SURVEY OF SUBMERGED NOXIOUS WEED SPECIES IN LAKE CHELAN WASHINGTON

1/26/2015

Produced by AquaTechnex

Lake Chelan was surveyed by air and by boat in the fall of 2014 to locate noxious weeds and assess their overall presence and influence in the lake. What follows is the summary of methods, survey finding, discussions on observations and recorded data, and a set of maps showing the locations of any recorded invasive species.

Survey of Submerged Noxious Weed Species in Lake Chelan Washington

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Surveying Methods

A two pronged approach was utilized in the surveying of Lake Chelan. The first step was to conduct an aerial imaging mission using AquaTechnex protocols for mapping invasive aquatic weed growth. This technology uses a DGPS imaging camera to collect digital high resolution low altitude photography and obtain seamless coverage of the littoral areas and shorelines of the lake. This imagery is collected using flight protocols and water penetrating filter systems to maximize detection of aquatic plant communities.

The ASA imagery was processed and linked to the ArcGIS project file for this mission. Each image was analyzed for the presence of aquatic macrophyte beds and the locations of these beds were mapped in a new layer. These maps were then transferred to our field computers for the next stage of the survey.

Our team then mobilized mapping vessels to Lake Chelan. The on-board systems are equipped with Toughbook Computers, ArcGIS, Trimble ProXT submeter GPS receivers and Trimble GPS Analyst extension for ArcGIS. This system allows for the display of the mapping vessel's exact location over the project in ArcGIS showing the aerial imagery of the project and the various information layers. This system is used to navigate to each plant bed mapped from previously and update real time in the field to include the exact species composition and plant bed boundary. The aquatic plant species and density attributes were collected using the Trimble Software and updates to the ArcGIS project file would be performed real time. Any noxious aquatic weed species beyond Eurasian Milfoil would be noted and mapped as well. Our biologists are expert in the identification of both submerged and emergent noxious aquatic weeds.

All collected data from this survey was transferred to ArcMap and utilized to generate maps and data for this report. These maps are included at the end of this document.

Findings and Discussion

Lake Chelan has had a known community of Eurasian Milfoil for at least 15 years and was likely present for many years prior to its first recorded observation of fragments. This is evident in the milfoil having established itself in much of the habitable photic zone of the lake. Lake Chelan tends to have a lot of debris accumulated on the bottom which made for a challenge during photo interpretation and in the field needed more than the usual amount of time to inspect.

An interesting aspect of the plant community in Lake Chelan is how it has adapted to the fluctuation in water level each year. The difference in the high-water level in the summer and the lower levels of the winter drawdown seem to average about 15 feet. The areas of shoreline which are exposed during this drawdown period are subject to the freezing temperatures and this will typically cause plants to die. Because milfoil is spread by fragmentation and does not produce seeds or over-wintering buds, its only means of survival during winter months is to regrow from its root crown. If this root crown is exposed to freezing temperatures for long enough it will not survive the winter. This drawdown and freezing effect has restricted the milfoil to depths generally below 15 feet when the lake is at full pool in the summer. The pattern creates a band of plants which abruptly starts a foot or two below low pool levels. This band varies in width from 10 feet to 60 feet depending on the bathymetric characteristics and water clarity – typically being a thin band where depths increase quickly or clarity is poor and wider where clarity is high the depths increase gradually.

The drawdown which has restricted the milfoil to deeper water not subject to freezing has probably also allowed the milfoil to establish itself in water depths which are greater than typically seen. While the water level is low in the fall and winter months, the plants can root in depths which are 5-10 feet in April but are up to 25 feet deep in August. This can have a significant affect in terms of management but also for timing surveys to locate all the plant beds. A form of rapid plant biovolume assessment such as the BioBase system

