TAHOE KEYS LAGOONS
2025 AQUATIC MACROPHYTE SURVEY REPORT

PREPARED PURSUANT TO
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION BOARD ORDER NO. R6T-2014-0059

Tahoe Keys
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FINAL REPORT

JANUARY 2, 2026

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ACRONYMS AND ABBREVIATIONS

2024 Survey	2024 Tahoe Keys Lagoons Aquatic Macrophyte Survey
2025 Survey	2025 Tahoe Keys Lagoons Aquatic Macrophyte Survey
AIP	Aquatic Invasive Plants
AIS	Aquatic Invasive Species
BrSc	*Brasenia schreberi* (watershield)
CeDe	*Ceratophyllum demersum* (coontail)
CMT	Tahoe Keys Lagoons Aquatic Weed Control Methods Test
Cu yds	Cubic yards
ElCa	*Elodea canadensis* (elodea)
ESA	Environmental Science Associates
FA	Other Filamentous Algae
IDW	Inverse Distance Weighted
IMP	Integrated Management Plan
Lahontan	Lahontan Regional Water Quality Control Board
Keys Lagoons	Tahoe Keys lagoons
MyQu	*Myriophyllum quitense* (Andean watermilfoil)
MySp	*Myriophyllum spicatum* (Eurasian watermilfoil)
NiSp	*Nitella* sp. (filamentous algae)
NuPo	*Nuphar* polysepala (yellow pond-lily)
PeAm	*Persicaria amphibia* (water smartweed)
PoCr	*Potamogeton crispus* (curlyleaf pondweed)
PoFo	*Potamogeton foliosus* (leafy pondweed)
PoRi	*Potamogeton richardsonii* (Richardson's pondweed)
SEA	Sierra Ecosystem Associates
TKPOA	Tahoe Keys Property Owners Association
TRPA	Tahoe Regional Planning Agency
USGS	United States Geological Survey
WDR	Waste Discharge Requirements

1.0 INTRODUCTION

As required by the Waste Discharge Requirements (WDR) permit issued by the Lahontan Regional Water Quality Control Board (Lahontan), Order No. R6T-2014-0059 on July 18, 2014, this report summarizes the results of the annual aquatic macrophyte survey completed in the Tahoe Keys lagoons (lagoons or Keys lagoons) in 2025. The survey took place July 7 – July 11, 2025 and was conducted by Sierra Ecosystem Associates (SEA) Senior Ecologist, Jeremy Waites, SEA Natural Resources Analysts Summer Abel and Aria Pauling, and SEA Assistant Environmental Scientist Marissa DeFazio with the assistance of Tahoe Keys Property Owners Association's (TKPOA) Water Quality Manager (Kristine Lebo) and staff.

This report presents the sampling methodology (Section 2.0), results of the sampling activities in each of the lagoons (Section 3.0), and a narrative summary of the results compared to the previous ten years of data (Section 4.0). Section 4.0 also includes a discussion on the continued aggressive expansion of curlyleaf pondweed and the relationship of plant biovolume to water volume in response to TKPOA and stakeholder interest in these two topics.

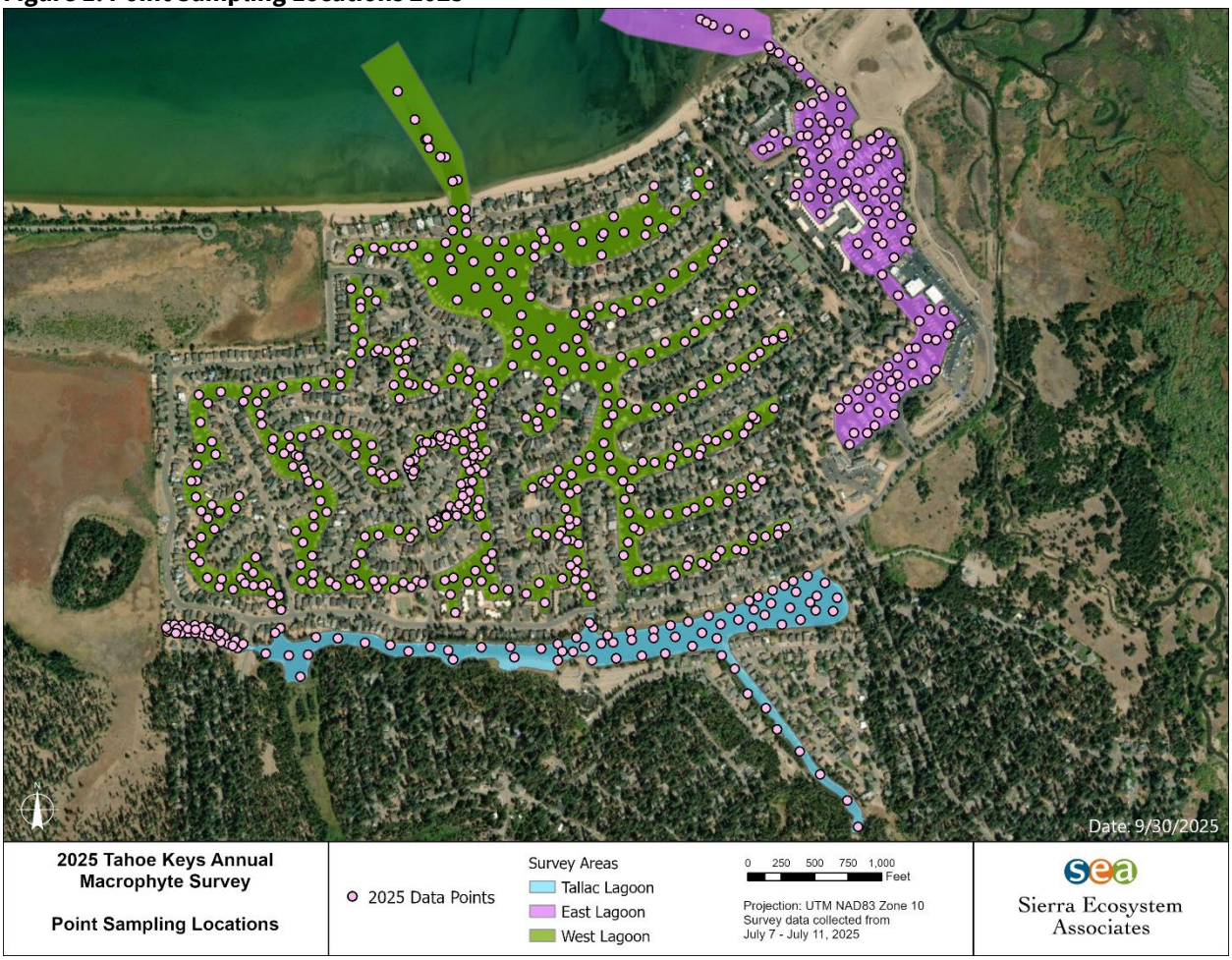
Lastly, a discussion of survey results is presented (Section 5.0) relative to the Tahoe Regional Planning Agency (TRPA) Board-adopted Threshold Standard regarding long-term goals for reducing aquatic invasive plant (AIP) biovolume in the Tahoe Keys lagoons more than 75% from 2020 baseline levels. This and future annual reports will provide a mid-growing season assessment of progress toward this new threshold standard specific to the lagoons.

1.1 Overview of Site

The Tahoe Keys is a private housing, public marina, and commercial office development, created in the 1950s and 1960s and is located at the south end of Lake Tahoe. It is comprised of a residential area, the largest Lake Tahoe commercial marina open to the public, and commercial business center covering an area of approximately 372 acres (including waterways). In addition to 1,528 private home lots and townhomes, several public and private entities own and manage land in and around the Tahoe Keys development including: Tahoe Keys Village, Tahoe Keys Marina (purchased by Suntex Marinas in 2022), the State of California, USDA Forest Service, and Tahoe Keys Beach and Harbor Association.

The water surface area of the lagoons during the 2025 Aquatic Macrophyte Survey (2025 Survey) was approximately 167 acres. This area encompasses the Marina (or East) Lagoon, West Lagoon, Lake Tallac Lagoon, and sections of the dredged channels extending from both the East and West lagoons into Lake Tahoe. The survey areas and the results described in this report are separately addressed for the East Lagoon, West Lagoon, and Tallac Lagoon. In response to 2025 UV and DASH treatments, certain areas in the West Lagoon were sampled at a higher density to evaluate the efficacy of treatments. Figure 1 shows the locations of all macrophyte sample points for the 2025 Survey.

Figure 1. Point Sampling Locations 2025



1.2 Purpose of 2025 Survey

Beginning in 2014, in compliance with the WDR permit issued by Lahontan to TKPOA (Lahontan 2014), and in response to the increase of the Aquatic Invasive Species (AIS) infestation, TKPOA began preparing and updating an Integrated Management Plan (IMP) annually to develop and report on measures that may be more effective to control AIP than the historical weed harvesting program. The annual aquatic macrophyte survey supplies data that can identify yearly trends in species composition, and partially track the efficacy of IMP methods, and help identify successful approaches to achieve the IMP goals and objectives. However, since the surveys are only during a single 4-to 6-day period in mid-summer, the results do not inform seasonal changes in either biovolume or species composition (i.e., relative abundance or frequency of occurrence).

Past aquatic macrophyte surveys of the Tahoe Keys lagoons were conducted in 2009, 2011, and annually from 2015 through 2025 to measure presence and absence of plant species (including percent occurrence and percent composition). Initial surveys were performed in 2014 in

portions of the lagoons, but data collection was limited and therefore not addressed in this report. The 2015-2025 annual surveys benefit from hydroacoustic scanning performed by TKPOA staff to determine the percent plant biovolumes within the water column.

1.3 Summary of 2025 Survey Results

The 2025 point-intercept survey was conducted over the course of five days: July 7 - July 11, 2025. During the survey, a total of 647 points were sampled throughout the Tahoe Keys lagoons, including the East Lagoon (113 points), West Lagoon (436 points), and Lake Tallac Lagoon (98 points). Appendix A presents the survey data with GPS coordinates taken in the lagoons.

Hydroacoustic scans conducted around the time of the survey (July 8 – July 15, 2025) provided aquatic plant biomass information. The results of the 2025 survey were compared to the results of the prior annual surveys to determine whether there were any identified trends in growth of the aquatic macrophyte populations, including possible trends in species composition or abundance. Overall, species presence in 2025 for most areas of the Keys lagoons is similar to previous years. Species identified during the survey are:

- *Myriophyllum spicatum* (Eurasian watermilfoil)
- *Ceratophyllum demersum* (coontail)
- *Potamogeton crispus* (curlyleaf pondweed)
- *Potamogeton richardsonii* (Richardson's pondweed)
- *Potamogeton foliosus* (leafy pondweed)
- *Elodea canadensis* (elodea)
- *Brasenia schreberi* (watershield)
- *Nuphar polysepala* (Yellow pond-lily)
- *Persicaria amphibia* (water smartweed)
- various species of Nitella, Chara, Spirogyra, and other filamentous algae

Among these species, the non-native Eurasian watermilfoil and curlyleaf pondweed, along with the native nuisance coontail, have remained the most prevalent plant species in the waterways of the Tahoe Keys lagoons since full surveys began in 2015. Species frequency of occurrence (Figures 2 through 4) has fluctuated from year to year. Curlyleaf pondweed has shown an aggressive increasing trend of occurrence in the lagoons since sampling began, especially in the West Lagoon Exceptions are noted for all three lagoons in different years between 2020 and 2023. Figures 2, 3 and 4 show the year-to-year general trends in AIP frequency of occurrence rates for the East, West, and Lake Tallac lagoons.

