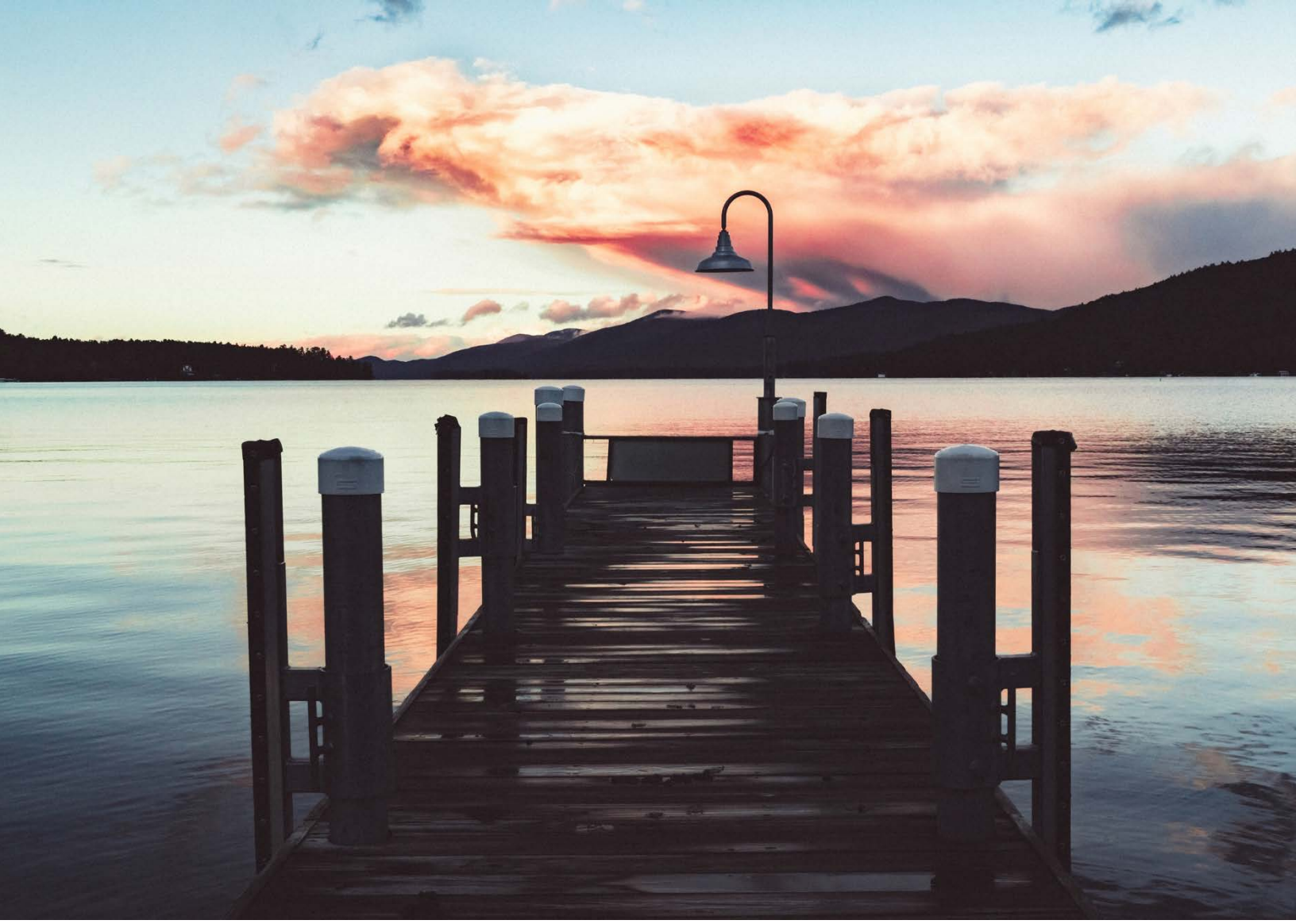

# Lake George Milfoil Project
# Annual Report

# 2021

Prepared by:
AE Commercial
Diving Services, INC.