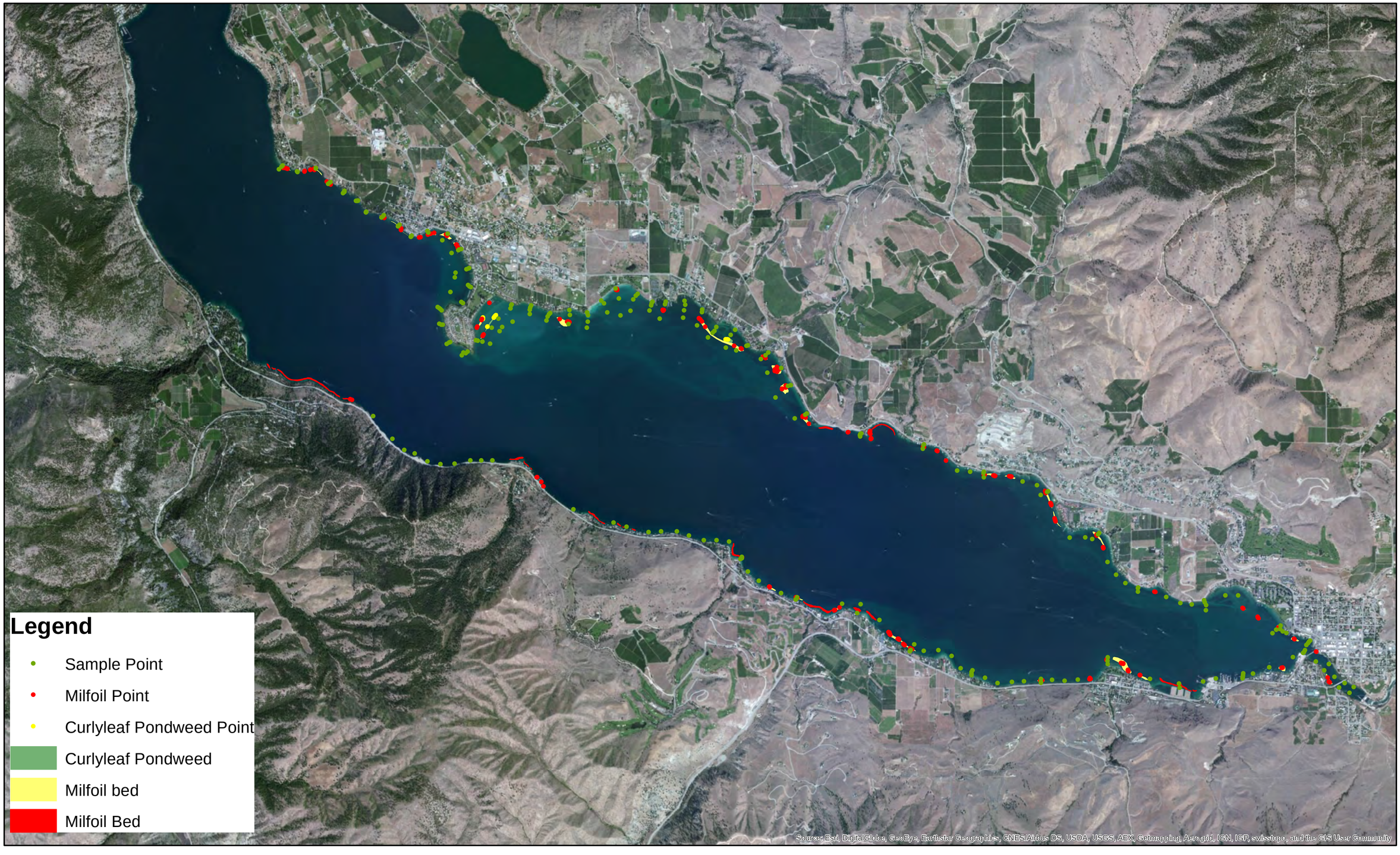
would be able to accomplish this by scanning the photic zone of Lake Chelan throughout the year – which could be depths of 40 feet or more when the lake is at full pool. This may have also had an effect on the overall dominance of milfoil within many of the plant beds. Milfoil was often the dominant species but in many plant beds it was certainly established in the area but was not dominant nor did it look like it was expanding quickly.

Additional surveying of Lake Chelan at different times of the year would likely give a better understanding of the milfoil community. Because Eurasian milfoil has a higher growth rate than most of our native species and seems to hold out in the fall as temperatures drop, surveying when the lake is at a low pool – perhaps in the fall or possibly spring – would allow for even more milfoil to be exposed and identifiable.