Figure 2. East Lagoon AIP Frequency of Occurrence

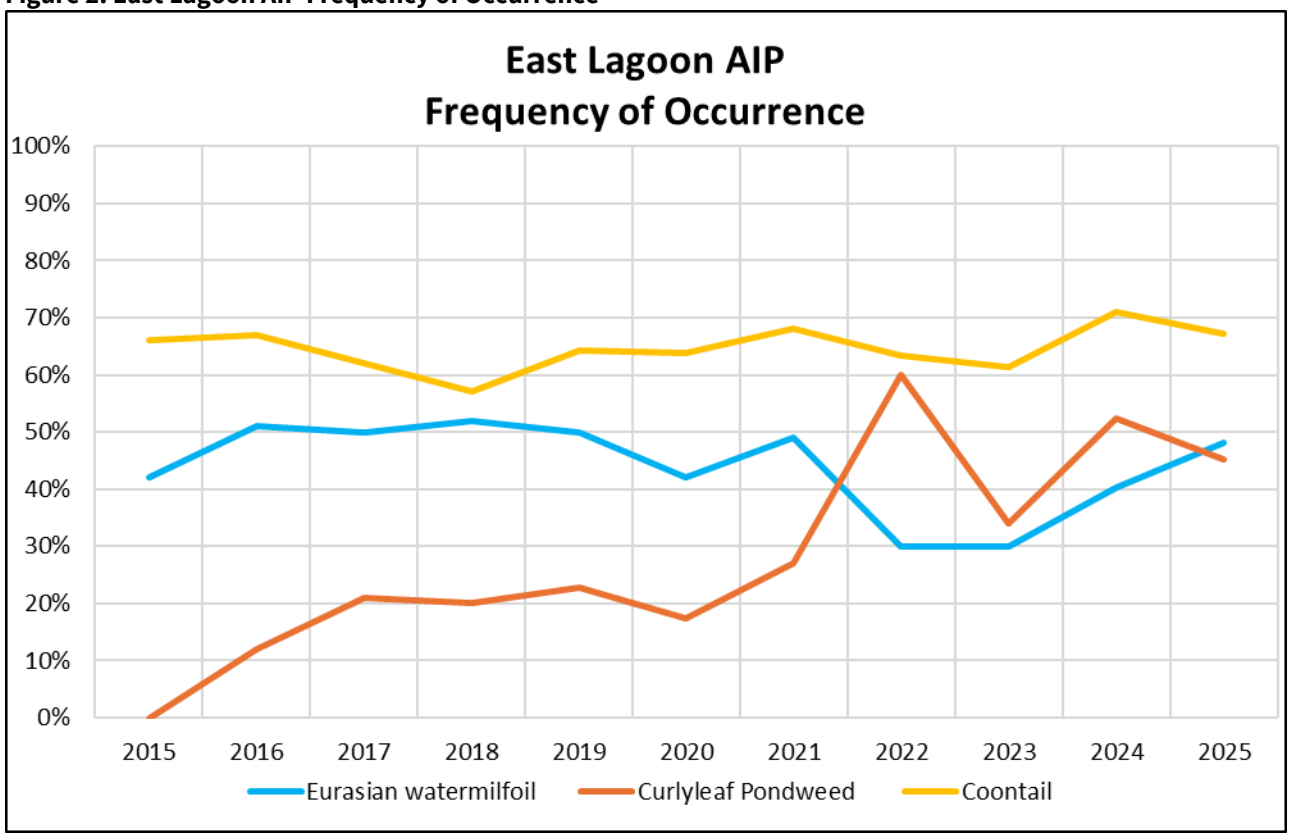


Figure 3. West Lagoon AIP Frequency of Occurrence

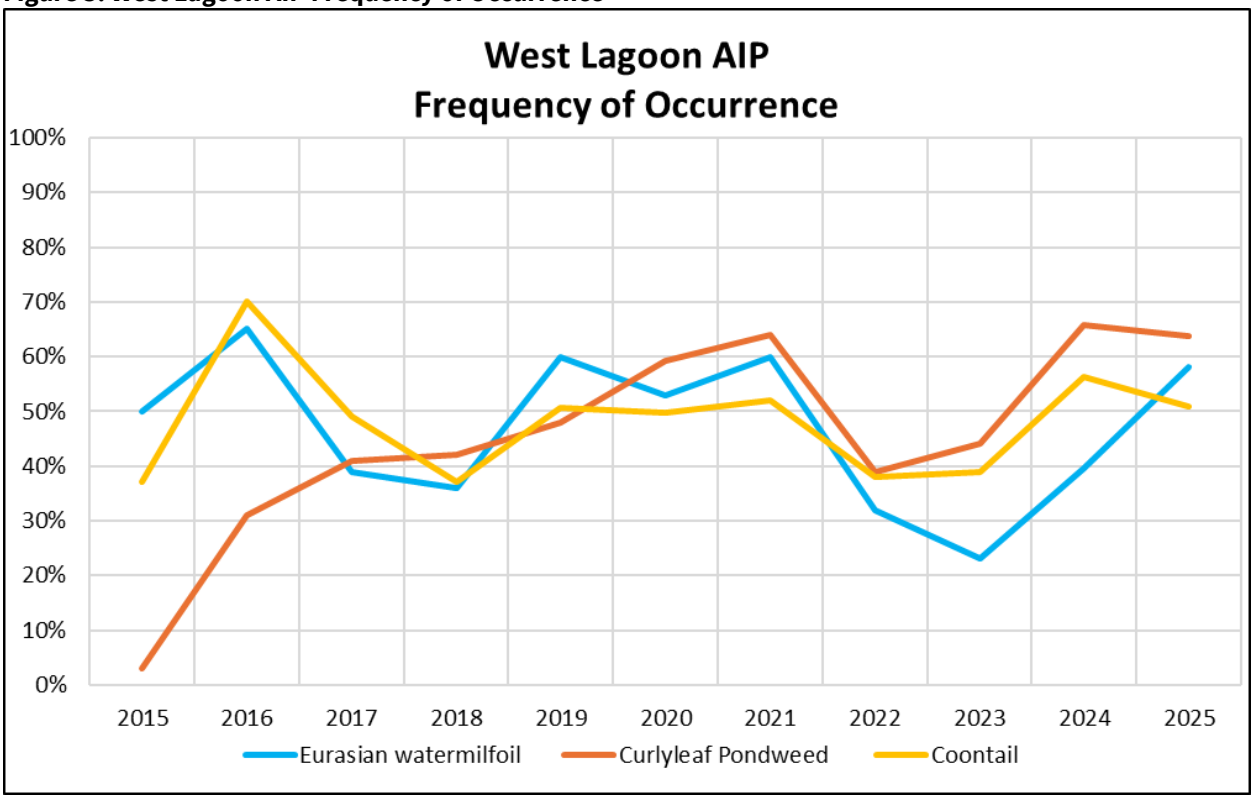
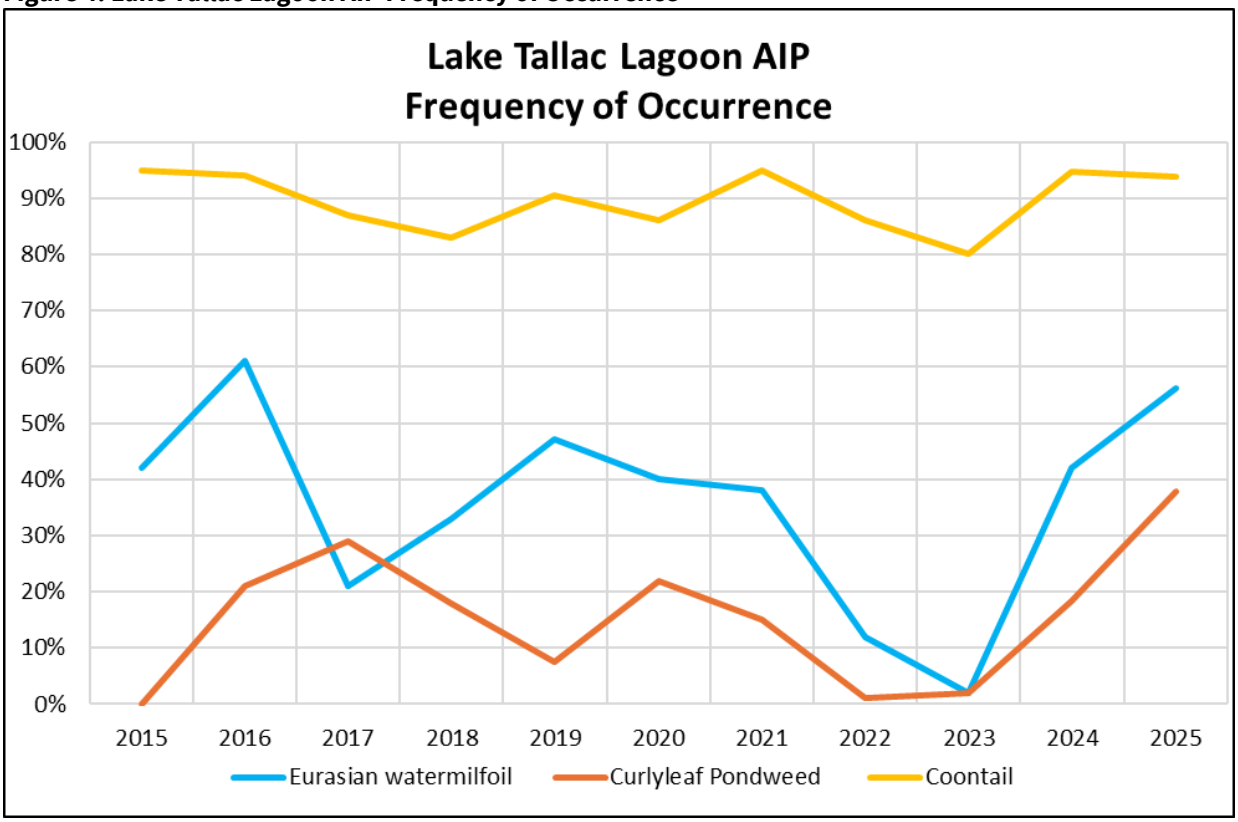


Figure 4. Lake Tallac Lagoon AIP Frequency of Occurrence



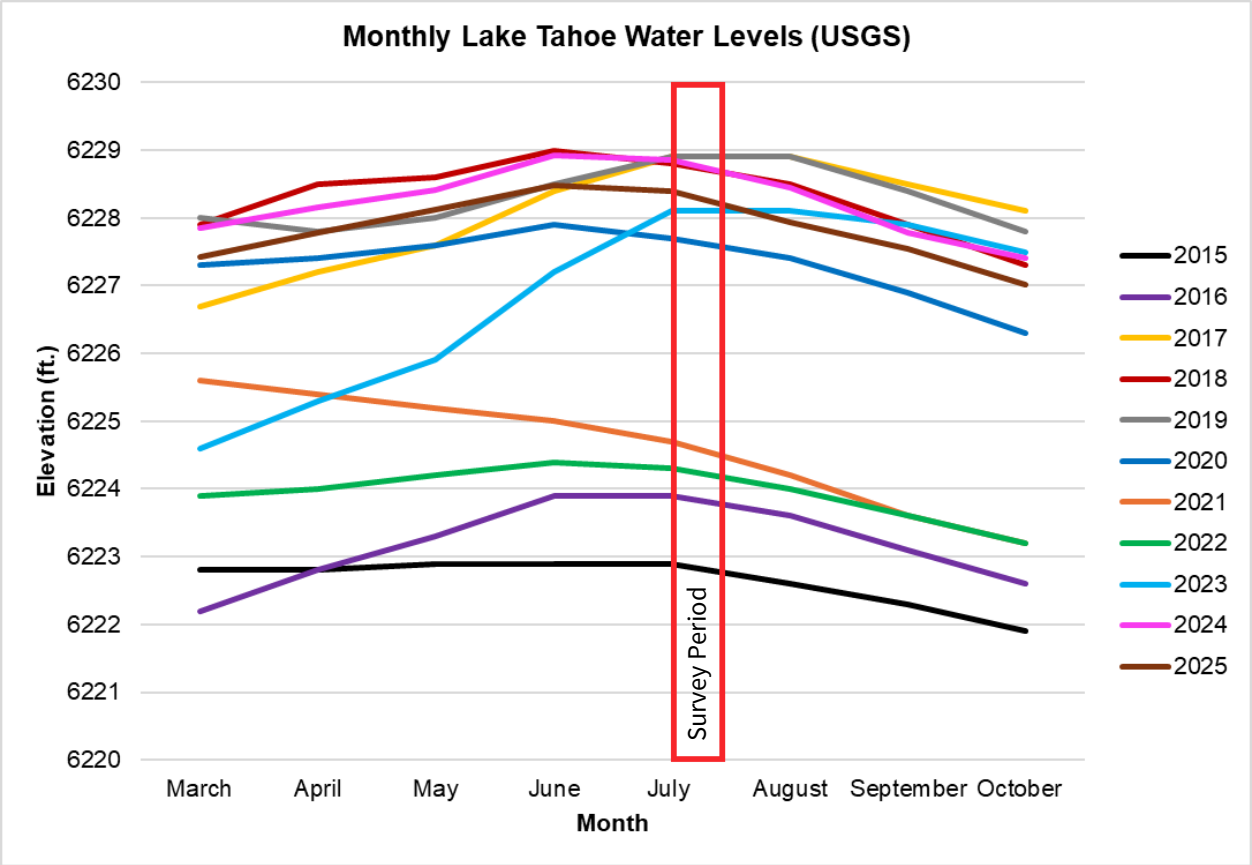
2.0 METHODOLOGY

The annual aquatic macrophyte surveys focus on submersed and floating-leaf aquatic plants in the littoral zones of the surveyed areas in the Tahoe Keys lagoons. Fringe wetlands and emergent species were not sampled. As with previous years, the method used for the 2025 survey was point-intercept to determine composition and hydroacoustic scanning to determine plant biovolume.

2.1 Timing

The 2025 point-intercept survey was conducted over the course of five days: July 7-July 11. This time period was chosen to coincide with the evident and identifiable point in the growing season associated with the germinating, sprouting, flowering, or fruiting stages of the various species. Due to the short growing season in Lake Tahoe and the germination and sprouting timing of the aquatic plants of concern, one period of data collection is considered sufficient to assess presence, mid-summer relative abundance, and general year-to-year trends. The 2025 survey occurred during average water levels in Lake Tahoe. United States Geological Survey (USGS) gauge data for 2025 and the previous 10 years of Lake Tahoe water levels is shown in Figure 5.

Figure 5. Monthly Lake Tahoe Water Levels (USGS)



Hydroacoustic scans were conducted July 8 and July 15, 2025. Scans are conducted on a regular basis by TKPOA Water Quality staff to track the growth and decline of aquatic macrophytes in the water column throughout the season. The scans presented in this report are those that most closely coincide with the timing of the point sampling survey.

2.2 Point Intercept Sampling

Point-intercept sampling involves plunging a double-tined, telescoping pole-mounted "thatch" rake into the water to the bottom, rotating the attached vertical pole when retrieving the rake, and then identifying the plant species retrieved on the rake sample (DiTomaso 2003). Georeferenced sample locations were accessed by boat, typically along regularly spaced and somewhat linear transects that represented the conditions of the area.

Percent species composition, percent species occurrence (aka presence/absence), relative biovolume (percentage), absolute biovolume (cu yds), health rating, rake fullness, and rake sample weight can be recorded and serve as indicators important to tracking changes in the amounts and distribution of AIP and desirable native species year-to-year. Presented in the following sections are the metrics used in this report and what each metric represents.

2.2.1 Percent Species Composition

The percent species composition was determined visually and recorded, and then the sample was photographed. The composition is recorded for each species as a percentage of the total rake sample, with the sum of the species composition totaling 100% for each rake sample. Floating plants, such as watershield (*Brasenia schreberi*) and water smartweed (*Persicaria amphibia*) are not well sampled with the method used in this survey. Water smartweed was rare and was the only floating aquatic plant observed in the West and East lagoons, but it was prevalent along the north and south near-shore areas of the Lake Tallac Lagoon. Additionally, the native emergent plant, yellow pond lily (*Nuphar polysepala*), was found in the stormwater inflow channel into the Lake Tallac Lagoon between Lassen Drive and Whitney Drive. The analyses of percent composition for the 2024 survey are discussed in Section 2.4 (Data Analysis) below.

2.2.2 Percent Species Occurrence (or Frequency of Occurrence or Occurrence Rate)

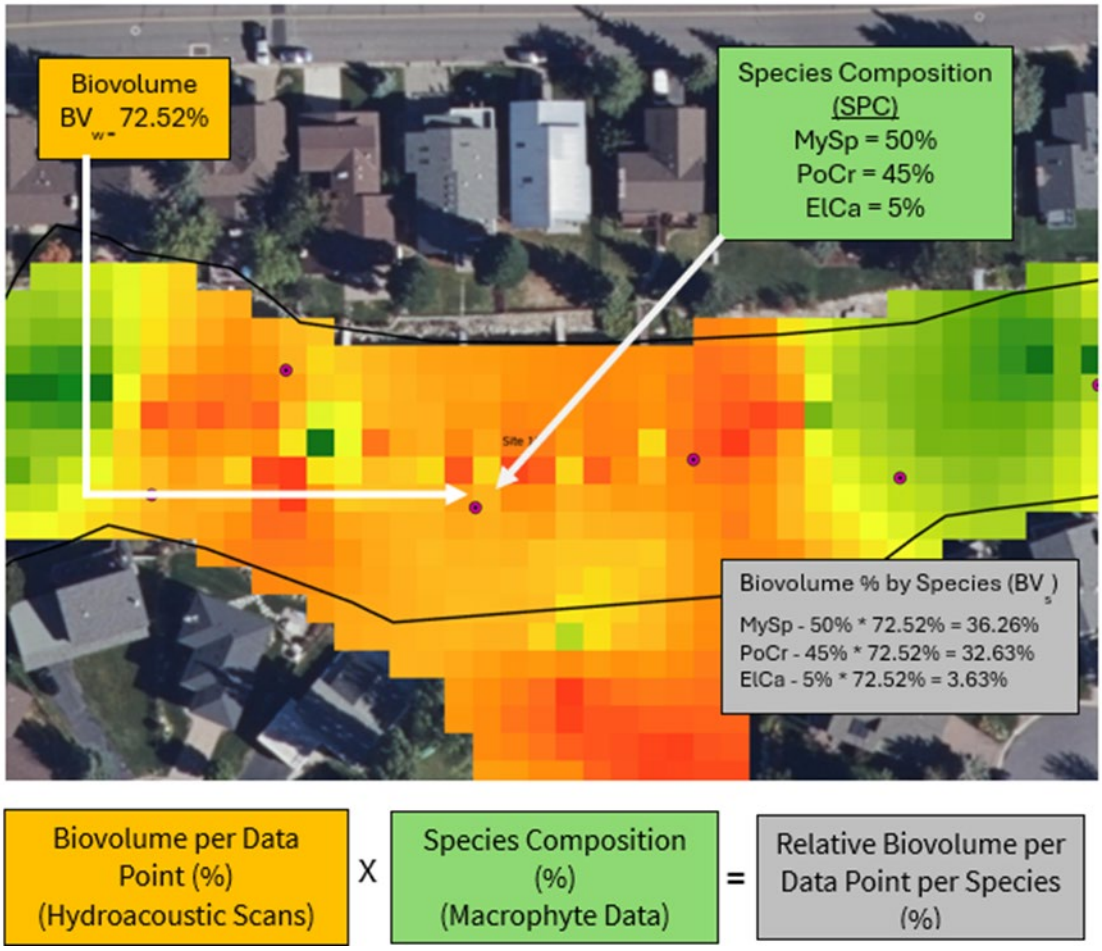
Percent species occurrence is the frequency that a particular species appears (presence/absence) in any amount in a sample. A rake sample with one fragment or a rake sample completely full of a species is 100% frequency of occurrence for that sample. This metric is a measure relative to the total number of rake samples. This compares to Percent Species Composition, which is relative to each rake sample. As a result, when considering all rake samples, Percent Species Occurrences can total more than 100%, whereas Percent Species Composition does not exceed 100%.

2.2.3 Relative Biovolume (% of the water column)

Relative biovolume, also known as biovolume percent, is a value produced by hydroacoustic scanning. It represents the percentage of the water column occupied by plant matter at each sonar ping relative to water depth. Relative biovolume by species is calculated by first extracting hydroacoustic scan biovolume percent data at all macrophyte sampling locations using ArcGIS Pro Spatial Analyst. The rake data gives species composition at the points where hydroacoustic scan biovolume data were obtained. Biovolume per data point (%) and species composition (%) are then multiplied to form relative biovolume for each data point per species (see Figure 6).

To calculate average relative biovolume, all biovolume per species and data point values are summed and divided by the total number of data points for each lagoon. One limitation of this metric is that low water elevation years can produce higher relative plant biovolumes than high water elevation years, even though actual (absolute) biovolume values may be lower in the low water elevation years. Data and results for relative biovolume during the 2020 through 2025 period can be found in Section 4.3.

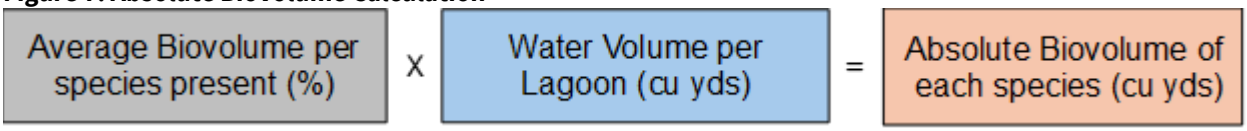
Figure 6. Relative Biovolume Calculation



2.2.4 Absolute Biovolume (cu yds)

Absolute biovolume (cu yds) is also calculated using the macrophyte rake sample (percent species composition) and hydroacoustic scanning data. While percent biovolume values are relative to water depth, absolute biovolume represents total plant volume within the water column. Absolute biovolume values can vary depending on plant density and species composition in the water column and for water depths at the time and point of measurement. Absolute plant biovolume, as calculated within the water column, would be considerably less if measured out of the water column due to the removal of the plants from the water column 'suspended' conditions. To calculate absolute species biovolume per water body, average percent biovolume by species (relative biovolume) and water volume per lagoon (cu yds) are multiplied (see Figure 7). Data and results for absolute biovolume during the 2020 through 2025 period can be found in Section 4.3.

