Echo Lake 2023 Pilot Research Summary

Image 1: Two CUTL team members on the water on Echo Lake. In the background is the Western rim of the basin.

Pilot Survey Dates:
October 2nd, 2023 - October 6th, 2023

Pilot Summary:
Our team performed four survey cleanup dives in Echo Lake (See Figure 1 below). During these dives the team covered a total underwater distance of 1.27 miles while collecting litter and evaluating litter accumulation, and distribution patterns below the surface. The team also performed a preliminary assessment and documentation of the presence of potential aquatic invasive species, heavy lift items, unknown items and hot spot areas.

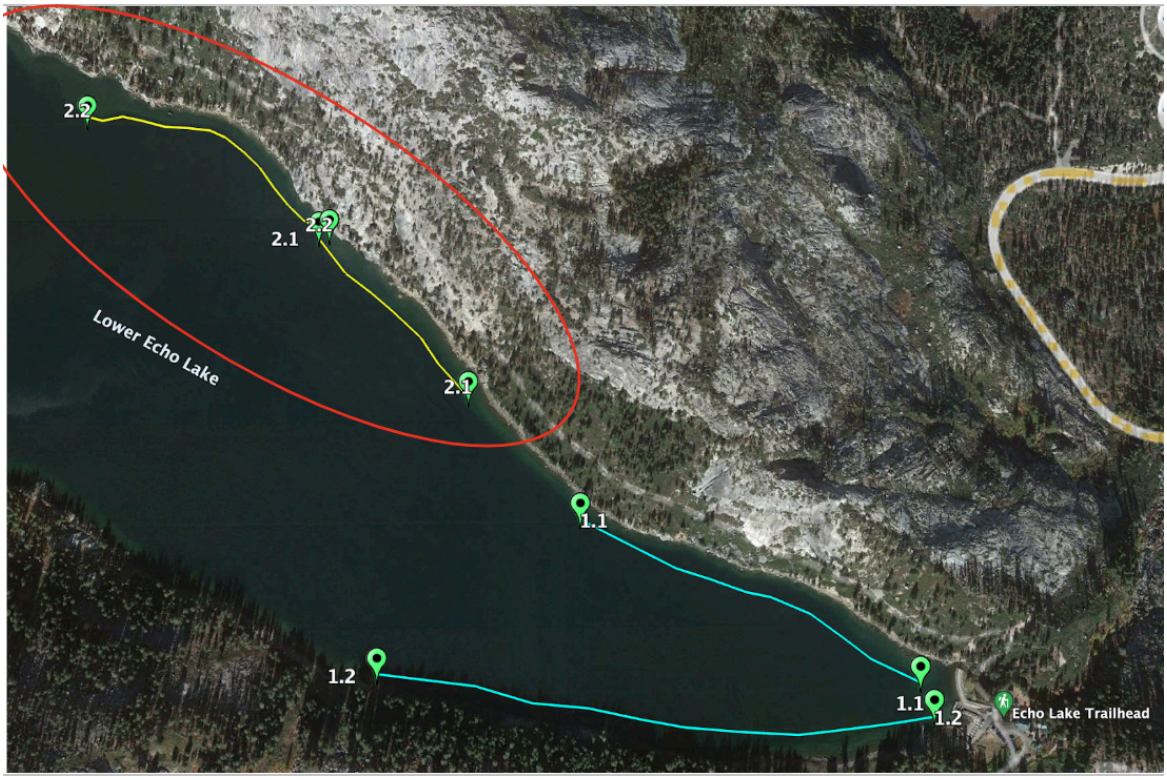

Figure 1: Shows the start and end points for the four dives that the CUTL team completed at Echo Lake. Note that dives 1.1 and 1.2 (shown with a blue pathway) were dives using Diver Propulsion Vehicles (DPVs) where the target was video + photo surveillance during the DPV dive to assess prevalence of litter, non collection items and potential aquatic invasive species. Dives with endpoints labeled 2.1 and 2.2 (with yellow pathway) were survey clean up dives where DPVs were left behind and divers removed litter to have a proper sample of Echo Lake submerged litter. The red circle shows the area on Echo lake with the most development of private residences.