Included Maps

Several maps are included in the following pages. The first map in the series is one showing the entire survey area. There are red boxes on this map indicating the area which is projected in more detail on maps pages which follow.

Lake Chelan Submerged Noxious Weeds



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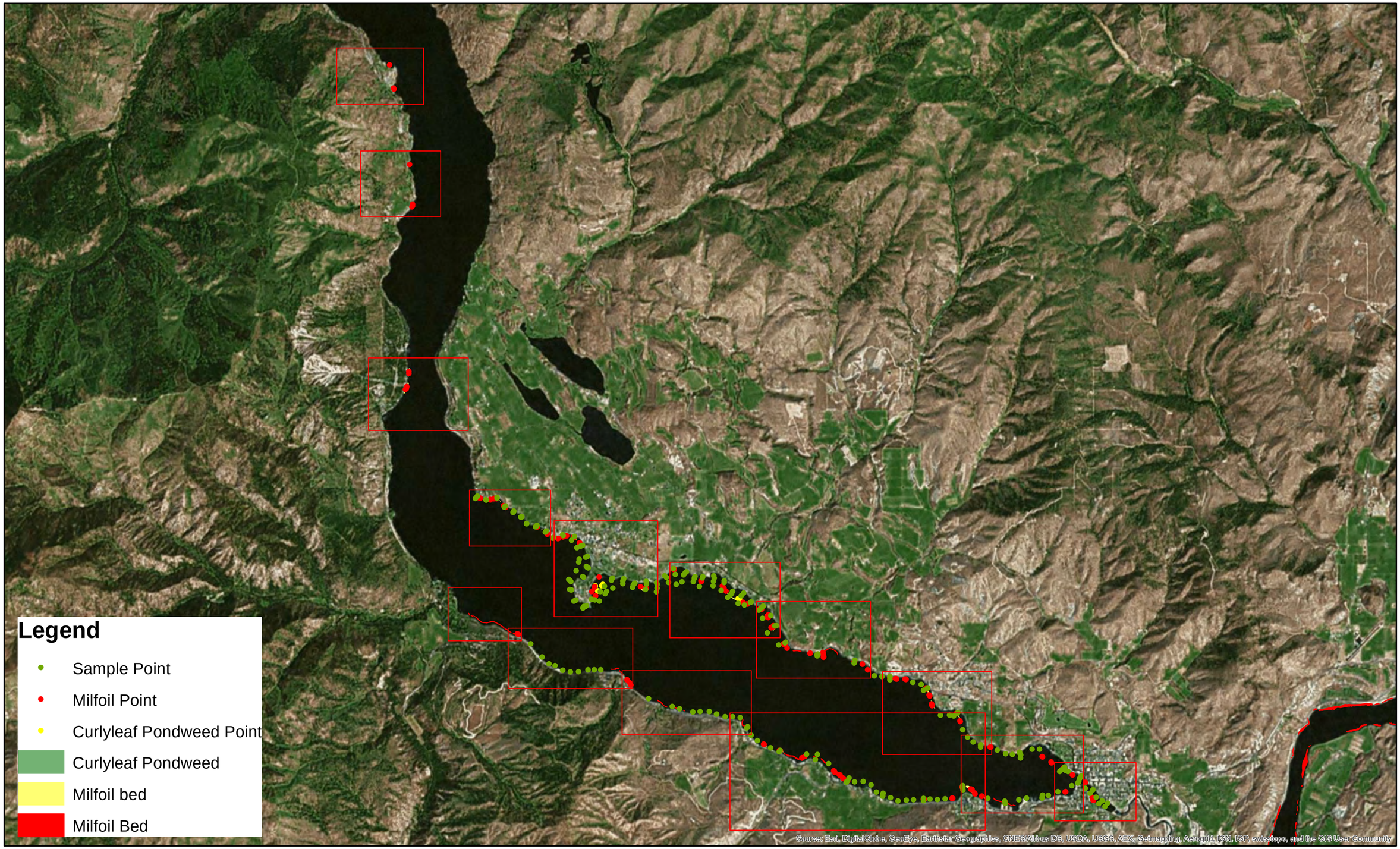
Map Generated by
AquaTechnex, LLC.