Figure 7. Absolute Biovolume Calculation



2.2.5 Plant Health Rating

Rake samples were assigned a health rating based on the attributes in Table 1 below.

Table 1. Plant Condition Rating System

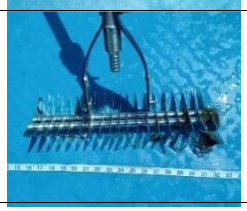
Score	Description
1	Plants are barely recognizable due to decomposed or disintegrating tissues including leaves, stems, roots and rhizomes, and any attached reproductive parts (flowers, fruit/seed/ turions)
2	Plants are defoliated, roots and stems are recognizable, intact but disintegrating. Plants easily come apart with minor physical force.
3	Plants are defoliated but stems are mostly intact; roots and rhizomes are mostly intact and firm; reproductive parts are intact (if present). Some plants may appear almost normal.
4	Some plants are partially defoliated or have “bleached” or pale leaves; most plant parts are otherwise intact and appear normal: stems, rhizomes, roots, reproductive parts are present.
5	Plants are consistently intact and appear normal with green tissues (leave/stems); rhizomes and roots are firm and intact and reproductive parts if present are normal.

Rake samples showing no plants were not assigned a health rating.

2.2.6 Rake Fullness

Rake samples were assigned a rake fullness rating based on the attributes in Table 2. Rake fullness ratings were based on CMT Project methodology developed by Environmental Science Associates (ESA) in 2023.

Table 2. Rake Fullness Rating

Rake Fullness Rating	Description	Example
0	0%; no plants (but filamentous/macro algae (e.g., Chara) may be present	
1	1-5%; handful of sprigs	

2	6-25%; less than one-fourth of the rake full	
3	26-50%; a fourth to half of the rake full; tines visible	
4	51-75%; more than half of the rake full; some tines still visible	
5	76%+; completely full rake; no tines visible	

Note: Rake Fullness Rating scale modified from Tahoe Keys Lagoons Macrophyte Control Efficacy Report: Year 2 (Table 5) prepared by ESA (March 2024).

2.2.7 Rake Sample Weight

Weight was collected for a representative sample of each rake fullness rating. This was a parameter added in 2024 to contribute to CMT Project analyses and current/future AIP biovolume evaluations. Each rake sample (39 total samples) was allowed a 60-second drip time and then the plants from the rake were placed in a 5-gallon bucket. Samples were weighed in the bucket using a UWE hanging scale (Mfr # AHS-60) accurate from 0.05 to 60 pounds.

2.3 Hydroacoustic Sampling

Hydroacoustic sampling uses sonar technology to scan a water body to determine and record the surface water temperature, depth to bottom, presence of plant matter, plant height, and plant biovolume. Scans are made using a Lowrance HDS Live 7 unit coupled to a transponder unit attached to the stern of boat. The system is fine-grained, collecting data at a frequency of 10 times per second. The digitized data is uploaded to BioBase, a third-party data processing subscription service company.

Hydroacoustic scanning produces percent aquatic plant biovolume which represents the percent of the water column occupied by plant matter at each sonar ping. It is plant height divided by water depth multiplied by 100 for each location along a traveled path. The biovolume range of values is from 0% (bare bottom with no plants in water column) to 100% (vegetation growth sonar 'returns' from the bottom to the surface).

Hydroacoustic data is also used to determine the average vessel hull clearance, which is the distance between the water surface and the top of the aquatic plant canopy. Vessel hull clearance was also an efficacy measurement for CMT evaluations.

2.4 Data Analysis

Spatial data obtained from point sampling and hydroacoustic scan transect sampling for biovolume were analyzed using ArcGIS Pro with Spatial Analyst to create thematic heat maps showing the composition and distribution of a species based on percent composition. The species composition data was interpolated into a raster surface from points using an Inverse Distance Weighted (IDW) technique. IDW uses data points to predict the values of un-sampled locations by weighing the surrounding values by distance. This method interpolates the composition percentage of the data points into a surface display representing the species composition and distribution within the Keys lagoons. Appendix A contains the survey data points from the study and Appendix B presents the species composition thematic maps.

To compare the 2025 survey data with data from past surveys, the current data were normalized to show species presence or absence. This approach provided a means to reveal trends in the relative abundance and prevalence of the various aquatic plants over the past years.

3.0 RESULTS

A total of 647 points were sampled throughout the Keys lagoons, including the East Lagoon (113 points), West Lagoon (436 points), and Lake Tallac Lagoon (98 points), as shown in Figure 1. Sections 3.1 through 3.4 below discuss the point-intercept and hydroacoustic scanning data results.

Note that the values for percent occurrence rates represent the frequency that each species was detected. For example, in the East Lagoon *M. spicatum* could be detected in 40% of samples and *C. demersum* could be detected in 71% of the samples. Thus, these data are different from percent composition totaling 100%, but instead individually represent frequency of occurrence for the entire rake sample data set (see Section 2.2 above).

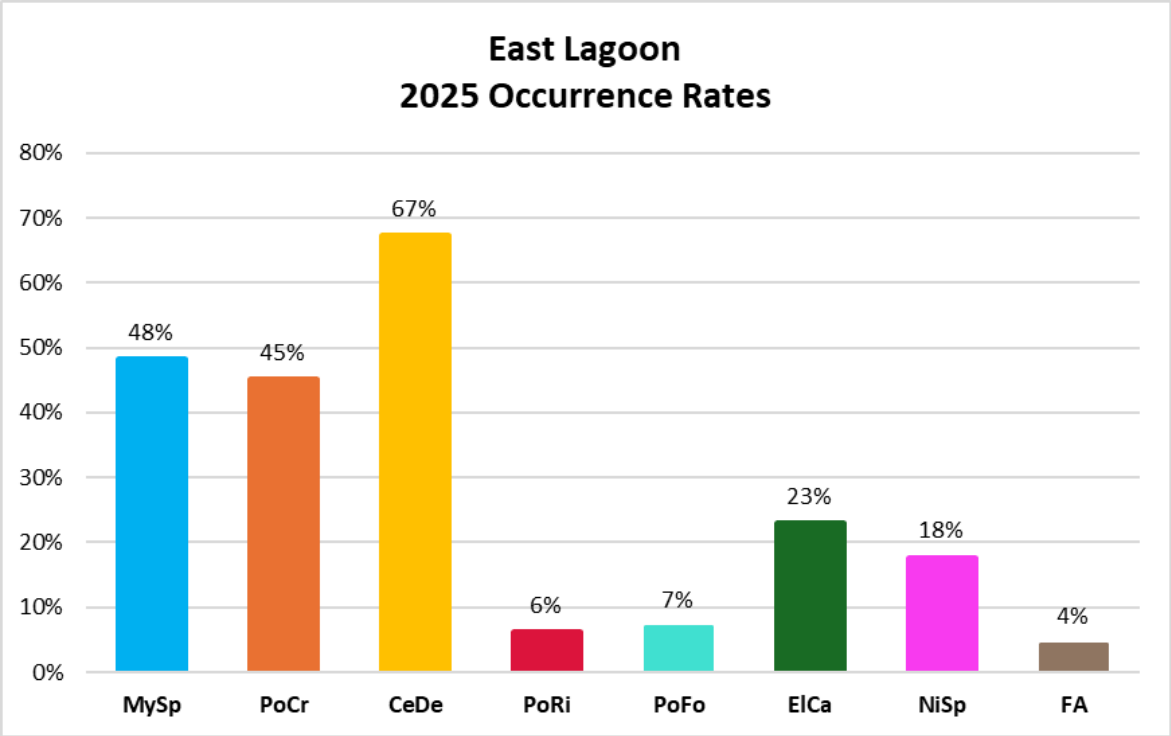
The abbreviations on the species occurrence charts are as follows:

Common Name	Scientific Name	Abbreviation
Eurasian watermilfoil*	*Myriophyllum spicatum*	MySp
Curlyleaf Pondweed*	*Potamogeton crispus*	PoCr
Coontail*	*Ceratophyllum demersum*	CeDe
Richardson's pondweed	*Potamogeton richardsonii*	PoRi
Leafy Pondweed	*Potamogeton foliosus*	PoFo
Elodea	*Elodea canadensis*	ElCa
Filamentous Algae	*Nitella sp.*	NiSp
Other Filamentous Algae	--	FA
Watershield	*Brasenia schreberi*	BrSc
Yellow pond lily	*Nuphar polysepala*	NuPo
Andean watermilfoil	*Myriophylum quitense*	MyQu
Water smartweed	*Persicaria amphibia*	PeAm

3.1 East Lagoon

In the East Lagoon, a presence/absence analysis (Figure 8) shows a frequency of occurrence of 48% for Eurasian watermilfoil - *M. spicatum* (MySp), 45% for curlyleaf pondweed - *P. crispus* (PoCr), and 67% for coontail - *C. demersum* (CeDe). Other species occurrences included: 6% Richardson's pondweed – *P. richardsonii* (PoRi), 7% leafy pondweed - *P. foliosus* (PoFo), 23% elodea - *E. canadensis* (ElCa), 18% filamentous algae – *Nitella sp.* (NiSp), and 4% other filamentous algae (FA).

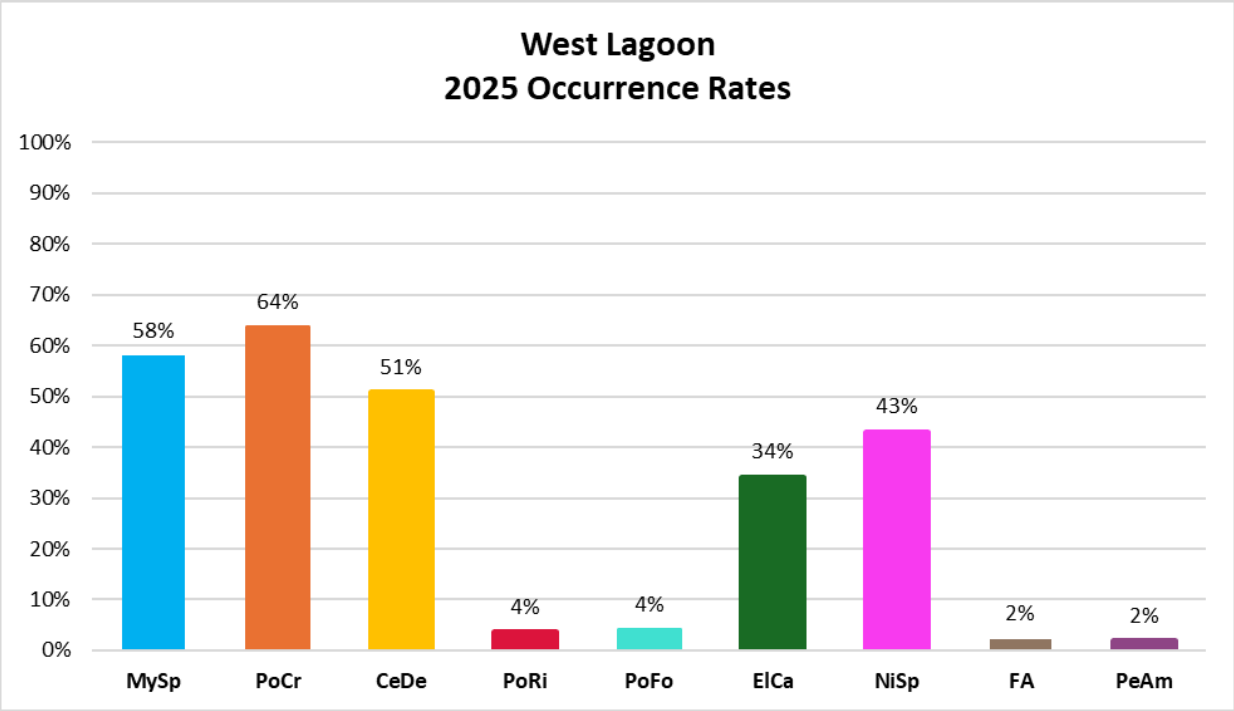
Figure 8. East Lagoon 2025 Occurrence Rates



3.2 West Lagoon

In the West Lagoon, presence/absence analysis (Figure 9) shows a frequency of occurrence of 58% for Eurasian watermilfoil - *M. spicatum* (MySp), 64% for curlyleaf pondweed - *P. crispus* (PoCr), and 51% for coontail - *C. demersum* (CeDe). Other species occurrences included: 4% Richardson's pondweed - *P. richardsonii* (PoRi), 4% leafy pondweed - *P. foliosus* (PoFo), 34% elodea - *E. canadensis* (ElCa), 43% filamentous algae - *Nitella sp.* (NiSp), 2% other filamentous algae (FA), and 2% water smartweed - *P. amphibia* (PeAm).

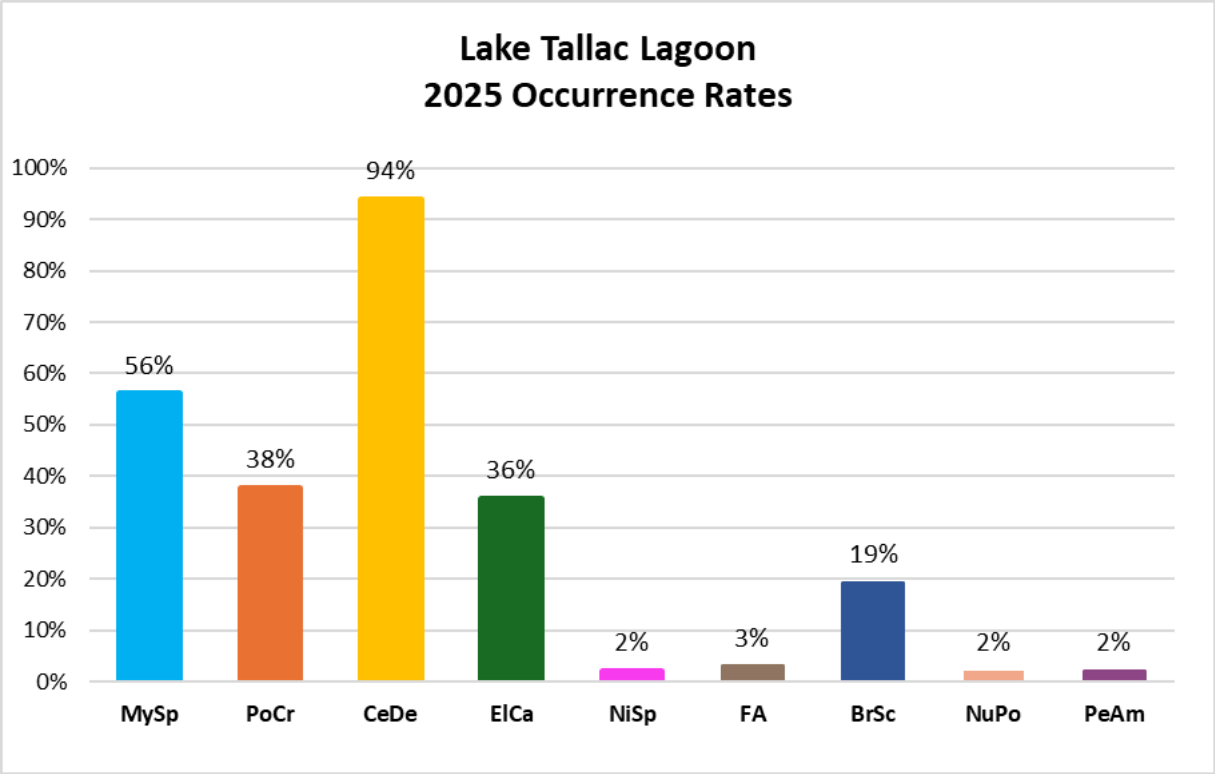
Figure 9. West Lagoon 2025 Occurrence Rates



3.3 Lake Tallac Lagoon

In the Lake Tallac Lagoon, presence/absence analysis (Figure 10) showed a frequency of occurrence of 56% for Eurasian watermilfoil - *M. spicatum* (MySp), 38% curlyleaf pondweed - *P. crispus* (PoCr), and 94% for coontail - *C. demersum* (CeDe). Other species detected included: 36% elodea – *E. canadensis* (ElCa), 19% watershield - *B. schreberi* (BrSc), (however, as noted earlier, this species dominates the stormwater inflow channel to the Lake Tallac Lagoon), 2% yellow pond lily - *N. polysepala* (NuPo), 2% filamentous algae - *Nitella* sp. (NiSp), 3% other filamentous algae (FA), and 2% water smartweed - *P. amphibia* (PeAm).