# 2021
# Lake George Annual Report

Prepared by Christopher Sheldon & H.K. Sotak

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www.lgpc.state.ny.us

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www.lakegeorgeassociation.org

The Fund for Lake George (FUND)
PO Box 352, Lake George, NY 12845
www.fundforlakegeorge.org

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# Introduction

Lake George is a 32-mile-long lake situated in Northern New York State. It is about 2 miles wide at its widest point, 196 feet deep at its deepest, and holds approximately 550 billion gallons of water.[1] It is considered a fairly 'young' lake, having been formed as glaciers receded and filled the sunken basin approximately 10,000 to 12,000 years ago. The relatively younger age of the lake tends to mean that it will have higher ratings for water clarity, lower levels of vascular plant growth, and higher levels of dissolved oxygen, as is true in Lake George. These features, along with lake's prominently rocky or sandy shoreline, result in a naturally lower phosphorous enrichment and low algal growth combine to classify Lake George as an oligotrophic lake. This classification means the waters of Lake George are suitable as an unfiltered drinking water source and is rated by the state of New York as a Class AA Special drinking water source.[2]

*Figure 1:' Lake George' by James Casil, Copyright 2021, All rights reserved.*

Bordering 9 municipalities and crossing through 2 counties, the waters of Lake George also support thousands of businesses and residents who call the surrounding areas home. 12 communities in three counties depend on the Lake George watershed. The natural quality of the water also makes it an ideal inhabitant for many species of plants and animals both in its waters and in the surrounding lake shore watershed.[3] Thirty-six fish species have been catalogued in Lake George, from the American Eel to the Yellow Perch. Invertebrates, native mollusks, crustaceans, and a rich variety of microorganisms populate the waters and wetlands of the lake.

*Figure 2: A boat drives by Three Brothers Islands. (Photo by MajicPhotos, Copyright 2021, All rights reserved.)*

Native plants number in the thousands, many of which are integral to the wellness of the lake chemistry and ecosystem. Birds large and small utilize Lake George along migratory routes, and many species call it home more permanently. Several species of turtle, salamander, frog, toads, and snakes live within the watershed and mammals, from White-tailed Deer to American Bobcat, feed and drink along its shores. In 1961, New York State passed Article 43 of the New York State Consolidated Laws Environmental Conservation, which established the "Lake George Park" and thereby designated, "The lake and its land drainage basin as an area so distinctive in natural qualities and scenic beauty that it is deserving of special protection."[4]

[1] "Lake George Facts: Separating Fact from Fiction about the 'Queen of American Lakes.'" *Lake George Association*, 24 Mar. 2021, https://www.lakegeorgeassociation.org/about-us/lake-george-faq/#Facts.

[2] "Lake George Water Quality." *Lake George Association*, 5 July 2018, https://www.lakegeorgeassociation.org/educate/science/lake-george-water-quality/.

[3] Ibid

[4] "About the Lake George Park Commission." *Lake George Park Commission*, https://lgpc.ny.gov/about.

Lake George, heralded as one of the cleanest lakes in the US, and nicknamed the 'Queen of American Lakes', is also a critical part of the financial wellness of its area, as it hosts thousands of seasonal residents and visitors every year. Several recreational sports, in every season, depend on the lake for transit and enjoyment. It's active boating community consists of everything from kayaks, sailboats, and fishing boats to jet skis, historic paddle boats, steam ship cruisers, and search and rescue boats. The lake's natural beauty effortlessly draws thousands for fishing, SCUBA diving, parasailing, and swimming. Additionally, several scientific research projects, sites, and stations, including the Darrin Freshwater Institute and the Lake George Association Floating Classroom, learn and work within the ecosystem that is Lake George.

With so many ecosystems, economies, and residents relying on the health of the lake, it is absolutely critical to identify, reduce, and manage those things which threaten Lake George. One significant threat facing the lake ecologically, economically today is the invasive is Eurasian Watermilfoil.