Lake Chelan Submerged Noxious Weeds



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Map Generated by
AquaTechnex, LLC.

Lake Chelan Submerged Noxious Weeds

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AquaTechnex, LLC.

Lake Chelan Submerged Noxious Weeds

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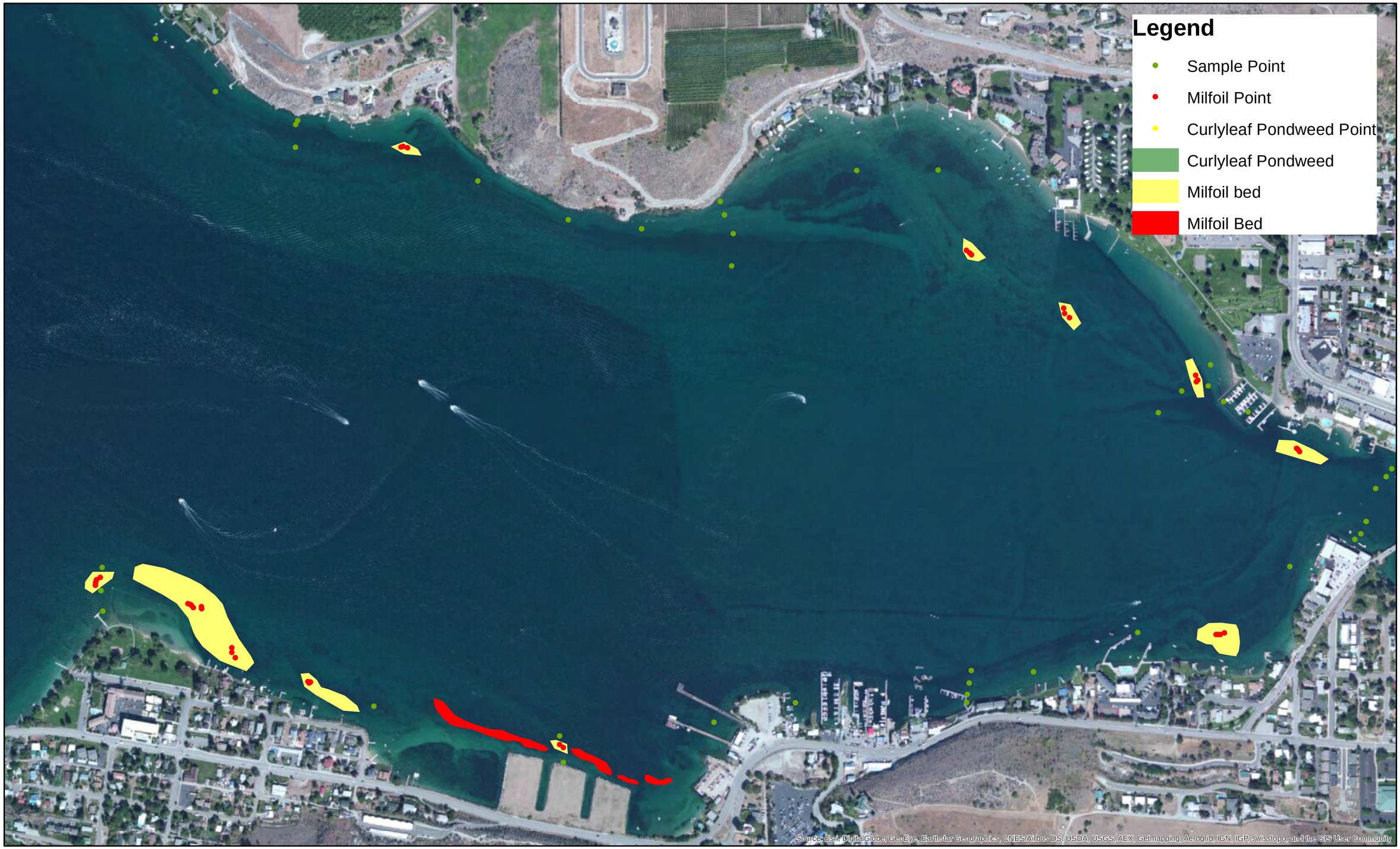

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AquaTechnex, LLC.