Figure 10. Lake Tallac Lagoon 2025 Occurrence Rates



3.4 Hydroacoustic Sampling

The East Lagoon had a percent area plant coverage of approximately 98% and an average plant biovolume of approximately 36%, meaning that, on average, within the portion of the lagoon where plant cover existed (99% of the lagoon area), 36% of any given column of water would contain plant matter and the remaining 64% would be water.

The West Lagoon had a percent area plant coverage of approximately 91% and an average plant biovolume of approximately 30%, meaning that, on average, within the portion of the lagoon where plant cover existed (91% of the lagoon area), 30% of any given column of water would contain plant matter.

The Lake Tallac Lagoon had a percentage area plant coverage of approximately 99% and an average plant biovolume of approximately 56%, meaning that, on average, within the portion of the lagoon where plant cover existed (99% of the lagoon area), 56% of any given column of water would contain plant matter. The hydroacoustic scan data did not extend far into the stormwater inflow channel due to vegetation obstruction. Surface observations indicate that plant matter likely occupies the entire column of water in the storm channel.

Figure 11 presents the heat map of vegetation biomass in the East Lagoon for the hydroacoustic scan performed on July 8, 2025. Figure 12 shows the heat map of all aquatic vegetation for the West Lagoon and Lake Tallac Lagoon from hydroacoustic scan data collected on July 15, 2025.

Figure 11. Heat Map of East Lagoon

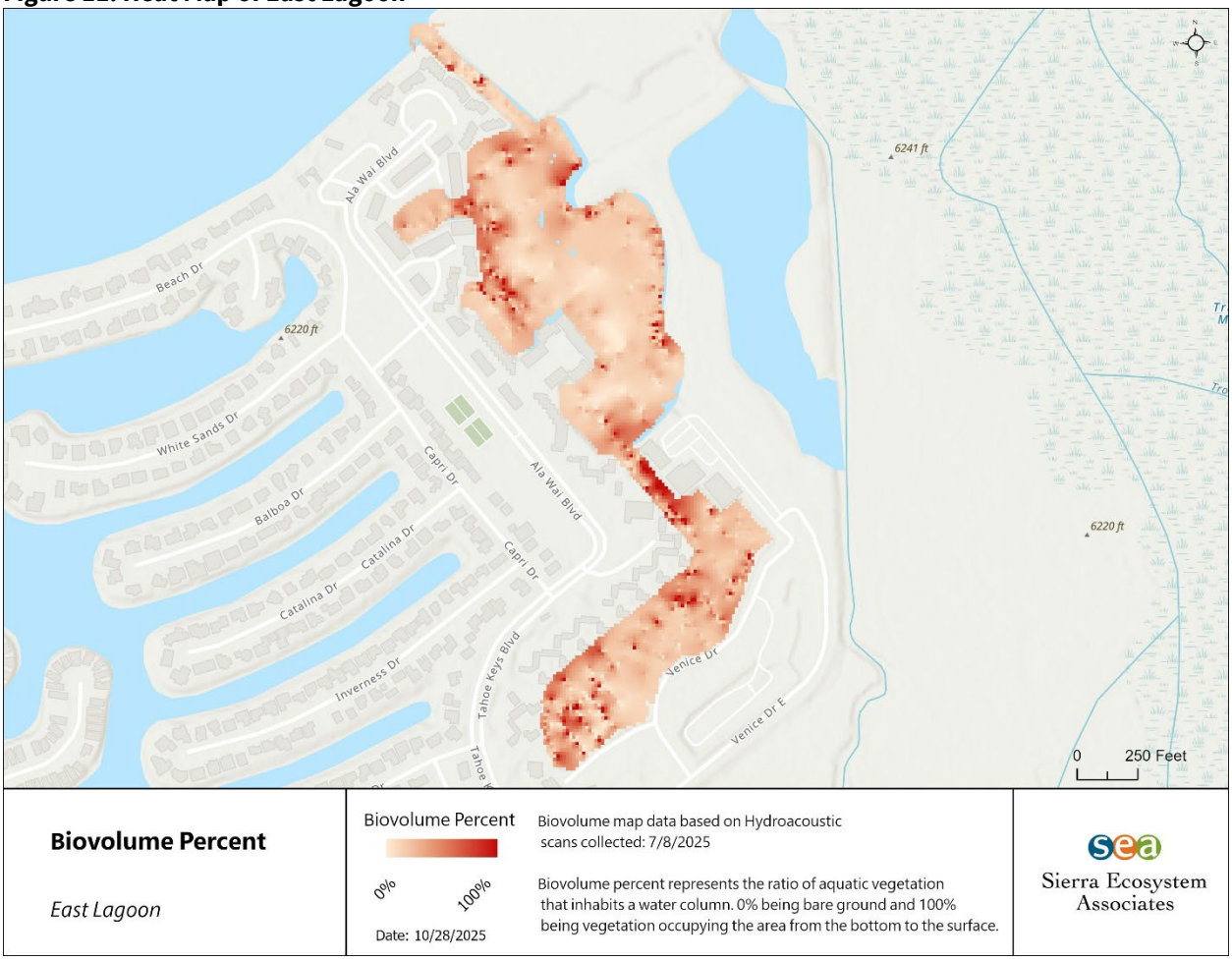
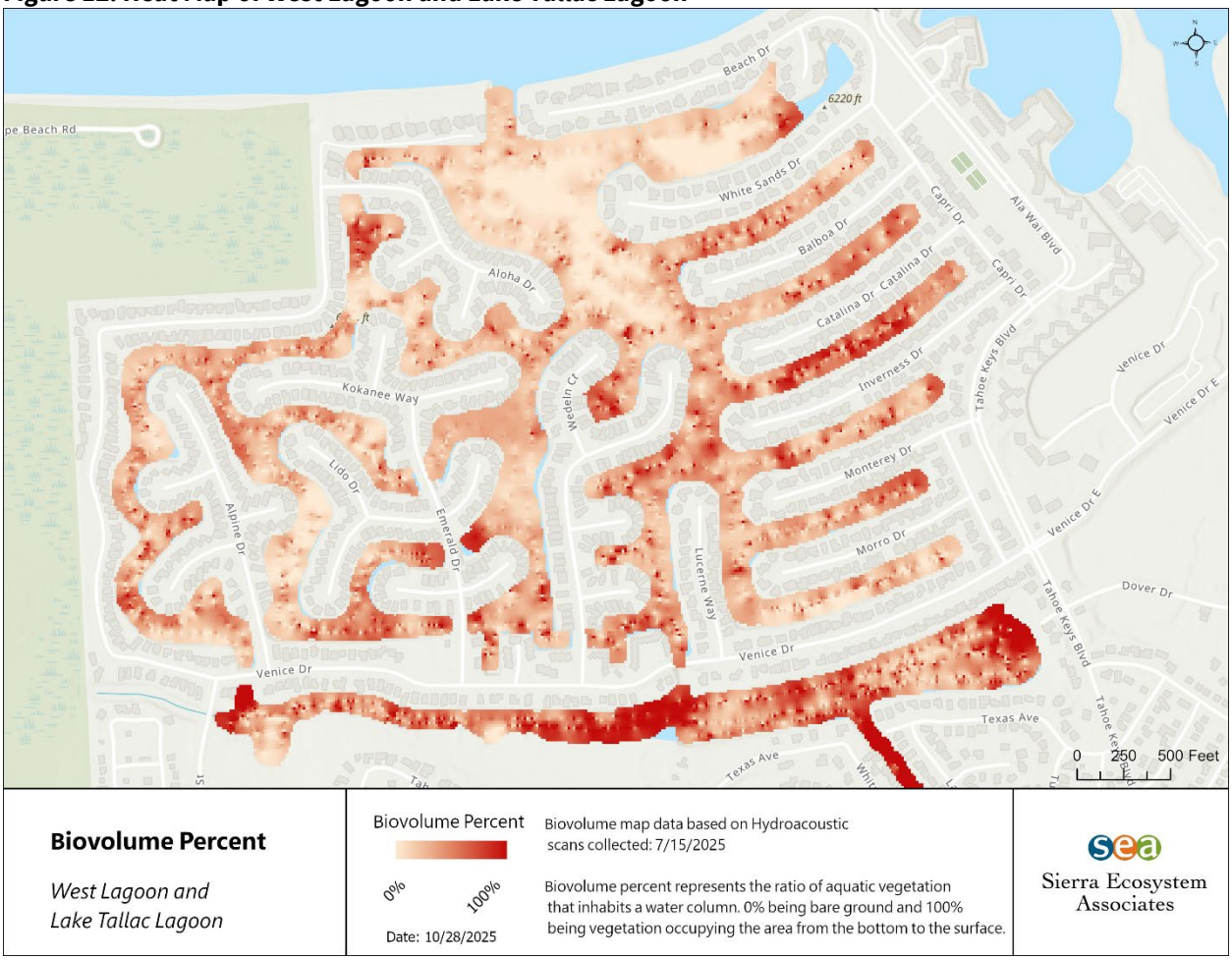


Figure 12. Heat Map of West Lagoon and Lake Tallac Lagoon



4.0 DISCUSSION AND ANALYSIS

The 2025 Survey showed some similarities to previous surveys. Many other species were observed in the waterways, but for the purpose of discussion, the primary focus is on Eurasian watermilfoil, curlyleaf pondweed, and coontail, which dominate and are the three invasive species highlighted for control in the IMP. Curlyleaf pondweed continues its aggressive spread throughout the three lagoons as displayed below in Table 3 through Table 5.

Tables 3 through 5 display frequency of occurrence (presence/absence) data for each species and lagoon from 2015 through 2025 (TKPOA 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024).

Table 3. Frequency of Occurrence by Species in the East Lagoon (2015- 2025)

East Lagoon											
Species	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Eurasian watermilfoil (*M. spicatum*)	42%	51%	50%	52%	50%	42%	49%	30%	30%	40%	48%
Curlyleaf Pondweed (*P. crispus*)	0%	12%	21%	20%	23%	17%	27%	60%	34%	52%	45%
Coontail (*C. demersum*)	66%	67%	62%	57%	64%	64%	68%	63%	61%	71%	67%
Richardson's Pondweed (*P. Richardsonii*)	0%	2%	0%	2%	1%	1%	4%	2%	5%	6%	6%
Leafy Pondweed (*P. foliosus*)	0%	11%	8%	4%	5%	9%	12%	7%	14%	6%	7%
Elodea (*Elodea sp.*)	1%	21%	21%	10%	14%	10%	12%	3%	23%	31%	23%
Nitella (*Nitella sp.*)	2%	10%	11%	18%	5%	4%	3%	0%	15%	16%	18%
Watershield (*B. schreberi*)	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%

Table 4. Frequency of Occurrence by Species in the West Lagoon (2015-2025)

West Lagoon											
Species	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Eurasian watermilfoil (*M. spicatum*)	50%	65%	39%	36%	60%	53%	60%	32%	23%	40%	58%
Curlyleaf Pondweed (*P. crispus*)	3%	31%	41%	42%	48%	59%	64%	39%	44%	66%	64%
Coontail (*C. demersum*)	37%	70%	49%	37%	51%	50%	52%	38%	39%	56%	51%
Richardson's Pondweed (*P. Richardsonii*)	3%	5%	4%	4%	3%	2%	2%	2%	3%	4%	4%
Leafy Pondweed (*P. foliosus*)	5%	28%	10%	9%	9%	4%	14%	10%	7%	2%	4%
Elodea (*Elodea sp.*)	6%	48%	34%	24%	21%	19%	27%	42%	30%	40%	34%
Nitella (*Nitella sp.*)	7%	17%	19%	39%	11%	10%	9%	18%	21%	39%	43%
Watershield (*B. schreberi*)	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	1%

Table 5. Frequency of Occurrence by Species in the Lake Tallac Lagoon (2015-2025)

Lake Tallac											
Species	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Eurasian watermilfoil (*M. spicatum*)	42%	61%	21%	33%	47%	40%	38%	12%	2%	42%	56%
Curlyleaf Pondweed (*P. crispus*)	0%	21%	29%	18%	8%	22%	15%	1%	2%	18%	38%
Coontail (*C. demersum*)	95%	94%	87%	83%	91%	86%	95%	86%	80%	95%	94%
Richardson's Pondweed (*P. Richardsonii*)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Leafy Pondweed (*P. foliosus*)	3%	12%	5%	1%	0%	0%	0%	0%	0%	0%	0%
Elodea (*Elodea sp.*)	3%	6%	0%	0%	2%	4%	2%	2%	6%	36%	36%
Nitella (*Nitella sp.*)	0%	3%	13%	6%	0%	0%	0%	1%	3%	3%	2%
Watershield (*B. schreberi*)	8%	0%	32%	23%	6%	38%	35%	47%	53%	24%	19%

4.1 Occurrence Rate Discussion

The following sections describe the species composition and occurrence rate data collected during the 2025 survey. The 2025 occurrence rates are compared to the data collected during past surveys for each lagoon. Figures 13 through 15 display percent composition for AIP species.

4.1.1 East Lagoon

The frequency of occurrence data calculated for the East Lagoon is relatively consistent with the previous year (2024) as Eurasian watermilfoil and curlyleaf pondweed still dominate the shallow areas while coontail dominates the deeper areas. The occurrence rate for Eurasian watermilfoil increased from 30% in 2023, to 40% in 2024, to 48% in 2025. The occurrence rate for curlyleaf pondweed appears to be fluctuating in recent years with a large increase to 60% in 2022, a decrease to 34% in 2023, another increase to 52% in 2024, and lastly a slight decrease to 45% in 2025. The occurrence rate for coontail also appears to be fluctuating, although more mildly with a slight decrease to 61% in 2023, an increase up to 71% in 2024, and another slight decrease to 67% in 2025. These year-to-year fluctuations demonstrate the inherent variability in natural systems and in data collection. Similar fluctuations can be seen in previous years as AIP populations change depending on environmental conditions and the abundance of competitors.

4.1.2 West Lagoon

The frequency of occurrence values for the three AIP species in the West Lagoon are similar for 2025, ranging from 51% to 64%. The occurrence rate for Eurasian watermilfoil increased from 23% in 2023, to 40% in 2024, to 58% in 2025. The occurrence rate for curlyleaf pondweed increased from 39% in 2022, to 44% in 2023, to 66% in 2024, followed by a slight decrease to 64% in 2025. The occurrence rate for coontail appears to follow a similar trajectory with increases from 38% in 2022 to 56% in 2024, followed by a decrease to 51% in 2025. Nitella and elodea continue to be the most prevalent desirable native species in the West Lagoon.

4.1.3 Lake Tallac Lagoon

Species frequency of occurrence in the Lake Tallac Lagoon continued to be mostly dominated by coontail, a consistent finding since 2015. The 2025 occurrence rate for coontail in the Lake Tallac Lagoon is 94%, a 1% decrease from 2024. The occurrence rate for Eurasian watermilfoil has increased significantly since 2023 with a 56% occurrence rate recorded for 2025. Curlyleaf pondweed occurrence in the Lake Tallac Lagoon also appears to be increasing rapidly in recent years. The occurrence rate for curlyleaf pondweed increased from 1% in 2022 to 38% in 2025. The 2025 occurrence rate is the highest for this species, period of record, and location.

Watershield decreased in occurrence in the Lake Tallac Lagoon from 53% in 2023 to 19% in 2025.

Figure 13. Eurasian Watermilfoil Percent Composition Map Based on Rake Samples

Figure 14. Coontail Percent Composition Map Based on Rake Samples

Figure 15. Curlyleaf Pondweed Percent Composition Map Based on Rake Samples

4.2 Curlyleaf Pondweed

While the occurrence of curlyleaf pondweed has varied somewhat since sampling began, the survey data indicates that this target invasive plant has become much more established in the Keys lagoons over the eleven-year period. In 2015, the average total occurrence rate (combining samples pulled from the East Lagoon, West Lagoon and the Lake Tallac Lagoon) was 4%. In 2019, the average occurrence rate was 39% for all three lagoons. The increasing trend continued into 2024 with an average total occurrence rate of 58%. A 1% decrease in total average occurrence is noted for 2025.

Figure 16 shows the relative changes in curlyleaf pondweed occurrence from 2015 to 2025 for all lagoons. As shown, the most dramatic increases took place from 2015 to 2016 and from 2023 to 2024, and the largest decrease from 2021 to 2022. Variations in water year types (e.g., drought, average or wet years), year-to-year shifts in growing seasons (e.g., early spring v. late spring), and AIP control method treatments (from 2022-2025 in the West Lagoon and Lake

Tallac Lagoon) are believed to contribute to some of the variability observed in the sample data.

