

APPENDIX IE-4 – Lake Tahoe Aquatic Invasive Species Program Summary

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The Lake Tahoe Aquatic Invasive Species Program (LTAISP) is part of the Lake Tahoe Environmental Improvement Program (EIP) and one of the programs that is implemented through the *Regional Plan*. The LTAISP is a bi-state, local, private, and federal multi-agency partnership tasked with the implementation of the Lake Tahoe Region Aquatic Invasive Species Management Plan (The Plan). TRPA is the lead agency for oversight of the Plan as well as the fiscal agent. Implementation of the Plan is organized into three areas that address the Plan's goals: Prevention, Control, and Monitoring. For more details on the organization of the LTAISP and implementation of the Plan please refer to the LTAISP Annual Work Program Review.

Funding for the implementation of the Plan and LTAISP is provided by multiple federal, state, and private sources. TRPA acts as the fiscal agent for the Plan and provides reporting and accounting for LTAISP funds, as well as passing through funding from other sources. Since 2006, significant contributions from multiple partners have made the LTAISP possible. The largest single source of funding for the LTAISP to date has been from the Southern Nevada Public Land Management Act (SNPLMA) through the USFWS.

The control effort of the LTAISP is focused on the removal of aquatic invasive species (AIS) currently found in the Lake Tahoe Region, and abating the impacts from these species. The suite of AIS currently in the Lake Tahoe Region includes, Eurasian watermilfoil (*Myriophyllum spicatum*), curlyleaf pondweed (*Potamogeton crispus*), Asian clam (*Corbicula fluminea*), and multiple species of invasive warm water fish such as largemouth bass (*Micropterus salmoides*) and small mouth bass (*Micropterus dolomieu*).

The Asian Clam Working Group (ACWG), comprised of agency staff and researchers, is a sub-group of the LTAISP, and is tasked with planning and implementing projects that experiment with non-chemical treatment strategies for Asian clam treatment in Lake Tahoe. The ACWG began experimental work in Tahoe during the summer and fall of 2009. Small scale (10' x 10' plots), of rubber pond liner sheets were placed over Asian clam beds in two locations within the Lake (Marla Bay and Lakeside Marina). These rubber bottom barriers created a zero dissolved oxygen environment underneath the sheet, and after an approximately 30-day period at peak summer Lake temperatures (16-19 °C), caused Asian clam and other benthic macroinvertebrate mortality. The ACWG came to the conclusion that this small-scale pilot project yielded potential for the use of rubber bottom barriers as a treatment method in Lake Tahoe. This protocol was tested in 2010 at a larger scale with two ½ acre plots at Marla Bay and Lakeside Marina with equally successful results. In 2011, focus shifted to the Asian Clam population in Emerald Bay, and to assessing the viability of the bottom barrier technique in the colder waters of the winter months. The Emerald Bay population was first surveyed in 2009 and is currently limited to the mouth of the bay. The topography and boat use in the area necessitated further testing of bottom barriers before full scale control operations could be undertaken.

The Nearshore Aquatic Weed Working Group (NAWWG) of the LTAISP encompasses the various efforts underway to control, and where possible, eradicate populations of invasive weeds in the nearshore of Lake Tahoe. Projects within this program make use of established techniques such as benthic barriers and diver-assisted suction, while also seeking to improve these methods and evaluate novel approaches which may increase efficiency and effectiveness.

Work on aquatic weeds in Tahoe began in 2005 with a survey and removal project to test the diver-assisted suction removal method for an existing small population in the southwest corner of Emerald Bay. Since 2005, the number of acres of weeds removed from the nearshore of Lake Tahoe has increased (Figure 1).