<u>Dive Day 1- October 3, 2023</u>:
Distance Surveyed: 0.82 mi

- **Dive 1.1) 0.33mi**
- **Dive 1.2) 0.49 mi**

In the Echo Lake Pilot Research project, the team utilized diver propulsion vehicles (DPVs) to survey Echo Lake. These underwater scooters significantly increased the team's efficiency, enabling us to conduct a comprehensive assessment of the factors threatening Echo Lake's health. During the DPV survey dives the team was able to complete two separate dives to assess the Eastern rim of the Lake. These dives are shown in blue on Figure 1 above. The team notes that housing development is prevalent on the Northern and Southern shores further from the marina, toward the eastern side of the lake, and thus prioritized cleaning up on the most developed section of the lake shown in Figure 1 in the red circle.

During this survey, the team utilized GPS technology to pinpoint hotspot locations and identify various heavy lift litter items. The locations of the hotspots as well as the heavy lift items are shown in Figure 2 below. The team identified four heavy lift items (denoted by yellow pins) and five hotspots (denoted in pink pins), displayed on Figure 2 below. Heavy lift items are items that

are too heavy for the divers to extract without additional equipment. GPS points, photographs and items description were recorded for removal in the future. Some heavy lift items identified in Echo Lake were a fire hose, an oil drum and metal pipe among other items. Hot spots are GPS recorded to identify areas where the dive team noticed a large amount of litter noting that more attention may be required.

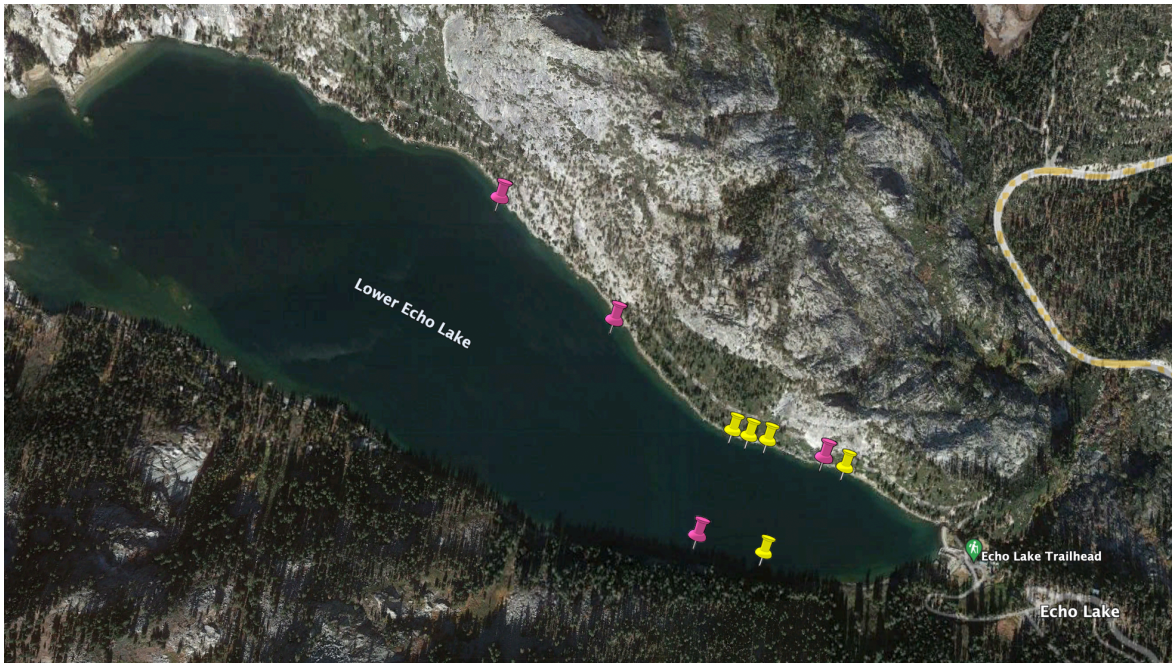

Figure 2: Shows the locations of five heavy lift items denoted by a pink pin and four hot spot areas denoted by a yellow pin.