Curlyleaf pondweed was first discovered in Lake Tahoe in 2003 (Anderson 2008). The species is the highest priority aquatic invasive plant of concern for the Tahoe Keys lagoons and Lake Tahoe proper (Wittmann et al. 2015). Curlyleaf pondweed is very adaptable to the climate and ecology of Lake Tahoe because it sprouts in the fall, over-winters under ice, and gets a head start growing in the spring while temperatures are still cool. Further, this invasive plant can grow to depths of 20 or more feet in clearer waters where competition is minimal with other aquatic plants. This gives the species competitive advantages over native and invasive aquatic plants.

In addition to tolerating colder and deeper waters, curlyleaf pondweed produces up to dozens of turions per plant during the growing season. Turions are vegetative propagules that break free from the parent plant and settle in the sediment where they can either sprout in the late summer to fall or remain dormant for several years until habitat conditions are adequate for growth (Sastroutomo 2003). The CMT Draft Final Report estimates that 10 to 15 million turions are produced annually by curlyleaf pondweed in the West Lagoon alone (Anderson 2025).

Increasing occurrence is common for aquatic invasive plant species. When a new species is introduced, a lag time often exists between the first occurrence and the widespread presence of the species. A larger study of upper-Midwest plant invasions looked at a number of herbarium records and reported that lag times for species can be anywhere from three to 140 years. This wide range can be attributed to the vast differences in plant morphology. Curlyleaf pondweed has a lag time of 8 to 35 years (Larkin 2012).

4.3 Control Methods Test (CMT) & Follow-Up Treatments

The Control Methods Test (CMT) Project concluded in 2024 following three years of testing various treatment methods on the AIP in the lagoons. Detailed site-, lagoon-, and species-specific results from this multi-year effort are presented in the CMT Draft Final Report (TKPOA 2025). In 2025, additional, non-herbicide follow-up treatments were implemented in approximately 8 acres of the West Lagoon, during which TKPOA and ESA conducted macrophyte sampling to assess treatment effectiveness for combinations of UV and DASH treatments. Findings from the 2025 treatments will be presented in a separate report.

4.4 Other Observations

Water smartweed (*Persicaria amphibia)* continues to spread through the West Lagoon. It is now more common in both the West Lagoon and East Lagoon (based on observations during field survey). In past surveys (prior to 2023), smartweed only occurred sporadically in the Lake Tallac Lagoon. Occurrences of smartweed in 2025 can be seen in the Figure B-9 composition map in

Appendix B. In the West Lagoon, the number of samples that contain water smartweed went from four in 2024 to nine in 2025. This species, like coontail, is native, but can become a nuisance plant very quickly if left unimpeded and unmanaged. The composition map in Appendix B does not accurately reflect this species' occurrence in the Lake Tallac Lagoon due to difficulties in accessing near shore areas and collecting strongly rooted vegetation such as watershield and water smartweed.

Figure 16. Curlyleaf Pondweed Frequency of Occurrence in All Samples

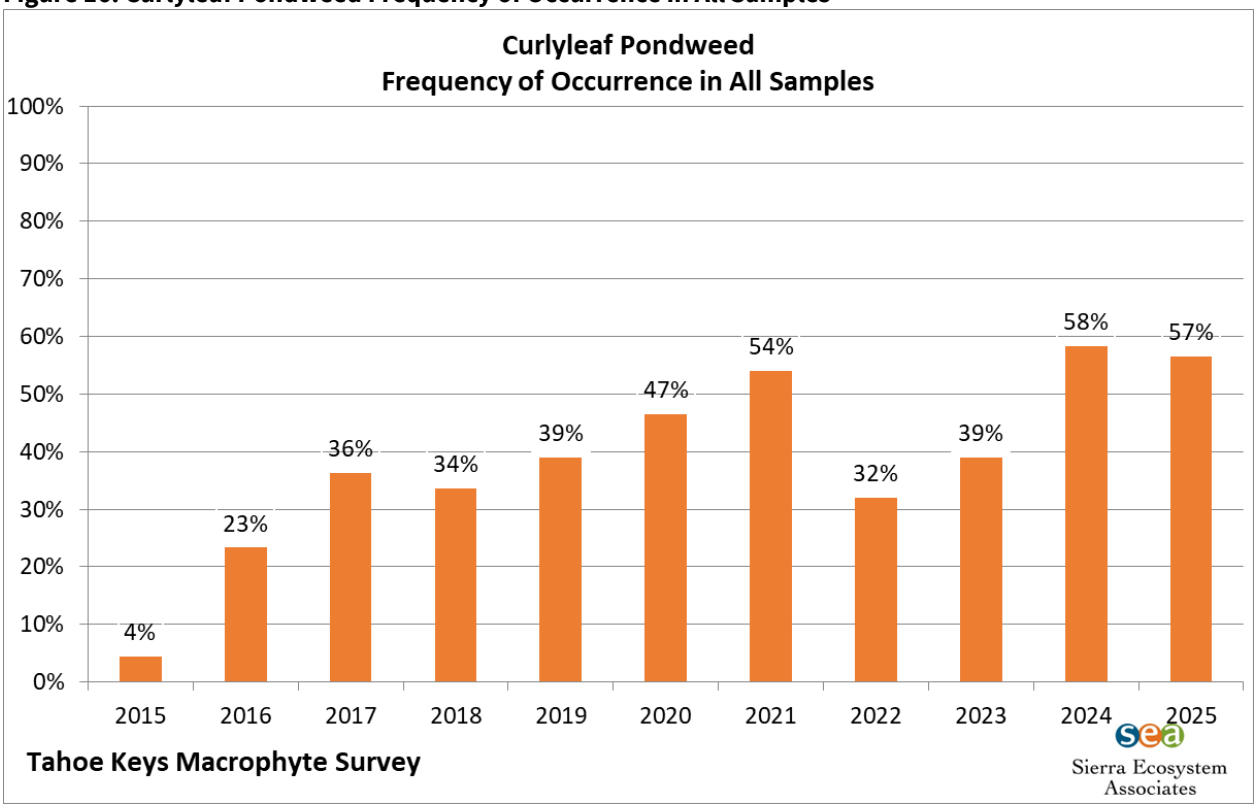
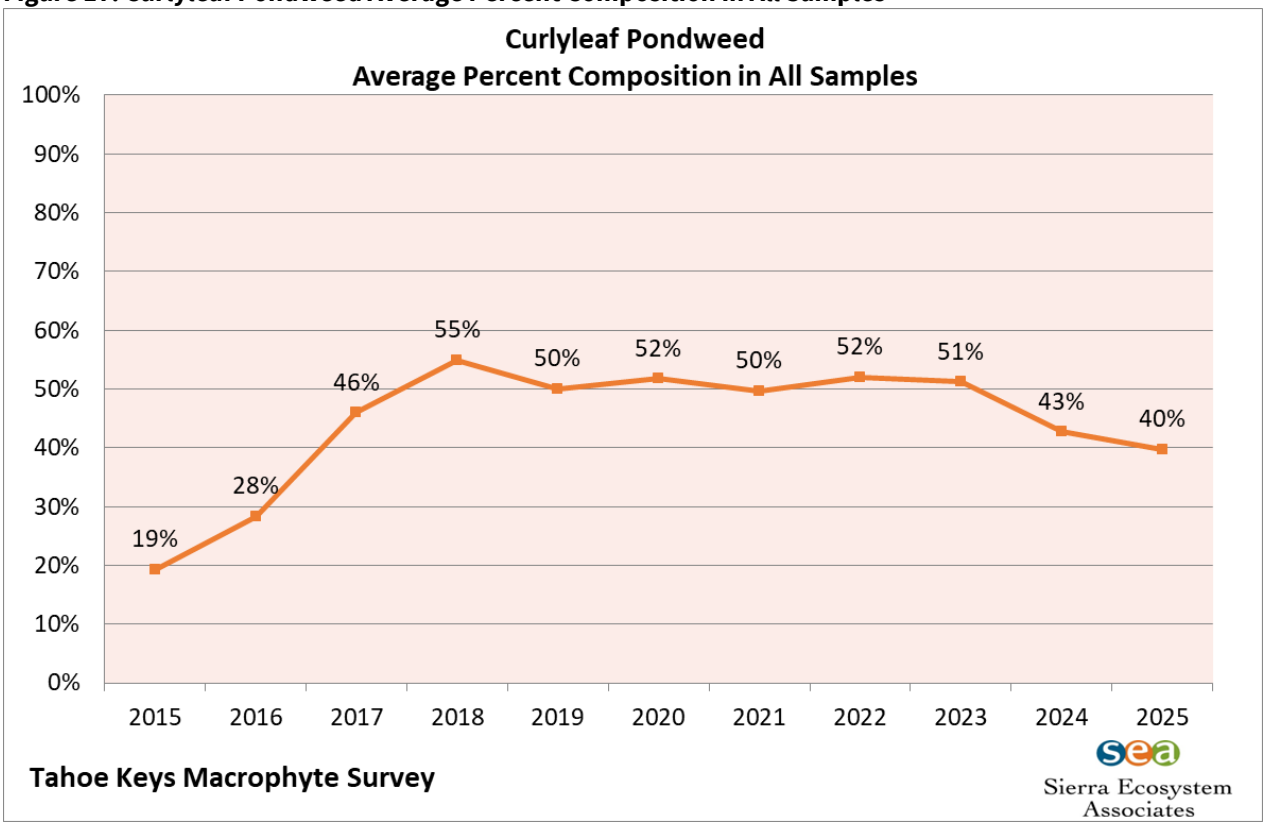


Figure 17 shows the average percent composition of curlyleaf pondweed collected in each sample. This average indicates that, in each sample where curlyleaf pondweed was present, it comprised this percentage of the sample's total composition. Average percent composition for the species remained relatively consistent from 2018 through 2023, ranging from 50% to 55%. However, decreases occurred in 2024 and 2025 with a 2025 percent composition value of 40%. Note that a 3% decrease in percent composition occurred this year, while a 1% decrease in frequency of occurrence was noted for curlyleaf pondweed. This means that in recent years curlyleaf pondweed presence in each sample has slightly decreased, even though the species is maintaining the same (or a similar) frequency of occurrence in all samples.

Figure 17. Curlyleaf Pondweed Average Percent Composition in All Samples



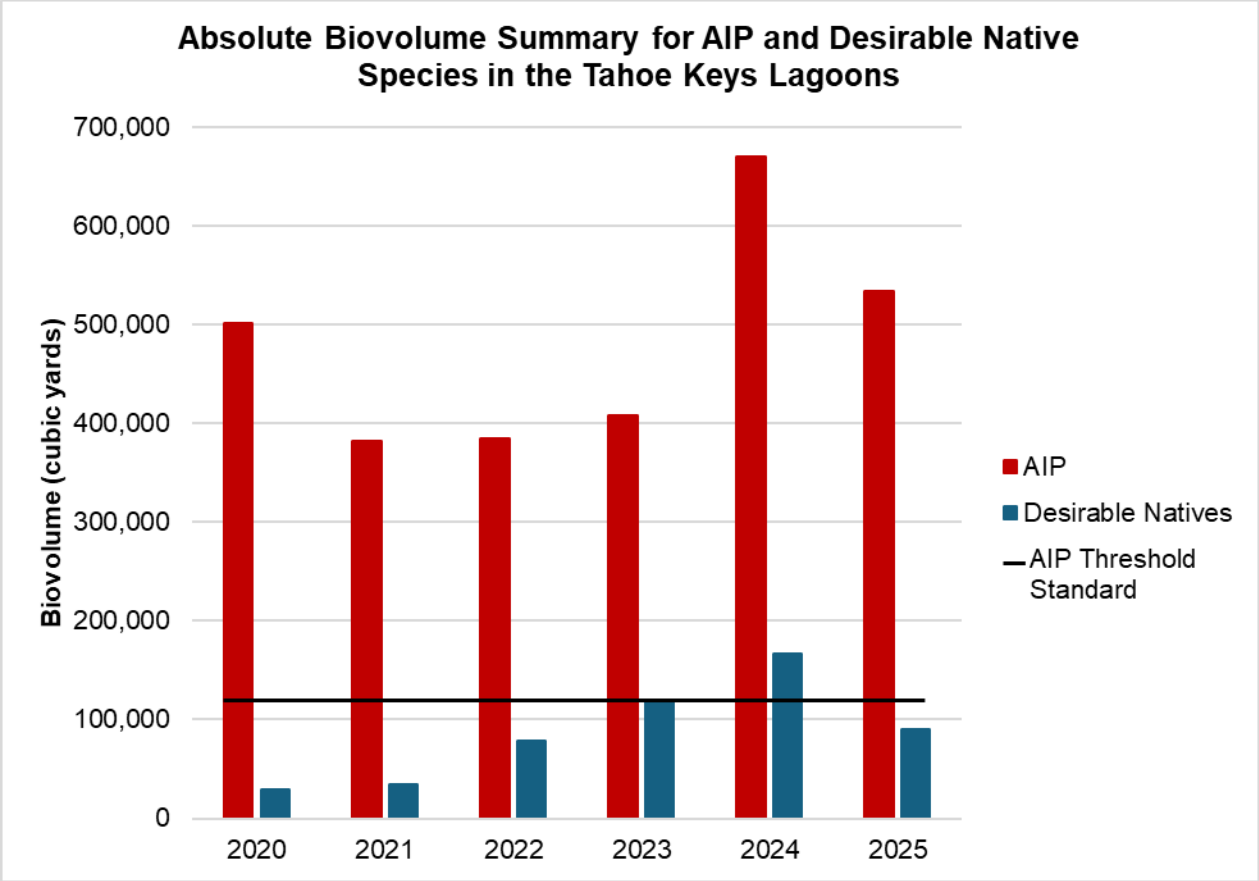
5.0 AIP THRESHOLD STANDARD TRACKING (BIOVOLUME)

The West and East lagoons have been identified as high-priority areas for gaining control of the AIP due to the scale of the infestations and intensity of recreational boater use (Wittmann et al. 2015). In response to these concerns, the Tahoe Regional Planning Agency (TRPA) Governing Board adopted a specific AIP threshold standard for the lagoons, which is stated below.

"WQ10: Reduce average aquatic invasive plant abundance in the Tahoe Keys by a minimum of 75% from the 2020 baseline year" (TRPA 2024).

This section summarizes the 2025 abundance of AIP and desirable native species and discusses trends since the 2020 baseline year for monitoring progress towards the 75% AIP abundance reduction goal. The following sections present species-specific AIP data from 2020 through 2025 within the Tahoe Keys lagoons. Figure 18 illustrates the overall status of AIP (Eurasian watermilfoil, curlyleaf pondweed, and native coontail) and desirable native species biovolumes in the lagoons for the 2020 through 2025 period. Note that although coontail is considered a native species, it is included as an AIP due to its excessive growth in the lagoons.

