydraulic gillnet lifter, which is a primary tool used in cooperative surveys across Lake Ontario. To survey forage fish and zooplankton biomass, the vessel is



The old R/V *Kaho*, 65 ft. length.

equipped with a hydroacoustic transducer (120kHz) and is deployed in a through-hull transducer tube designed to minimize bubble sweep and background noise. Ship propulsion and power plant systems are designed for quiet operation. Twin propellers, a bow thruster, and hydraulic anchor winch provide a variety of options for stationary sampling. In addition, the scientific instrument winch has slip-ring capability that facilitates safe deployment of sensor arrays when real-time observation is necessary. Onboard sample processing and storage is supported via a stainless steel work bench in the wet laboratory, motion-compensating balance, chemical storage locker, cold and hot water supply, clean AC power supply, and large freezer capacity. Navigation, weather, and winch operation data are supplied to the dry lab area and can be integrated electronically with data from scientific sensors to support a wide range of project needs. To facilitate business communications while underway, the ship is also equipped with a 3G/4G cellular modem and WiFi network that are operational throughout most of US waters on Lake Ontario.