<u>Dive Day 2- October 5, 2023</u>:
Distance Surveyed: 0.45 mi

- **Dive 2.1) 0.20 mi**
- **Dive 2.2) 0.25 mi**

During the second dive day, the team was able to successfully complete two clean up survey dives (2.1 and 2.2) along the northern shore, heading west. These dives are shown on Figure 1, denoted by yellow pathways. A volunteer team consisting of volunteer divers, a free diver, two kayakers and a jet skier was deployed to collect litter. Beginning at site 2.1 the team headed west along the northern shore and collected 36 different lightweight litter items totaling 26.41 lbs of litter. In the afternoon the team started a second dive at site 2.2 and again headed west. **That dive resulted in 44 lightweight litter items totaling only 9.82 lbs. In total for day two, the team collected and removed 80 different lightweight litter items weighing a total of 36.07 lbs from Echo Lake.**

<u>Pilot Findings:</u>
After removing litter from Echo Lake, our team meticulously sorted the collected litter using the internationally recognized method established by the United Nations Environmental Programme. This method categorizes items into 83 distinct groups based on their material

composition and purpose, refer to Figure 5 to see the full breakdown of categories. Upon analysis, the predominant materials, ranked by weight were, metal (21.39 lbs.), wood (4,06 lbs.), other (3.96 lbs.), cloth (3.63 lbs.), glass/ceramic (2.29 lbs.) and plastic (0.74 lbs.). Conversely, the predominant materials ranked by individual item count were, metal (43 items), plastic (17 items), glass/ceramic (11 items), rubber and cloth (4 items) and wood (1 item). It is important to note that despite plastic ranking last by weight it ranks second in count, see Figure 4 for visual representation.