Lake Chelan Submerged Noxious Weeds

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Map Generated by
AquaTechnex, LLC.

Lake Chelan Submerged Noxious Weeds

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Lake Chelan Submerged Noxious Weeds

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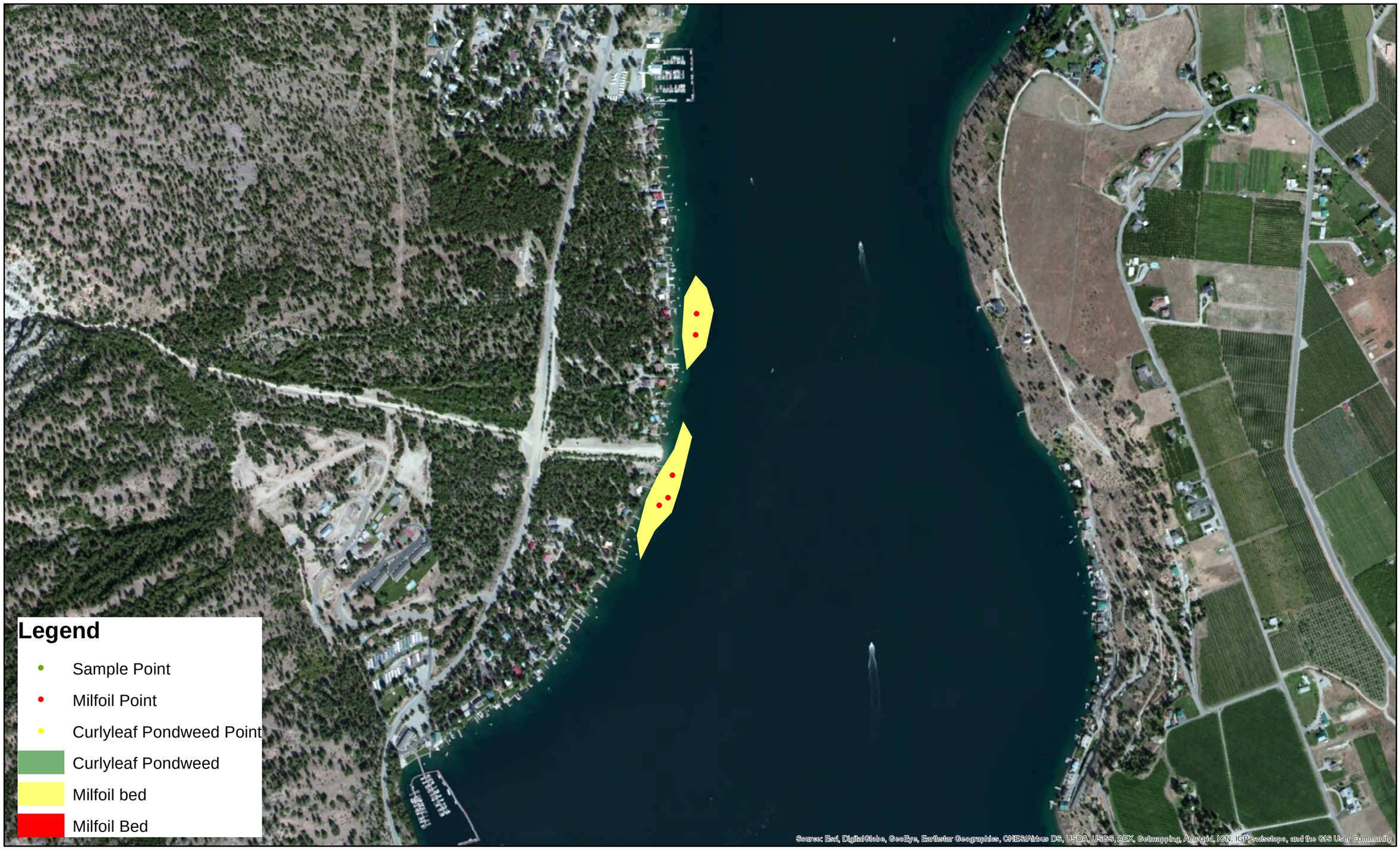