Figure 18. Absolute Biovolume Summary for the AIP and Desirable Native Species in the Tahoe Keys Lagoons

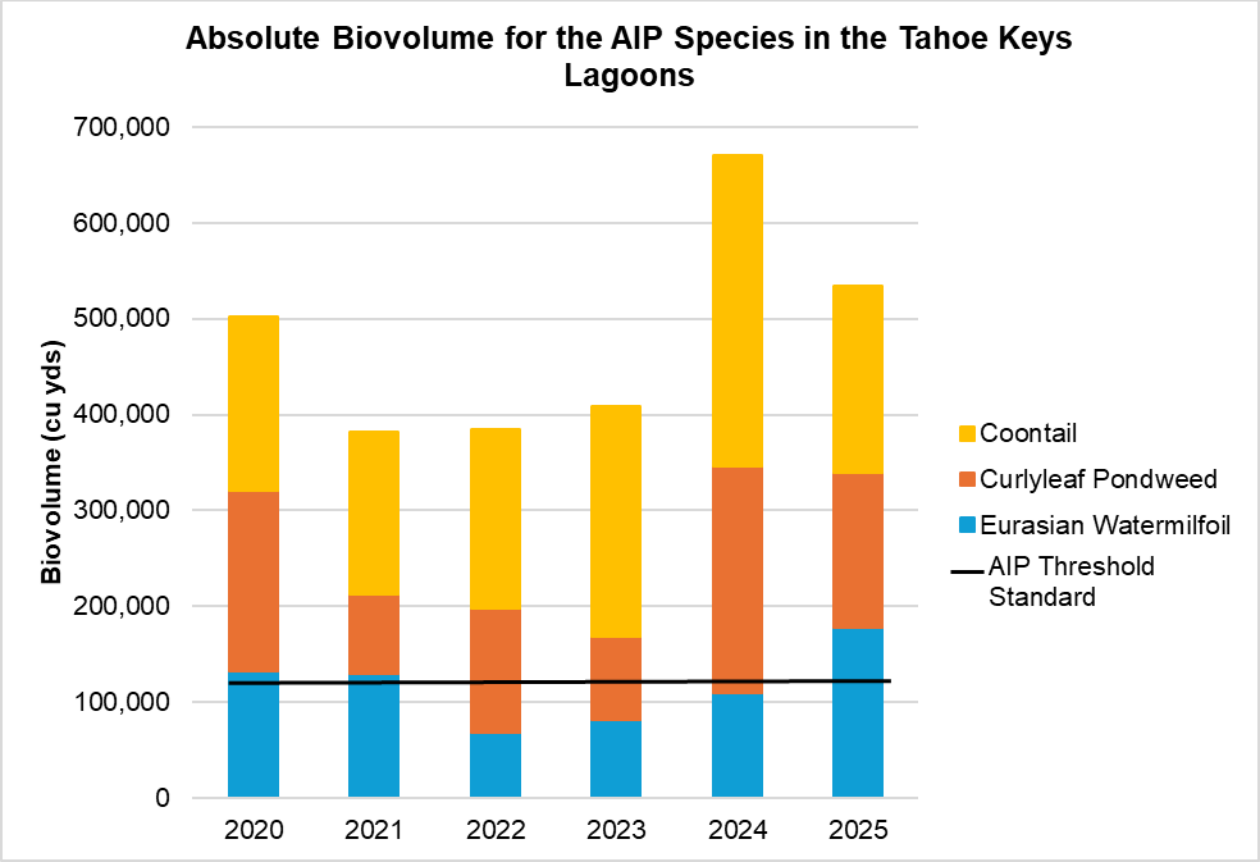


5.1 Absolute Biovolume (2020-2025)

Figure 19 depicts absolute biovolume data for each AIP species (Eurasian watermilfoil, curlyleaf pondweed, and coontail) from 2020 through 2025. This metric represents total plant volume within the water column (see Section 2.2.4). The threshold standard for absolute biovolume relative to the 2020 baseline year is 125,447 cu yds as shown with the black line in Figure 19.

Eurasian watermilfoil absolute biovolume for the lagoons decreased from 131,729 cu yds in 2020 to 68,625 cu yds in 2022. Following the 2022 decrease, absolute biovolume for the species increased to 177,274 cu yds in 2025. Curlyleaf pondweed absolute biovolume increased in 2022 and 2024 and decreased in 2021, 2023 and 2025. In 2025, curlyleaf pondweed biovolume decreased to 161,606 cu yds. Nuisance native coontail absolute biovolume decreased from 181,395 cu yds in 2020 to 169,634 cu yds in 2021, then increased to 324,706 cu yds in 2024, followed by another decrease to 195,112 cu yds in 2025.

Figure 19. Absolute Biovolume for the AIP Species in the Tahoe Keys Lagoons



5.2 Relative Biovolume (2020-2025)

Table 6 depicts relative biovolume data for the AIP and total desirable natives (Leafy pondweed, Nitella, Elodea, and Richardson's Pondweed) from 2020 through 2025. In 2020, the total relative biovolume of AIP was 33.9%. Relative biovolume for total AIP decreased to 19.8% in 2023, then increased to 30.3% in 2024, followed by another decrease to 25.8% in 2025. Although relative biovolume for the total desirable natives has mostly increased over the years, it decreased to 4.5% in 2025.

Table 6. Relative Biovolume for the AIP and Desirable Native Species in the Tahoe Keys Lagoons

	Eurasian Watermilfoil	Curlyleaf Pondweed	Coontail	Total AIP	Total Desirable Natives
2020	8.9%	12.7%	12.3%	**33.9%**	**2.0%**
2021	11.0%	7.0%	14.4%	**32.4%**	**3.0%**
2022	5.8%	10.9%	15.7%	**32.4%**	**6.7%**
2023	3.9%	4.2%	11.7%	**19.8%**	**5.7%**
2024	4.9%	10.7%	14.6%	**30.3%**	**7.5%**
2025	8.1%	8.0%	9.6%	**25.8%**	**4.5%**

*Some values depicted for 2020 have been updated from previous reports to account for corrections in the calculations of lagoon water volumes.

6.0 CONCLUSIONS

Non-native Eurasian watermilfoil, along with the native (but nuisance) coontail, are no longer the only dominant species throughout the Tahoe Keys. Coontail is still the dominant species in the deeper areas of the lagoons, while the dominant species in the shallow areas has changed from Eurasian watermilfoil to curlyleaf pondweed. Eurasian watermilfoil's historical dominance in the shallow areas has waned in response to various factors including recent high lake water levels, increased competition from curlyleaf pondweed, and effects from the CMT treatments in certain areas.

The high presence of curlyleaf pondweed in the West Lagoon and increasing presence of this AIP species in the East and Lake Tallac lagoons, combined with its unique reproductive strategy and capacity (i.e., turions), reinforces the importance of actions to reduce the spread of this species into Lake Tahoe. Developing a new Integrated Management Plan that would reduce AIP in accordance with the TRPA Threshold Standard, based on knowledge gained through the CMT Project, should continue to be a top priority for AIP management efforts in the coming years.

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The following individuals prepared the text presented in this report.

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TKPOA Staff including Kristine Lebo, Meghan Hoffmann, Moire Breslin, and Katie Terwilliger provided boat transportation and assisted in data collection.