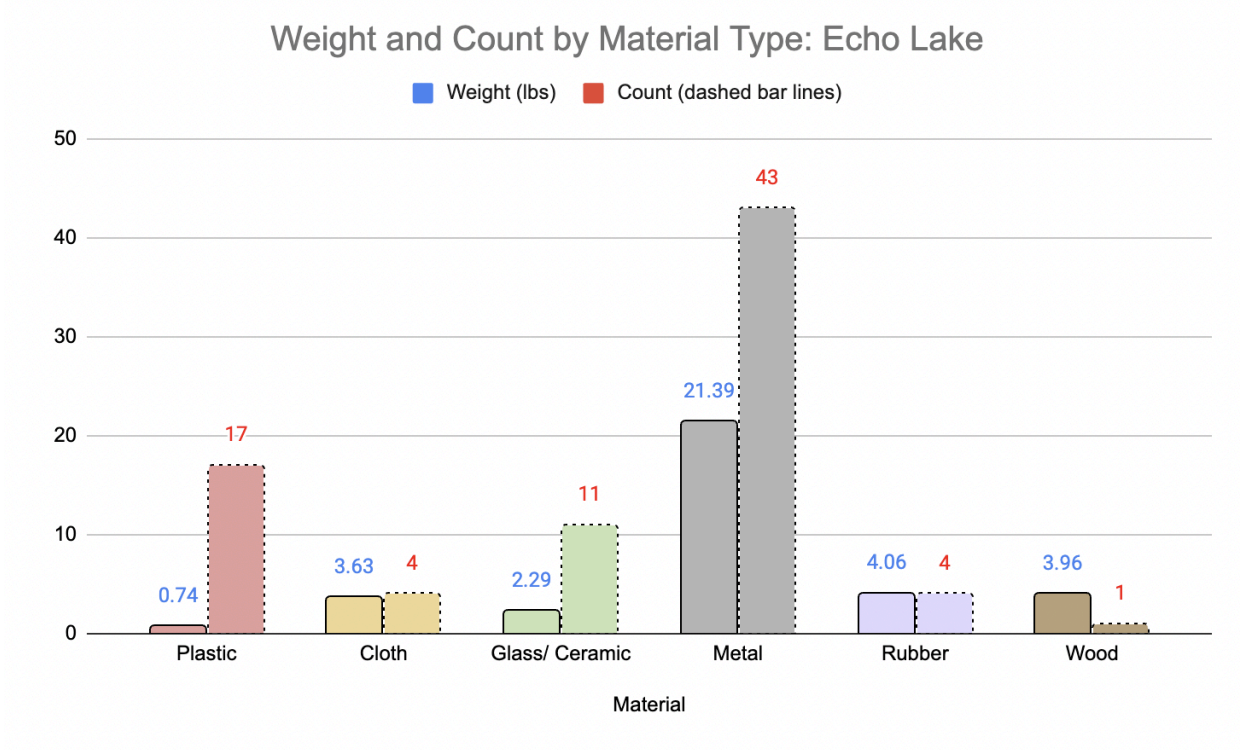

Figure 4: Shows material collected from Echo Lake by weight and count.

Material Data	Weight (lbs.)	Item Count
Plastic	0.74	17
Foam Weight	0	0
Cloth	3.63	4
Glass/Ceramic	2.29	11
Metal Weight	21.39	43
Paper/Cardboard	0	0
Rubber Weight	4.06	4
Wood Weight	3.96	1
Other Weight	0	0
Project Totals	**36.07**	**80**

Figure 5: Shows a tabular version of the material breakdown including item count and weights.

Conclusion:

According to our current dataset for Echo Lake, there is a low urgency for a full circumnavigated cleanup which are typically recommended for lakes that rank medium to high urgency as they allow our teams to address the heavily littered lake beds. Our organization was encouraged by the result of the pilot research that indicated lower levels of litter accumulation in Echo Lake. While the litter-loads present in Echo Lake are not as high as what our team found in Fallen Leaf Lake, Donner Lake and Lake Tahoe where we have cleaned in recent years - we recognize any level of litter is unwelcome in our alpine lakes. As a result of the pilot research there is now a baseline assessment of Echo Lake's health and initial next steps for protection. As with most lakes around the nation, what is out of sight is out of mind; and without having completed this pilot research with the support of Drink Coffee Do Stuff and Meyers Community Foundation Echo Lake would still be an unknown factor.

Regarding future submerged litter cleanups in Echo Lake, we consider it to be of low to medium urgency for comprehensive circumnavigated cleanup endeavors. However, we advocate for additional litter surveys in the next 3-5 years to assess how visitation influences litter accumulation. Additionally, leveraging the identified litter hotspot data, our Environmental Dive Center intends to conduct altitude dive cleanups using specific GPS coordinates. This will enable us to organize conservation dive tours aimed at continuing the cleanup efforts in those targeted locations.

When considering the weight, the predominant types of litter in Echo Lake, such as metal and rubber, align with those observed in other lakes in the region. In terms of quantity, plastic and metal emerge as the most prevalent, which matches the trends we have found in other regional lakes.

As for monitoring of Aquatic Invasive Species (AIS), our dive teams did not find any signs of invasive species in the areas we surveyed in October 2023. However, given the high risk and fast spreading potential of AIS, we would recommend annual surveys for protecting against the threat of aquatic invasive species, especially with the recent introduction of the New Zealand Mudsnail into the Lake Tahoe region.

To ensure the continued protection of Echo Lake in the most effective manner, we recommend all interested parties conduct further AIS and submerged litter surveillance using tools like diver propulsion vehicles and SCUBA divers. These efforts would identify any future threat of aquatic invasive species that could be introduced into Echo Lake from other regional lakes.

While the primary concern for Echo Lake is the potential spread of AIS, individuals conducting surveys will be equipped to remove all litter during upcoming work to preserve and enhance its present state. To bolster future initiatives, our organization intends to proactively guide conservation dive tours from our Environmental Dive Center, particularly those interested in higher altitude diving, towards the hotspots identified by our pilot team along the rim of Echo Lake using GPS coordinates. The objective of these recommendations for Echo Lake is to

safeguard this cherished regional asset from the risks of pollution and bio-pollution posed by submerged litter and aquatic invasive species.

Image 2: CUTL diver holding bags of litter collected from dives 2.1 and 2.2