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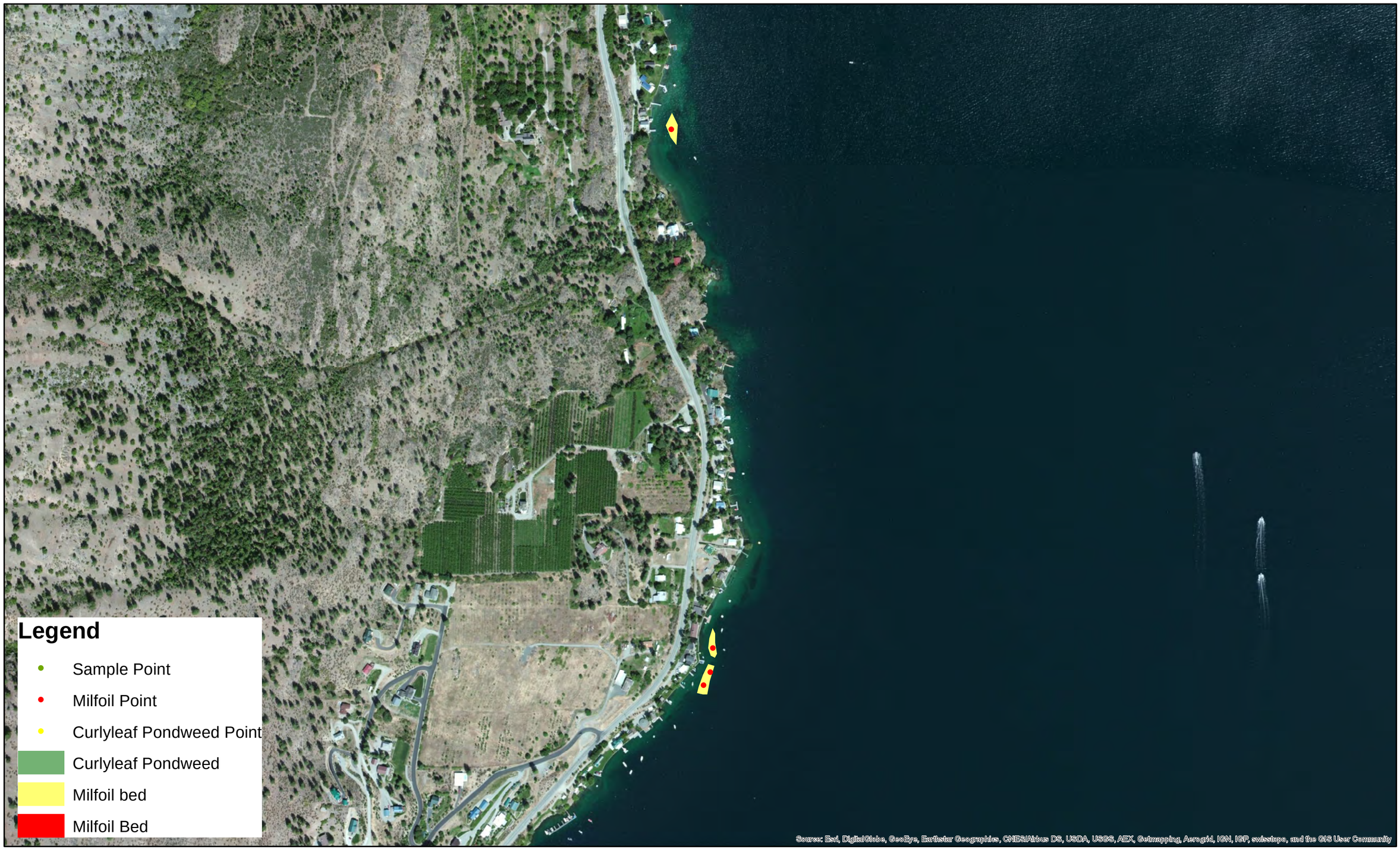

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Lake Chelan Submerged Noxious Weeds

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