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Appendix A

Tahoe Keys Lagoons 2025 Aquatic Macrophyte Survey Data Points

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
1	1	1	0	100	0	0	0	0	0	0	0	0	0
2	5	3	0	80	0	5	5	10	0	0	0	0	0
3	2	1	0	0	0	0	0	100	0	0	0	0	0
4	5	4	0	5	0	70	5	20	0	0	0	0	0
5	4	4	0	0	0	60	0	40	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	5	3	0	70	0	20	10	0	0	0	0	0	0
8	3	3	0	0	50	50	0	0	0	0	0	0	0
9	5	2	0	60	0	5	5	30	0	0	0	0	0
10	3	2	0	10	80	0	0	10	0	0	0	0	0
11	5	1	0	100	0	0	0	0	0	0	0	0	0
12	3	2	0	0	5	0	0	95	0	0	0	0	0
13	5	5	0	50	0	45	5	0	0	0	0	0	0
14	5	1	0	0	0	0	100	0	0	0	0	0	0
15	4	2	0	50	40	10	0	0	0	0	0	0	0
16	4	4	0	10	0	70	10	20	0	0	0	0	0
17	5	3	0	5	0	5	0	90	0	0	0	0	0
18	4	4	0	5	0	80	5	10	0	0	0	0	0
19	5	3	0	90	0	5	5	0	0	0	0	0	0
20	4	5	0	0	90	10	0	0	0	0	0	0	0
21	3	4	0	5	0	80	10	5	0	0	0	0	0
22	5	1	0	0	0	0	0	0	0	0	100	0	0
23	5	5	0	0	0	90	0	10	0	0	0	0	0
24	4	4	0	25	70	0	5	0	0	0	0	0	0
25	5	2	0	40	0	20	20	0	0	0	0	0	20
26	5	4	0	0	0	90	0	0	10	0	0	0	0
27	3	3	0	0	50	20	30	0	0	0	0	0	0
28	4	4	0	90	5	5	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0
30	3	1	0	0	10	90	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0
32	3	3	0	2	0	95	0	3	0	0	0	0	0
33	4	4	0	40	50	10	0	0	0	0	0	0	0
34	4	1	0	0	0	0	0	100	0	0	0	0	0
35	4	1	0	10	0	30	10	50	0	0	0	0	0
36	5	4	0	0	98	0	0	0	0	0	2	0	0
37	5	5	0	75	25	0	0	0	0	0	0	0	0
38	4	2	0	100	0	0	0	0	0	0	0	0	0
39	4	2	0	30	0	30	0	40	0	0	0	0	0
40	5	3	0	5	0	80	0	15	0	0	0	0	0
41	5	5	0	0	50	30	5	15	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
42	4	3	0	0	0	60	0	40	0	0	0	0	0
43	4	2	0	65	0	10	0	25	0	0	0	0	0
44	5	3	0	50	0	0	30	20	0	0	0	0	0
45	5	3	0	80	10	5	5	0	0	0	0	0	0
46	5	5	0	90	0	5	0	0	0	0	0	0	0
47	4	4	0	10	5	60	5	20	0	0	0	0	0
48	5	4	0	0	5	90	0	5	0	0	0	0	0
49	5	3	0	30	40	30	0	0	0	0	0	0	0
50	5	2	0	95	0	0	0	0	0	5	0	0	0
51	3	1	0	10	0	90	0	0	0	0	0	0	0
52	5	1	0	0	0	80	20	0	0	0	0	0	0
53	5	2	0	95	0	0	0	5	0	0	0	0	0
54	4	2	0	5	5	30	0	50	0	0	0	0	0
55	5	3	0	50	0	5	0	40	0	0	0	0	0
56	5	5	0	10	70	20	0	0	0	0	0	0	0
57	4	3	0	95	0	0	0	5	0	0	0	0	0
58	3	5	0	0	0	95	0	5	0	0	0	0	0
59	5	4	0	10	10	70	0	15	0	0	0	0	0
60	5	5	0	5	0	95	0	0	0	0	0	0	0
61	3	2	0	0	5	90	5	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0	0
63	0|5	0	0	0	0	0	0	0	0	0	0	0	0
64	5	3	0	0	50	0	50	0	0	0	0	0	0
65	4	1	0	0	5	5	0	90	0	0	0	0	0
66	5	1	0	5	0	0	95	0	0	0	0	0	0
67	5	2	0	85	0	10	5	0	0	0	0	0	0
68	4	5	0	1	0	95	3	2	0	0	0	0	0
69	5	3	0	0	80	20	0	0	0	0	0	0	0
70	4	2	0	90	0	0	0	10	0	0	0	0	0
71	4	3	0	80	0	0	0	10	0	10	0	0	0
72	5	3	0	60	0	0	30	10	0	0	0	0	0
73	5	3	0	0	50	45	5	0	0	0	0	0	0
74	4	4	0	0	2	90	5	3	0	0	0	0	0
75	4	2	0	45	0	50	5	0	0	0	0	0	0
76	3	3	0	0	0	95	0	5	0	0	0	0	0
77	5	5	0	0	100	0	0	0	0	0	0	0	0
78	3	2	0	50	0	5	45	0	0	0	0	0	0
79	3	1	0	0	10	70	0	20	0	0	0	0	0
80	5	3	0	80	0	15	0	5	0	0	0	0	0
81	0	0	0	0	0	0	0	0	0	0	0	0	0
82	4	4	0	5	5	85	5	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
83	4	3	0	15	15	0	0	70	0	0	0	0	0
84	5	1	0	90	0	0	0	10	0	0	0	0	0
85	5	1	0	0	0	0	0	0	0	0	100	0	0
86	4	1	0	90	10	0	0	0	0	0	0	0	0
87	4	1	0	80	0	0	0	15	0	5	0	0	0
88	5	5	0	0	95	5	0	0	0	0	0	0	0
89	5	5	5.15	0	0	95	0	0	5	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0
91	5	5	0	1	98	1	0	0	0	0	0	0	0
92	3	3	0	0	0	70	0	30	0	0	0	0	0
93	5	5	0	0	15	45	10	30	0	0	0	0	0
94	5	5	0	0	40	55	5	0	0	0	0	0	0
95	3	1	0	80	0	0	10	10	0	0	0	0	0
96	5	4	0	2	90	8	0	0	0	0	0	0	0
97	5	1	0	0	0	0	0	0	100	0	0	0	0
98	5	1	0	0	100	0	0	0	0	0	0	0	0
99	5	4	0	0	0	30	30	40	0	0	0	0	0
100	5	3	0	5	0	20	5	0	70	0	0	0	0
101	5	1	0	30	10	15	0	30	0	15	0	0	0
102	5	2	0	100	0	0	0	0	0	0	0	0	0
103	5	3	0	0	0	80	5	0	15	0	0	0	0
104	4	2	3.03	0	60	40	0	0	0	0	0	0	0
105	5	3	0	80	5	15	0	0	0	0	0	0	0
106	5	2	0	100	0	0	0	0	0	0	0	0	0
107	4	3	0	50	20	0	0	20	0	10	0	0	0
108	1	1	0	0	0	0	0	0	100	0	0	0	0
109	5	2	0	35	40	5	5	5	0	10	0	0	0
110	4	2	0	85	0	0	5	10	0	0	0	0	0
111	4	1	0	80	0	5	0	15	0	0	0	0	0
112	4	3	0	5	0	90	0	5	0	0	0	0	0
113	3	4	0	0	0	80	2	20	0	0	0	0	0
114	5	3	0	0	0	95	0	5	0	0	0	0	0
115	5	1	0	5	0	55	0	0	0	40	0	0	0
116	5	2	0	70	10	0	10	10	0	0	0	0	0
117	5	3	0	20	0	20	0	60	0	0	0	0	0
118	5	2	0	0	100	0	0	0	0	0	0	0	0
119	5	2	0	30	30	30	10	0	0	0	0	0	0
120	5	2	0	40	50	0	10	0	0	0	0	0	0
121	4	4	0	10	10	45	5	30	0	0	0	0	0
122	5	1	0	0	0	0	5	95	0	0	0	0	0
123	3	3	4.13	5	1	95	0	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
124	5	5	0	0	100	0	0	0	0	0	0	0	0
125	4	3	0	30	35	0	10	25	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	0	0	0	0
127	3	1	0	0	50	0	50	0	0	0	0	0	0
128	4	2	2.8	0	90	2	5	3	0	0	0	0	0
129	5	5	0	0	100	0	0	0	0	0	0	0	0
130	5	0	0	0	0	0	0	0	0	100	0	0	0
131	5	2	0	60	0	40	0	0	0	0	0	0	0
132	4	2	0	90	0	5	0	5	0	0	0	0	0
133	4	4	0	30	40	20	10	0	0	0	0	0	0
134	5	3	3.15	40	50	10	0	0	0	0	0	0	0
135	4	1	0	80	0	5	15	0	0	0	0	0	0
136	5	2	0	90	0	0	10	0	0	0	0	0	0
137	5	5	0	0	5	95	0	0	0	0	0	0	0
138	4	4	0	20	15	60	0	5	0	0	0	0	0
139	5	5	0	0	100	0	0	0	0	0	0	0	0
140	4	4	0	30	5	40	0	25	0	0	0	0	0
141	5	4	0	50	40	0	10	0	0	0	0	0	0
142	5	2	0	95	0	0	2	3	0	0	0	0	0
143	5	4	0	0	60	40	0	0	0	0	0	0	0
144	5	5	0	5	15	80	0	0	0	0	0	0	0
145	5	2	0	70	5	20	0	5	0	0	0	0	0
146	5	3	0	0	55	10	10	25	0	0	0	0	0
147	4	3	0	20	50	0	30	0	0	0	0	0	0
148	5	2	0	80	0	20	0	0	0	0	0	0	0
149	3	1	0	0	5	5	0	0	90	0	0	0	0
150	5	4	5.32	0	0	100	0	0	0	0	0	0	0
151	4	3	0	0	95	5	0	0	0	0	0	0	0
152	5	5	0	0	0	100	0	0	0	0	0	0	0
153	4	1	0	40	40	0	5	15	0	0	0	0	0
154	4	3	0	10	0	80	5	5	0	0	0	0	0
155	5	1	0	0	0	80	0	0	20	0	0	0	0
156	5	3	0	80	10	5	5	0	0	0	0	0	0
157	4	5	0	5	10	85	0	0	0	0	0	0	0
158	4	4	0	10	0	80	0	10	0	0	0	0	0
159	5	4	0	40	0	30	0	30	0	0	0	0	0
160	5	5	0	0	5	90	0	5	0	0	0	0	0
161	2	3	0	10	0	15	5	70	0	0	0	0	0
162	4	5	0	2	0	95	0	3	0	0	0	0	0
163	5	3	0	0	1	99	0	0	0	0	0	0	0
164	5	4	0	80	10	10	0	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
165	2	1	0	0	0	20	0	80	0	0	0	0	0
166	5	2	0	80	0	10	0	0	0	0	0	0	10
167	4	5	0	3	0	95	0	2	0	0	0	0	0
168	5	1	0	50	0	50	0	0	0	0	0	0	0
169	4	4	0	10	0	60	0	30	0	0	0	0	0
170	3	3	0	40	40	10	10	0	0	0	0	0	0
171	5	3	3.7	90	0	2	8	0	0	0	0	0	0
172	5	2	0	0	90	0	3	0	0	0	7	0	0
173	5	3	0	80	0	10	5	0	0	0	0	0	0
174	3	1	0	0	100	0	0	0	0	0	0	0	0
175	5	2	0	10	60	20	5	0	5	0	0	0	0
176	4	4	0	40	0	15	5	40	0	0	0	0	0
177	4	1	0	20	10	30	0	40	0	0	0	0	0
178	3	5	0	0	0	99	0	1	0	0	0	0	0
179	5	1	0	0	10	90	0	0	0	0	0	0	0
180	5	5	0	20	65	0	5	0	0	10	0	0	0
181	4	4	0	50	40	5	0	5	0	0	0	0	0
182	5	2	0	80	0	5	10	5	0	0	0	0	0
183	5	2	0	20	40	10	0	0	0	0	0	0	30
184	5	1	0	40	30	0	0	30	0	0	0	0	0
185	5	1	0	0	60	40	0	0	0	0	0	0	0
186	2	1	0	25	0	25	0	50	0	0	0	0	0
187	4	3	0	70	5	15	0	0	0	0	0	0	10
188	5	1	0	50	0	0	0	50	0	0	0	0	0
189	4	2	0	0	95	5	0	0	0	0	0	0	0
190	4	5	0	5	50	40	0	5	0	0	0	0	0
191	2	1	0	0	0	100	0	0	0	0	0	0	0
192	5	3	0	85	3	2	5	5	0	0	0	0	0
193	5	5	0	50	0	10	0	40	0	0	0	0	0
194	0|5	0	0	0	0	0	0	0	0	0	0	0	0
195	5	5	0	0	95	0	5	0	0	0	0	0	0
196	5	2	2.58	2	98	0	0	0	0	0	0	0	0
197	5	1	0	95	0	0	0	0	0	0	0	5	5
198	4	2	0	50	0	50	0	0	0	0	0	0	0
199	5	1	0	0	10	90	0	0	0	0	0	0	0
200	4	1	0	95	0	5	0	0	0	0	0	0	0
201	2	1	0	0	0	0	0	0	100	0	0	0	0
202	5	2	0	50	40	5	5	0	0	0	0	0	0
203	0	0	0	0	0	0	0	0	0	0	0	0	0
204	4	4	0	5	5	50	0	40	0	0	0	0	0
205	4	4	0	5	95	0	0	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
206	4	5	0	3	0	90	5	2	0	0	0	0	0
207	3	1	0	0	100	0	0	0	0	0	0	0	0
208	5	2	0	95	0	0	5	0	0	0	0	0	0
209	4	3	0	5	20	70	0	5	0	0	0	0	0
210	5	4	0	0	20	70	5	5	0	0	0	0	0
211	5	3	0	0	0	95	5	0	0	0	0	0	0
212	3	2	0	0	50	0	0	50	0	0	0	0	0
213	5	5	0	0	98	2	0	0	0	0	0	0	0
214	4	3	0	0	100	0	0	0	0	0	0	0	0
215	5	5	0	0	100	0	0	0	0	0	0	0	0
216	0	0	0	0	0	0	0	0	0	0	0	0	0
217	3	1	0	0	2	98	0	0	0	0	0	0	0
218	5	2	0	75	0	0	0	25	0	0	0	0	0
219	5	1		0	0	95	5	0	0	0	0	0	0
220	4	5	0	0	95	5	0	0	0	0	0	0	0
221	5	5	0	0	0	99	0	1	0	0	0	0	0
222	4	2	0	0	60	40	0	0	0	0	0	0	0
223	3	4	0	5	0	90	5	0	0	0	0	0	0
224	4	4	0	5	10	20	5	60	0	0	0	0	0
225	5	3	2.98	50	35	5	10	0	0	0	0	0	0
226	5	1	0	0	100	0	0	0	0	0	0	0	0
227	5	4	0	15	8	75	2	0	0	0	0	0	0
228	4	5	0	3	0	95	0	2	0	0	0	0	0
229	5	3	0	2	0	0	3	95	0	0	0	0	0
230	3	3	0	0	0	50	15	30	5	0	0	0	0
231	5	3	0	85	5	5	0	5	0	0	0	0	0
232	5	3	0	0	0	0	0	100	0	0	0	0	0
233	5	2	0	95	5	0	0	0	0	0	0	0	0
234	5	1	0	60	0	0	40	0	0	0	0	0	0
235	5	4	0	5	0	35	0	0	0	0	0	60	0
236	5	5	0	0	100	0	0	0	0	0	0	0	0
237	5	5	0	0	0	85	5	10	0	0	0	0	0
238	5	3	0	5	5	0	0	95	0	0	0	0	0
239	5	4	0	0	0	80	10	10	0	0	0	0	0
240	5	4	0	0	2	80	3	15	0	0	0	0	0
241	5	3	0	47	20	30	0	0	3	0	0	0	0
242	4	3	0	0	90	10	0	0	0	0	0	0	0
243	5	4	5	10	30	60	0	0	0	0	0	0	0
244	5	5	0	0	100	0	0	0	0	0	0	0	0
245	0	0	0	0	0	0	0	0	0	0	0	0	0
246	5	2	0	10	0	5	10	75	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
247	5	1	0	70	0	30	0	0	0	0	0	0	0
248	5	4	0	87	0	3	10	0	0	0	0	0	0
249	2	1	0	75	0	20	5	0	0	0	0	0	0
250	5	3	0	0	0	40	10	50	0	0	0	0	0
251	4	1	0	0	0	0	0	100	0	0	0	0	0
252	2	1	0	100	0	0	0	0	0	0	0	0	0
253	0	0	0	0	0	0	0	0	0	0	0	0	0
254	5	2	0	0	0	100	0	0	0	0	0	0	0
255	3	1	0	0	0	0	0	0	0	100	0	0	0
256	4	2	0	0	50	0	50	0	0	0	0	0	0
257	5	1	0	70	0	20	10	10	0	0	0	0	0
258	4	1	0	40	0	30	0	30	0	0	0	0	0
259	5	4	0	0	20	80	0	0	0	0	0	0	0
260	4	4	0	0	0	95	0	5	0	0	0	0	0
261	5	5	6	0	70	30	0	0	0	0	0	0	0
262	4	5	0	2	0	95	0	3	0	0	0	0	0
263	4	3	0	30	0	30	0	40	0	0	0	0	0
264	4	1	0	0	50	40	10	0	0	0	0	0	0
265	5	3	0	0	100	0	0	0	0	0	0	0	0
266	4	5	0	3	5	90	0	2	0	0	0	0	0
267	3	5	0	5	0	85	5	0	0	5	0	0	0
268	5	2	0	40	0	55	5	0	0	0	0	0	0
269	2	3	0	20	40	20	0	20	0	0	0	0	0
270	4	2	0	30	30	40	0	0	0	0	0	0	0
271	4	2	0	50	0	40	5	5	0	0	0	0	0
272	5	1	0	0	0	30	30	40	0	0	0	0	0
273	5	4	0	70	10	0	10	10	0	0	0	0	0
274	4	1	0	65	0	35	0	0	0	0	0	0	0
275	5	3	0	0	60	0	5	35	0	0	0	0	0
276	4	5	0	0	10	85	0	5	0	0	0	0	0
277	5	4	0	10	30	40	0	20	0	0	0	0	0
278	5	3	6	95	5	0	0	0	0	0	0	0	0
279	3	5	0	0	0	90	0	10	0	0	0	0	0
280	5	3	0	80	5	10	5	0	0	0	0	0	0
281	4	4	0	0	10	90	0	0	0	0	0	0	0
282	4	1	0	0	100	0	0	0	0	0	0	0	0
283	3	2	0	40	0	50	0	10	0	0	0	0	0
284	5	1	0	5	0	0	10	0	0	0	85	0	0
285	5	4	0	75	20	5	0	0	0	0	0	0	0
286	5	3	0	40	5	30	0	30	0	0	0	0	0
287	5	5	0	10	10	80	0	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
288	5	2	0	50	30	0	0	20	0	0	0	0	0
289	5	2	0	50	0	30	0	20	0	0	0	0	0
290	5	5	0	0	20	80	0	0	0	0	0	0	0
291	4	4	0	55	0	20	5	20	0	0	0	0	0
292	3	1	0	100	0	0	0	0	0	0	0	0	0
293	5	3	0	80	10	10	0	0	0	0	0	0	0
294	4	4	0	0	0	90	0	10	0	0	0	0	0
295	5	4	0	0	30	30	0	40	0	0	0	0	0
296	4	5	0	0	60	40	0	0	0	0	0	0	0
297	3	1	2.68	65	30	5	0	0	0	0	0	0	0
298	5	2	0	95	3	0	2	0	0	0	0	0	0
299	4	5	6	9	0	90	0	0	0	0	1	0	0
300	4	3	0	30	30	40	0	0	0	0	0	0	0
301	5	4	0	0	97	0	3	0	0	0	0	0	0
302	5	2	0	95	0	5	0	5	0	0	0	0	0
303	5	4	0	0	95	5	0	0	0	0	0	0	0
304	5	1	0	10	0	20	10	60	0	0	0	0	0
305	4	2	0	85	2	0	5	5	0	3	0	0	0
306	4	3	3.89	0	80	15	0	5	0	0	0	0	0
307	0	2	0	40	0	0	0	20	0	0	0	0	0
308	3	1	0	0	50	50	0	0	0	0	0	0	0
309	5	4	0	10	0	80	0	10	0	0	0	0	0
310	5	4	0	65	0	10	5	20	0	0	0	0	0
311	5	1	0	30	30	0	40	0	0	0	0	0	0
312	4	4	0	0	0	80	5	15	0	0	0	0	0
313	5	1	0	0	100	0	0	0	0	0	0	0	0
314	5	2	0	70	0	0	10	20	0	0	0	0	0
315	2	4	0	0	1	99	0	0	0	0	0	0	0
316	2	1	0	0	100	0	0	0	0	0	0	0	0
317	5	2	0	80	0	20	0	0	0	0	0	0	0
318	4	1	0	0	100	0	0	0	0	0	0	0	0
319	5	1	0	90	10	0	0	0	0	0	0	0	0
320	5	2	0	0	0	10	0	5	85	0	0	0	0
321	4	1	0	80	0	20	0	0	0	0	0	0	0
322	4	4	0	0	95	5	0	0	0	0	0	0	0
323	5	2	0	50	0	15	15	20	0	0	0	0	0
324	5	5	0	10	10	40	0	40	0	0	0	0	0
325	3	5	0	0	5	80	0	15	0	0	0	0	0
326	4	2	0	0	0	98	0	2	0	0	0	0	0
327	4	2	0	0	0	5	0	70	25	0	0	0	0
328	5	3	0	85	5	5	5	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
329	4	5	0	0	98	0	0	2	0	0	0	0	0
330	5	2	0	0	100	0	0	0	0	0	0	0	0
331	5	3	0	30	0	40	10	20	0	0	0	0	0
332	3	5	0	0	0	99	0	1	0	0	0	0	0
333	4	4	0	40	10	40	10	0	0	0	0	0	0
334	5	3	0	70	0	0	0	0	0	0	0	0	30
335	5	1	0	5	15	80	0	0	0	0	0	0	0
336	5	4	0	5	10	85	0	0	0	0	0	0	0
337	5	3	0	80	0	20	0	0	0	0	0	0	0
338	5	1	0	0	100	0	0	0	0	0	0	0	0
339	5	3	0	70	0	5	10	15	0	0	0	0	0
340	5	1	0	95	3	0	0	2	0	0	0	0	0
341	5	1	0	0	10	10	0	0	0	80	0	0	0
342	5	1	0	0	0	0	5	5	90	0	0	0	0
343	4	3	0	95	5	0	0	0	0	0	0	0	0
344	5	1	0	30	30	15	5	15	0	0	0	0	0
345	4	3	0	10	90	0	0	0	0	0	0	0	0
346	5	3	0	40	50	0	0	10	0	0	0	0	0
347	4	4	0	0	98	2	0	0	0	0	0	0	0
348	4	2	0	0	100	0	0	0	0	0	0	0	0
349	4	3	0	15	0	60	5	20	0	0	0	0	0
350	4	1	0	50	50	0	0	0	0	0	0	0	0
351	5	4	0	0	20	72	0	8	0	0	0	0	0
352	3	1	0	0	0	60	0	40	0	0	0	0	0
353	4	2	0	0	0	50	0	50	0	0	0	0	0
354	5	3	0	90	0	5	0	5	0	0	0	0	0
355	5	3	0	0	20	70	10	0	0	0	0	0	0
356	4	3	0	30	60	0	10	0	0	0	0	0	0
357	4	2	0	0	5	70	0	20	5	0	0	0	0
358	5	1	0	80	0	0	5	15	0	0	0	0	0
359	4	1	0	42	3	0	50	5	0	0	0	0	0
360	5	4	3.72	20	70	10	0	0	0	0	0	0	0
361	3	1	0	0	5	0	0	0	0	0	95	0	0
362	5	1	0	0	95	0	0	0	0	0	5	0	0
363	5	1	0	80	5	0	15	0	0	0	0	0	0
364	4	5	0	0	0	97	0	3	0	0	0	0	0
365	5	1	0	60	0	0	0	20	0	20	0	0	0
366	5	3	0	0	5	90	0	5	0	0	0	0	0
367	2	2	0	0	5	95	0	0	0	0	0	0	0
368	4	5	0	10	90	0	0	0	0	0	0	0	0
369	5	4	0	0	0	20	20	60	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
370	3	3	0	0	90	0	10	0	0	0	0	0	0
371	5	3	0	5	0	95	0	0	0	0	0	0	0
372	3	1	0	70	0	0	0	20	10	0	0	0	0
373	4	2	0	0	0	0	30	70	0	0	0	0	0
374	4	1	0	0	0	100	0	0	0	0	0	0	0
375	4	3	0	5	90	5	0	0	0	0	0	0	0
376	5	4	0	35	30	30	5	0	0	0	0	0	0
377	5	2	0	80	0	10	10	0	0	0	0	0	0
378	4	3	0	10	0	0	10	80	0	0	0	0	0
379	5	1	0	0	100	0	0	0	0	0	0	0	0
380	4	3	0	40	60	0	0	0	0	0	0	0	0
381	2	2	0	10	0	40	10	40	0	0	0	0	0
382	4	3	0	0	0	0	5	95	0	0	0	0	0
383	5	4	0	0	40	45	5	10	0	0	0	0	0
384	4	1	0	5	0	0	45	50	0	0	0	0	0
385	5	1	0	50	0	50	0	0	0	0	0	0	0
386	3	2	0	70	0	0	20	5	0	0	5	0	0
387	5	3	0	0	50	0	40	10	0	0	0	0	0
388	5	4	0	0	10	0	70	10	0	0	0	0	0
389	5	2	0	0	100	0	0	0	0	0	0	0	0
390	5	1	0	0	0	0	0	0	0	0	0	100	0
391	2	1	0	0	50	0	0	0	0	0	50	0	0
392	2	2	0	10	0	90	0	0	0	0	0	0	0
393	5	2	0	95	3	2	0	0	0	0	0	0	0
394	3	2	0	0	0	0	0	100	0	0	0	0	0
395	4	5	0	0	0	100	0	0	0	0	0	0	0
396	5	4	0	85	5	0	0	0	0	0	0	0	10
397	5	3	0	5	25	25	40	0	0	5	0	0	0
398	4	1	2.46	80	0	20	0	0	0	0	0	0	0
399	4	2	0	90	5	0	5	0	0	0	0	0	0
400	4	2	0	15	0	75	0	10	0	0	0	0	0
401	1	2	0	5	0	90	0	5	0	0	0	0	0
402	4	4	0	5	5	50	10	30	0	0	0	0	0
403	5	2	0	85	2	3	5	5	0	0	0	0	0
404	4	1	0	60	0	0	5	35	0	0	0	0	0
405	3	2	0	50	15	20	0	15	0	0	0	0	0
406	0	0	0	0	0	0	0	0	0	0	0	0	0
407	4	1	0	60	0	0	0	40	0	0	0	0	0
408	5	1	0	30	40	30	0	0	0	0	0	0	0
409	4	5	0	0	0	100	0	0	0	0	0	0	0
410	4	4	0	40	40	15	5	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
411	3	5	0	0	40	60	0	0	0	0	0	0	0
412	5	5	0	10	69	20	1	0	0	0	0	0	0
413	5	2	0	0	0	0	0	100	0	0	0	0	0
414	3	4	0	10	40	5	5	45	0	0	0	0	0
415	4	3	0	0	0	0	10	90	0	0	0	0	0
416	4	4	0	40	10	50	0	0	0	0	0	0	0
417	5	1	0	100	0	0	0	0	0	0	0	0	0
418	4	1	0	30	20	40	10	0	0	0	0	0	0
419	5	2	0	20	5	0	0	80	0	0	0	0	0
420	4	4	0	85	5	0	5	0	0	5	0	0	0
421	5	1	2.41	0	100	0	0	0	0	0	0	0	0
422	4	3	0	10	80	10	0	0	0	0	0	0	0
423	5	3	0	90	0	10	0	0	0	0	0	0	0
424	0	0	0	0	0	0	0	0	0	0	0	0	0
425	5	5	0	15	0	75	0	0	0	0	0	0	10
426	5	4	0	20	50	25	0	5	0	0	0	0	0
427	4	4	0	0	5	95	0	0	0	0	0	0	0
428	5	1	0	0	100	0	0	0	0	0	0	0	0
429	4	3	0	10	10	60	0	20	0	0	0	0	0
430	5	3	0	90	0	0	5	5	0	0	0	0	0
431	5	4	0	0	15	80	5	0	0	0	0	0	0
432	5	3	0	0	90	5	5	0	0	0	0	0	0
433	4	1	0	0	50	50	0	0	0	0	0	0	0
434	5	5	0	0	95	5	0	0	0	0	0	0	0
435	5	4	0	98	0	2	0	0	0	0	0	0	0
436	5	4	0	20	0	0	50	20	10	0	0	0	0
437	5	5	0	0	100	0	0	0	0	0	0	0	0
438	5	2	0	80	20	0	0	0	0	0	0	0	0
439	4	1	2.37	0	60	40	0	0	0	0	0	0	0
440	4	3	0	0	100	0	0	0	0	0	0	0	0
441	4	5	0	0	0	0	15	33	50	2	0	0	0
442	5	5	0	0	100	0	0	0	0	0	0	0	0
443	5	2	0	50	0	45	5	0	0	0	0	0	0
444	4	2	0	90	5	0	5	0	0	0	0	0	0
445	4	3	2.92	30	60	0	10	0	0	0	0	0	0
446	5	5	0	20	80	0	0	0	0	0	0	0	0
447	5	3	0	50	45	5	0	0	0	0	0	0	0
448	5	1	0	0	90	0	0	10	0	0	0	0	0
449	5	2	0	90	5	0	5	0	0	0	0	0	0
450	4	5	0	0	100	0	0	0	0	0	0	0	0
451	4	5	0	0	100	0	0	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
452	5	5	6	0	90	3	7	0	0	0	0	0	0
453	5	1	0		100	0	0	0	0	0	0	0	0
454	5	3	0	0	90	10	0	0	0	0	0	0	0
455	4	1	0	90	0	0	0	0	10	0	0	0	0
456	5	1	0	0	100	0	0	0	0	0	0	0	0
457	5	5	0	20	10	70	0	0	0	0	0	0	0
458	5	1	0	80	10	0	10	0	0	0	0	0	0
459	5	2	0	0	0	0	0	0	0	100	0	0	0
460	5	3	0	0	90	0	0	10	0	0	0	0	0
461	5	1	0	0	0	0	1	0	0	99	0	0	0
462	5	5	0	2	98	0	0	0	0	0	0	0	0
463	5	5	0	0	95	5	0	0	0	0	0	0	0
464	5	1	0	40	30	0	30	0	0	0	0	0	0
465	4	5	6	0	100	0	0	0	0	0	0	0	0
466	5	3	0	40	40	20	0	0	0	0	0	0	0
467	4	1	0	0	0	60	0	30	0	0	0	0	0
468	5	2	0	70	0	15	0	0	15	0	0	0	0
469	5	4	0	30	60	10	0	0	0	0	0	0	0
470	5	1	0	95	0	5	0	0	0	0	0	0	0
471	5	2	0	90	0	10	0	0	0	0	0	0	0
472	5	5	0	5	50	0	0	40	5	0	0	0	0
473	5	4	0	0	100	0	0	0	0	0	0	0	0
474	4	1	2.53	3	90	5	0	0	0	0	2	0	0
475	5	4	0	10	80	10	0	0	0	0	0	0	0
476	4	5	0	0	100	0	0	0	0	0	0	0	0
477	5	2	0	0	100	0	0	0	0	0	0	0	0
478	4	4	5.08	40	50	8	2	0	0	0	0	0	0
479	5	4	0	0	90	10	0	0	0	0	0	0	0
480	5	5	4.54	0	100	0	0	0	0	0	0	0	0
481	4	1	0	0	99	0	0	0	0	0	1	0	0
482	5	5	0	0	100	0	0	0	0	0	0	0	0
483	4	1	2.39	0	0	100	0	0	0	0	0	0	0
484	5	3	4.34	0	70	10	0	0	10	0	10	0	0
485	5	5	0	40	50	10	0	0	0	0	0	0	0
486	5	4	0	0	100	0	0	0	0	0	0	0	0
487	4	2	3	90	0	0	10	0	0	0	0	0	0
488	4	5	0	0	100	0	0	0	0	0	0	0	0
489	5	2	3.06	60	0	20	10	10	0	0	0	0	0
490	5	5	6	0	100	0	0	0	0	0	0	0	0
491	4	5	0	10	90	0	0	0	0	0	0	0	0
492	5	5	0	0	100	0	0	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
493	5	1	0	0	0	0	25	70	0	0	5	0	0
494	5	2	0	70	0	0	10	20	0	0	0	0	0
495	5	5	0	0	0	30	0	20	50	0	0	0	0
496	4	1	0	20	70	10	0	0	0	0	0	0	0
497	5	5	0	10	5	85	0	0	0	0	5	0	0
498	5	2	0	0	0	0	0	100	0	0	0	0	0
499	5	5	0	0	100	0	0	0	0	0	0	0	0
500	5	3	0	0	100	0	0	0	0	0	0	0	0
501	5	1	0	100	0	0	0	0	0	0	0	0	0
502	5	2	0	5	0	0	0	95	0	0	0	0	0
503	5	5	0	5	0	90	5	0	0	0	0	0	0
504	3	3	0	0	100	0	0	0	0	0	0	0	0
505	4	3	4.02	30	30	40	0	0	0	0	0	0	0
506	5	1	0	0	0	30	0	0	0	70	0	0	0
507	5	1	0	95	0	5	0	0	0	0	0	0	0
508	4	2	0	0	0	10	0	0	10	80	0	0	0
509	5	1	2.43	50	0	50	0	0	0	0	0	0	0
510	5	3	0	70	0	5	25	0	0	0	0	0	0
511	3	2	0	90	10	0	0	0	0	0	0	0	0
512	5	2	0	0	20	70	0	10	0	0	0	0	0
513	3	1	0	0	0	70	20	10	0	0	0	0	0
514	5	5	0	0	100	0	0	0	0	0	0	0	0
515	4	4	0	30	30	30	5	5	0	0	0	0	0
516	5	5	0	0	100	0	0	0	0	0	0	0	0
517	5	3	0	0	40	0	20	40	0	0	0	0	0
518	5	5	0	30	30	30	10	0	0	0	0	0	0
519	5	2	0	3	0	2	0	0	0	95	0	0	0
520	5	4	0	0	99	1	0	0	0	0	0	0	0
521	0	0	0	0	0	0	0	0	0	0	0	0	0
522	5	2	0	2	0	3	0	0	0	95	0	0	0
523	5	1	0	0	100	0	0	0	0	0	0	0	0
524	5	3	0	2	98	0	0	0	0	0	0	0	0
525	5	5	0	30	70	0	0	0	0	0	0	0	0
526	4	5	0	0	100	0	0	0	0	0	0	0	0
527	4	3	0	5	90	5	0	0	0	0	0	0	0
528	4	5	0	0	100	0	0	0	0	0	0	0	0
529	5	2	0	100	0	0	0	0	0	0	0	0	0
530	4	2	0	90	0	7	3	0	0	0	0	0	0
531	5	5	0	10	80	5	5	0	0	0	0	0	0
532	5	5	0	0	99	1	0	0	0	0	0	0	0
533	5	3	0	20	15	60	5	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
534	4	3	0	80	0	10	0	10	0	0	0	0	0
535	3	2	0	0	0	30	30	0	40	0	0	0	0
536	5	3	0	0	93	5	0	2	0	0	0	0	0
537	0	0	0	0	0	0	0	0	0	0	0	0	0
538	3	1	0	0	0	95	0	5	0	0	0	0	0
539	5	5	0	0	100	0	0	0	0	0	0	0	0
540	5	4	4.48	85	0	10	5	0	0	0	0	0	0
541	4	2	3.03	0	100	0	0	0	0	0	0	0	0
542	5	5	0	0	100	0	0	0	0	0	0	0	0
543	5	3	3.86	30	30	40	0	0	0	0	0	0	0
544	3	2	0	60	30	5	5	0	0	0	0	0	0
545	4	3	0	90	0	0	0	10	0	0	0	0	0
546	5	2	0	30	60	0	0	10	0	0	0	0	0
547	5	3	0	0	100	0	0	0	0	0	0	0	0
548	5	1	0	60	0	40	0	0	0	0	0	0	0
549	5	2	0	0	100	0	0	0	0	0	0	0	0
550	4	2	0	5	90	0	0	0	0	0	0	5	0
551	5	3	3.23	20	40	20	0	0	0	0	0	20	0
552	5	2	0	10	70	20	0	0	0	0	0	0	0
553	5	2	0	40	50	10	0	0	0	0	0	0	0
554	5	5	0	10	90	0	0	0	0	0	0	0	0
555	5	4	0	0	50	50	0	0	0	0	0	0	0
556	4	4	0	0	100	0	0	0	0	0	0	0	0
557	5	2	0	60	10	20	0	0	0	0	0	10	0
558	5	1	1.92	30	5	40	0	0	0	0	0	25	0
559	4	2	0	90	10	0	0	0	0	0	0	0	0
560	4	5	0	0	100	0	0	0	0	0	0	0	0
561	5	5	0	0	100	0	0	0	0	0	0	0	0
562	0	0	0	0	0	0	0	0	0	0	0	0	0
563	5	5	0	0	100	0	0	0	0	0	0	0	0
564	0	0	0	0	0	0	0	0	0	0	0	0	0
565	4	5	0	0	100	0	0	0	0	0	0	0	0
566	4	1	0	90	5	0	0	0	0	0	0	5	0
567	5	3	0	0	30	20	10	0	0	0	0	0	0
568	4	3	0	10	90	0	0	0	0	0	0	0	0
569	5	2	0	20	40	0	10	0	0	0	0	30	0
570	5	4	0	5	70	20	5	0	0	0	0	0	0
571	1	1	0	0	100	0	0	0	0	0	0	0	0
572	5	5	0	0	95	2	3	0	0	0	0	0	0
573	5	3	0	20	40	10	20	0	0	0	0	10	0
574	4	4	0	0	95	5	0	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
575	4	3	0	0	50	50	0	0	0	0	0	0	0
576	4	5	0	20	70	10	0	0	0	0	0	0	0
577	4	2	0	5	90	0	0	0	0	0	0	5	0
578	4	1	0	0	100	0	0	0	0	0	0	0	0
579	4	5	0	10	80	0	5	0	0	0	0	0	5
580	5	4	0	0	100	0	0	0	0	0	0	0	0
581	5	2	0	70	5	0	0	0	0	0	0	25	0
582	5	2	2.04	30	30	30	0	0	0	0	0	10	0
583	4	2	0	0	40	0	30	0	0	0	0	30	0
584	0	0	0	0	0	0	0	0	0	0	0	0	0
585	5	4	0	0	100	0	0	0	0	0	0	0	0
586	3	3	0	10	80	10	0	0	0	0	0	0	0
587	5	3	0	80	5	5	10	0	0	0	0	0	0
588	5	3	0	5	95	0	5	0	0	0	0	0	0
589	4	5	0	0	100	0	0	0	0	0	0	0	0
590	4	3	0	10	70	10	10	0	0	0	0	0	0
591	5	4	0	0	40	60	0	0	0	0	0	0	0
592	4	5	0	10	90	0	0	0	0	0	0	0	0
593	5	5	0	0	100	0	0	0	0	0	0	0	0
594	5	5	0	0	98	0	2	0	0	0	0	0	0
595	5	4	0	30	50	0	5	0	0	0	0	15	0
596	5	3	0	30	60	0	10	0	0	0	0	0	0
597	5	1	0	70	30	0	0	0	0	0	0	0	0
598	5	5	0	0	100	0	0	0	0	0	0	0	0
599	4	2	0	10	70	0	20	0	0	0	0	0	0
600	5	2	0	60	15	5	0	0	0	0	0	20	0
601	3	1	0	0	100	0	0	0	0	0	0	0	0
602	4	2	0	70	15	5	5	0	0	0	5	0	0
603	5	5	0	5	90	0	5	0	0	0	0	0	0
604	5	5	0	0	100	0	0	0	0	0	0	0	0
605	5	2	0	40	0	20	0	0	0	0	0	40	0
606	5	2	0	30	50	15	5	0	0	0	0	0	0
607	4	4	0	0	95	0	3	0	0	0	2	0	0
608	5	3	0	30	30	20	20	0	0	0	0	0	0
609	5	3	0	0	30	40	10	20	0	0	0	0	0
610	5	5	0	0	100	0	0	0	0	0	0	0	0
611	4	2	0	5	90	0	5	0	0	0	0	0	0
612	5	5	0	10	90	0	0	0	0	0	0	0	0
613	5	2	0	60	30	0	10	0	0	0	0	0	0
614	5	5	0	0	100	0	0	0	0	0	0	0	0
615	4	5	0	0	95	0	5	0	0	0	0	0	0