## Eurasian Watermilfoil

Eurasian Watermilfoil, (*Myriophyllum spicatum* L.) is a non-native aquatic plant. Discovered in 1986 in the lake, this invasive species threatens the ecology and economy of communities depending on Lake George. Its rapid growth robs the aqua soil of the nutrients many native plants and animals rely on and helps to forms a large lush canopy which blocks light from reaching other plants and organisms. Large mats of fragmented plants congest water passageways for humans and animals alike, and dense beds growing below can take over quickly, displacing native plants essential for many species of fish and other animals. Large stands of older plants also reduce the dissolved oxygen in the water as they die and decay, threatening water quality as a whole. Its presence can reduce property values in lake front communities and discourage participation in water sports and activities.

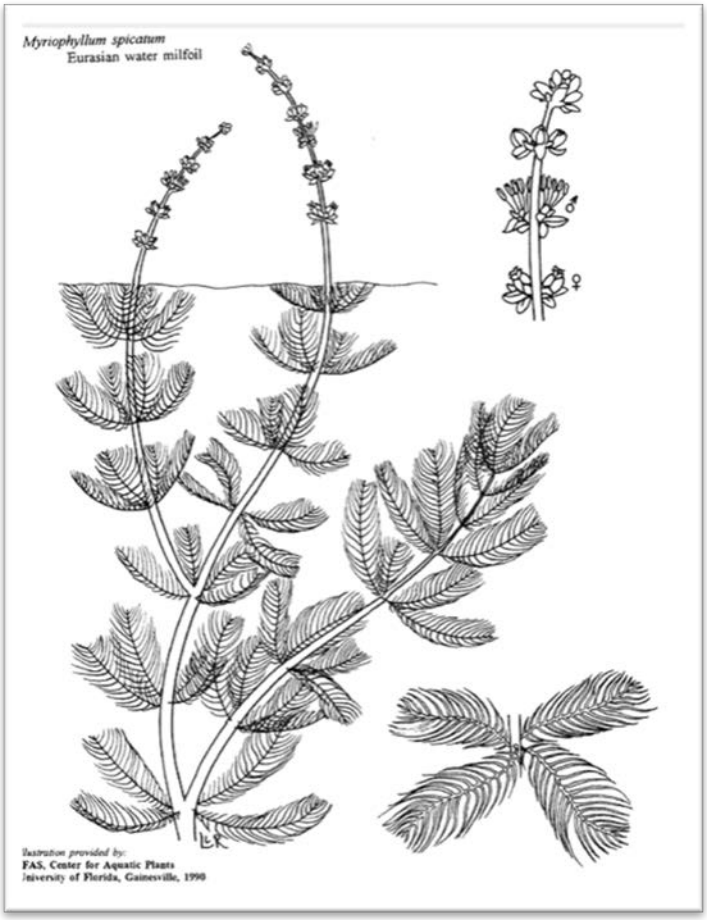



*Figure 3: Eurasian Watermilfoil Myriophyllum spicatum; curtesy of the Center for Aquatic and Invasive Plants, Copyright 2021. All rights reserved.*

Eurasian Watermilfoil is a perennial aquatic herb which naturally occurs in Eurasia and Northern Africa. It generally lives in 10 to 15 feet of water but has been found in clear lakes like Lake George in depths closer to 20 feet. Plants normally grow between 6 and 10 feet but can grow bigger given the right circumstances. Eurasian Watermilfoil outcompetes many native species due to various biological and chemical characteristics and is able to withstand a wide variety of water pH, from brackish waters in southern intercoastal areas to the cold fresh waters of northern lakes and rivers. It is also able to overwinter in freezing temperatures of the north as well as survive shallow overheated areas within the tropical regions of Florida.