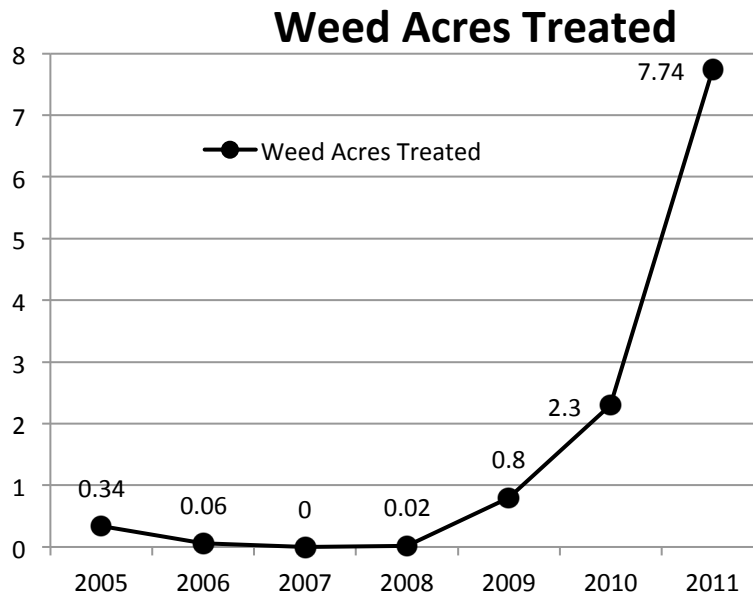


Figure 1: Acres of aquatic invasive weeds treated as part of the effort to control aquatic weeds in Lake Tahoe between 2005 and 2011. Treatment types included bottom barriers, which kill weeds in place and removal by diver assisted suction.

In addition to removing weeds from the nearshore of Lake Tahoe, additional work has been done in the Tahoe Keys. The Tahoe Keys were constructed along the south shore of Lake Tahoe in a historic wetland complex at the lakeshore interface between the Upper Truckee River and Taylor Creek marshes. Since the 1990s, the Tahoe Keys has become infested with invasive weeds, and are a source population of these species for the rest of the Lake. The purpose of the effort in the Tahoe Keys is to compare various strategies and actions (both mechanical and herbicide-based) for suppressing and controlling aquatic weeds, in order to develop a weed management plan for the Tahoe Keys. Implementation of this project started in 2011. Two types of bottom barriers were deployed (synthetic and burlap) covering a total area of approximately 1.23 acres. The effectiveness of both types of barriers in plant control, as well as potential impacts on macroinvertebrates, will be assessed as part of this study. In addition to the bottom barrier testing, dye dissipation studies were conducted in July and October 2011.

In recent years, small satellite populations of non-native warm water fishes (e.g. largemouth bass *Micropterus salmoides* and bluegill *Lepomis macrochirus*) have been found along the shoreline of Lake Tahoe. These populations are likely sourced from a larger, more established population in the Tahoe Keys. Establishment of these species has virtually eliminated the native minnow population from the Keys' lagoons. Lake-wide establishment of these non-native fishes can significantly impact the native biota of Lake Tahoe.

Beginning in 2011 mechanical removal of non-native fishes was conducted at 14 pre-selected sites (12 sites in California and 2 sites in Nevada) by CDFG staff between ice out (~ May) and ice in (~Nov). Electrofishing was the primary mechanical removal technique used, and it was supplemented by

occasional gillnetting, and hook and line attempts. Extensive distributions of non-native fish were found at Tahoe Keys East and Tahoe Keys West. A total of 12,485 non-native warmwater fishes were captured and removed from sampled sites. Species removed include largemouth bass, bluegill, black crappie (*Pomoxis nigromaculatus*), brown bullhead (*Ameiurus nebulosus*), goldfish (*Carassius auratus*), smallmouth bass (*Micropterus dolomieu*), and golden shiner (*Notemigonus crysoleucas*). The majority of the catch was captured in the Tahoe Keys, and mainly consisted of largemouth bass and bluegill. The first voucher specimen of smallmouth bass (15.5 inches, 2.3lb, gravid female) was collected at the first intensive electrofishing event in June.