Point Sample ID	Health Rating	Rake Fullness	Weight	MySp	CeDe	PoCr	ElCa	NiSp	PoFo	PoRi	FA	BrSc	PeAm
616	5	5	0	10	90	0	0	0	0	0	0	0	0
617	5	4	0	30	62	2	2	0	0	0	0	2	0
618	4	3	0	1	90	9	0	0	0	0	0	0	0
619	4	3	0	30	50	0	20	0	0	0	0	0	0
620	4	3	0	0	100	0	0	0	0	0	0	0	0
621	5	5	0	0	100	0	0	0	0	0	0	0	0
622	5	1	0	90	0	0	0	0	0	0	0	10	0
623	4	4	0	10	90	0	0	0	0	0	0	0	0
624	5	5	0	0	98	0	2	0	0	0	0	0	0
625	4	2	0	80	15	0	5	0	0	0	0	0	0
626	5	3	0	0	40	60	0	0	0	0	0	0	0
627	5	4	0	0	60	0	0	0	0	0	0	0	0
628	4	5	0	0	100	0	0	0	0	0	0	0	0
629	5	5	0	15	50	30	5	0	0	0	0	0	0
630	5	5	0	0	95	4	1	0	0	0	0	0	0
631	5	5	0	0	95	5	0	0	0	0	0	0	0
632	4	5	0	5	90	0	5	0	0	0	0	0	0
633	5	3	0	15	70	15	0	0	0	0	0	0	0
634	4	3	0	10	80	10	0	0	0	0	0	0	0
635	5	3	0	0	70	30	0	0	0	0	0	0	0
636	4	5	0	60	35	0	2	0	0	0	0	0	3
637	4	2	0	5	60	0	5	0	0	0	0	30	0
638	5	2	0	5	78	0	15	0	0	0	0	2	0
639	4	5	0	0	100	0	0	0	0	0	0	0	0
640	5	4	0	3	95	2	0	0	0	0	0	0	0
641	4	5	0	5	95	0	0	0	0	0	0	0	0
642	5	5	0	0	80	0	5	0	0	0	15	0	0
643	5	3	0	0	100	0	0	0	0	0	0	0	0
644	4	2	0	85	5	5	0	5	0	0	0	0	0
645	5	2	2.33	50	0	40	2	0	0	0	0	8	0
646	5	4	0	30	40	30	0	0	0	0	0	0	0
647	5	4	0	0	100	0	0	0	0	0	0	0	0

Appendix B

Species Composition Maps Based on Rake Samples

Figure B-1. 2025 Eurasian Watermilfoil Composition Map Based on Rake Samples

Figure B-2. 2025 Curlyleaf Pondweed Composition Map Based on Rake Samples

Figure B-3. 2025 Coontail Composition Map Based on Rake Samples

Figure B-4. 2025 Leafy Pondweed Composition Map Based on Rake Samples

Figure B-5. 2025 Elodea Composition Map Based on Rake Samples

Figure B-6. 2025 Nitella Composition Map Based on Rake Samples

Figure B-7. 2025 Richardson's Pondweed Composition Map Based on Rake Samples

Figure B-8. 2025 Filamentous Algae Composition Map Based on Rake Samples

Figure B-9. 2025 Water Smartweed Composition Map Based on Rake Samples

Figure B-10. 2025 Watershield Composition Map Based on Rake Samples