Another significant competitive advantage is its ability to reproduce in three ways: seeds production, rhizomes, and fragmentation.[5] Seeds, (formed through the sexual reproduction of the plant through pollination), are produced from small reddish-brown to pinkish-white flowers which grow out of the water on a long, emersed,

[5] Buchan, Lucy A., and Dianna K. Padilla. "Predicting the Likelihood of Eurasian Watermilfoil Presence in Lakes, a Macrophyte Monitoring Tool." *Ecological Applications*, vol. 10, no. 5, 2000, pp. 1442–1455., https://doi.org/10.1890/1051-0761(2000)010[1442:ptloew]2.0.co;2.

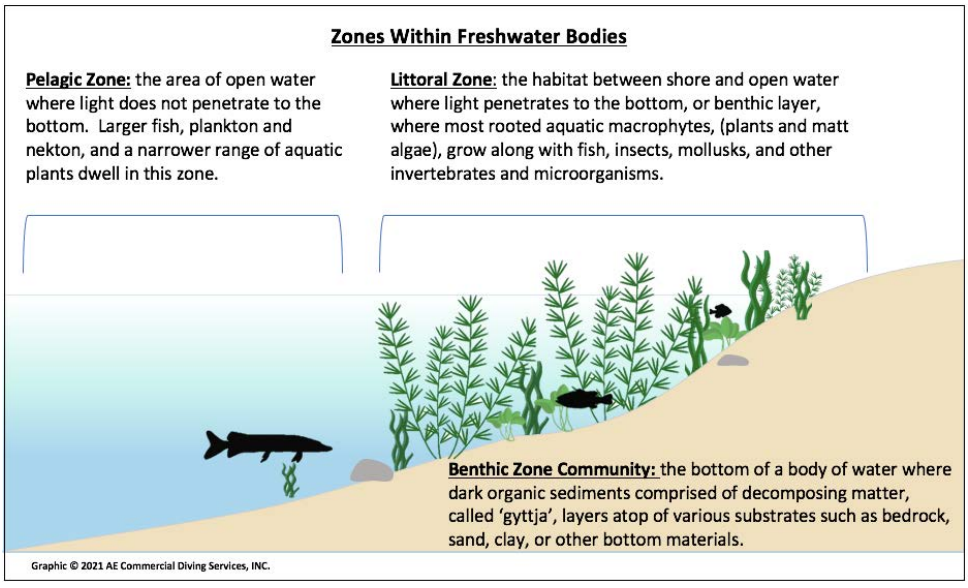
*Figure 4: Root ball of Eurasian Watermilfoil with rhizomes. (Photo by Wesley Sheldon. Copyright 2021, All rights reserved.)*

flower spike. At the end of the growing season, seeds enter the water in what is called the 'seed rain'. The seeds which are returned to the benthic layer, (or lake bottom), are then able to stay dormant for nearly 5 years. Even when dried, the seeds can remain viable for almost 36 weeks until the right conditions arise for germination.[6] Seeds can also be dispersed through the digestive systems of several animals, including waterfowl and fish. (*NOTE: This is one reason it is extremely important not to relocate caught fish into or from Lake George.*)

Rhizomes, (a form of vegetative reproduction), are lateral roots which develop from axillary bud on the mother Eurasain Watermilfoil plant. Rhizomes are capable of sending up new shoots which develop into new plants. This is one reason why it is not enough to simply removed the stems of the plant; if the root ball of the Eurasian Watermilfoil plant is not removed, it will regenerate stems and continue to thrive.

The third process is an asexual process called fragmentation. Eurasian Watermilfoil will naturally 'autofragment' as part of its life cycle. Autofragmentation begins when small root hairs develop along the stem of branched stems near the surface of the water. These small branched stems break free from the plant and enter the water column where they are dispersed in several ways: currents, wind, waterfowl, water flow between connected waterbodies, and human-related activities.[7] Once dispersed, these fragments can settle and begin rooting. While this plant is separate from its mother plant, it remains an identical genetic copy of the original plant.