The prevention effort of the LTAISP is focused on the prevention of new introductions of AIS and the prevention of existing AIS within the Region. While inspections of *non-motorized* watercraft have occurred since 2009, the primary focus of the prevention effort is the motorized watercraft inspection program.

The motorized watercraft inspection program is tasked with creating a barrier to target AIS entry to Tahoe Region, and preventing AIS movement from one Tahoe Region waterbody to another by motorized watercraft. Inspections of motorized watercraft began with a pilot program in 2007 and have dramatically increased in scope since then with additional regulations and programmatic improvements. Currently, the program is implemented year-round and encompasses roadside inspection and decontamination facilities. In addition, staff are present at all launch facilities to ensure that only previously inspected watercraft launch in the waters of the Region. The continual improvement of the program through changes in protocol and approach makes direct comparison of total effort between years difficult. However, the number of AIS inspections conducted by this program in 2010 and 2011 is reflected in Figure 2.

Approximately 30,427 check-ins were recorded at the launch facilities and marinas, representing launch activities of previously inspected and sealed watercraft.

In 2011, the motorized watercraft inspection program conducted a total of 7,667 full AIS inspections, and 4,800 decontaminations at roadside inspection stations.

Overall, performance by the motorized inspection program during 2011 exceeded the accomplishments of the previous year. While the number of full AIS inspections implemented in the summer season decreased from 8,200 during 2010, to 7,667 in 2011, this was likely due to conversion of watercraft to "Tahoe Only," by maintaining intact inspection seals, as the number of watercraft in that category increased from 6,500 to 6,989 during the same period.

The number of decontaminations in the summer season dramatically increased from 1,200 in 2010 to 4,800 in 2011.

Aquatic Invasive Species Inspections

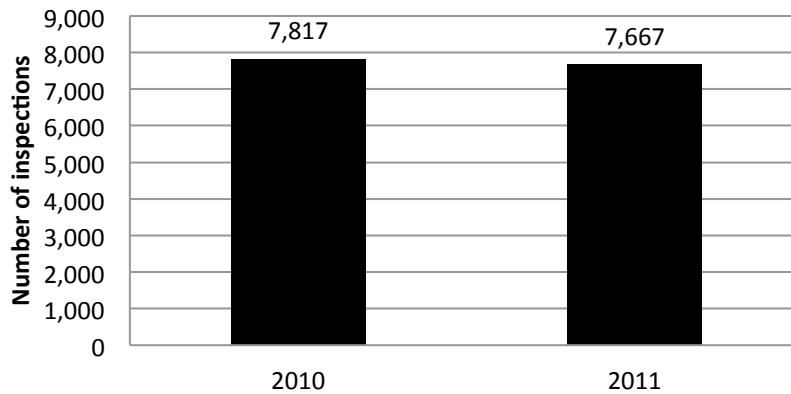


Figure 2: Number of aquatic invasive species inspections conducted in the Lake Tahoe Region in 2010 and 2011. While inspections were conducted in 2007-2009, changes in the program make direct comparison of these years invalid.

The monitoring effort of the LTAISP is focused on detecting new invasions and developing the tools to respond rapidly. Early detection monitoring and a rapid response plan are critical components of the LTAISP. As part of the early detection plan, monitoring for quagga mussel and zebra mussel veligers has been conducted each year since 2010 at various locations throughout Lake Tahoe, Echo Lake and Fallen Leaf Lake. Monitoring locations target boat ramps, open water, near water outflows and inflows, downwind areas, and eddies, or areas where plankton collects (i.e., behind islands, etc.). In 2010, 78 plankton samples were collected and analyzed for the monitoring effort. In 2011, 60 plankton samples were collected and analyzed. Seven substrate samplers (that provide locations for mussel veligers to settle in areas of high boat traffic) were also added to the monitoring effort. These substrate samplers were checked a total of 42 times during the boating season. To date, there have been no detections of quagga mussel or zebra mussel veligers in Lake Tahoe, Echo Lake, or Fallen Leaf Lake.