Eurasian Watermilfoil can also spread through fragmentation of the plant caused prematurely by natural phenomenon, such as large storm events or animal behavior such as beaver activity and migratory birds. *However, the biggest source of premature fragmentation and dispersal is human activity*. Efforts to cut tops of plants, pull plants without pulling as much of the complete root structure as is possible, and raking the plant may be well meaning but add to the proliferation of the plant.




Additionally, because all human activities on the lake require transit through the littoral zone, (the primary habitat for Eurasian Watermilfoil), the best long-term control solution is an integrated strategy of prevention, identification, and complete removal of the plant.

[6] Standifer, Nathan E., and J. D. Madsen. "The Effect of Drying Period on the Germination of Eurasian Watermilfoil Seeds." *Journal of Aquatic Plant Management*, vol. 35, 1997, pp. 35–36., https://doi.org/http://www.apms.org/japm/vol35/v35p35.pdf.

[7] Buchan, Lucy A., and Dianna K. Padilla. "Predicting the Likelihood of Eurasian Watermilfoil Presence in Lakes, a Macrophyte Monitoring Tool." *Ecological Applications*, vol. 10, no. 5, 2000, pp. 1442–1455., https://doi.org/10.1890/1051-0761(2000)010[1442:ptloew]2.0.co;2.

# 2021 Milfoil Management Program

*Figure 5: Crews led by Bennett Sheldon head out on a foggy Lake George. (Photo by Wesley Sheldon. Copyright 2021. All rights reserved.)*

Though it is unclear how Eurasian Watermilfoil was originally introduced to Lake George, efforts to identify, manage, and reduce Eurasian Watermilfoil are vital. Directed by the Lake George Park Commission, in cooperation with the Lake George Association, The Fund for Lake George, and The New York State Environmental Protection Fund, the Milfoil Management project this effort has resulted in nearly 68 tons of Eurasian Watermilfoil being removed from the lake in 2021. AE Commercial Diving Service, INC (AECDS) has proudly served as the contractor responsible for removing the invasive plant since 2018. In 2021, nearly 68 tons of Eurasian Watermilfoil (EWM) was removed from 33 sites by AE Commercial Diving Services as directed by the Lake George Park Commission. Crew from AE Commercial Diving Services, INC (AECDS) applied a combination of techniques for removal, including Diver Assisted Suction Harvesting (DASH), and hand harvesting.

## Applied Removal Techniques

Diver Assisted Suction Harvesting, (hereby referred to as DASH), is the process by which SCUBA divers guide a suction hose to the area of the targeted species within a body of water and, after carefully removing the roots from the substrate, deliver the stems and root ball to the suction hose. The entire plant then travels up the length of the hose to boat on the surface where it is deposited on a table and sorted by a boat tender for disposal. DASH is an effective method to reduce and control large beds of Eurasian Milfoil so as to prevent it from spreading through fragmentation or seeding. AE Commercial Diving Services has developed a patent pending sorting system that allows the nutrient rich substrate to return to the bottom where it is needed to support regrowth and health of the native species. This system also delivers the material back to the bottom in such a way as to reduce large plumes of sediment from disturbing the water column.

*Figure 6: An AECDS DASH Diver begins to harvest a Eurasian Watermilfoil plant from the top down in order to reduce fragmentation and capture any parts which are already fragmented but trapped in the foliage of the plant.. Photo by Wesley Sheldon, Copyright 2021.*

Hand Harvesting is a technique usually applied to an area where the targeted species is growing sporadically. Instead of utilizing a suction hose, the SCUBA diver instead removes the target species and places it in a mesh bag carried by the diver. Once the area is cleared or the bag is full, the diver returns to the surface and hands the bag to the boat tender for sorting and disposal.

## 2021 Crew

In 2021, four DASH units and two hand harvesting boats were staffed and present, for a total of 25 employees. All of our divers are certified and have experience as certified scientific divers, recreational divers, commercial divers, or working divers. The diversity of our divers' education and experience has never failed to contribute positively to the overall crew success. The team was headed by AECDS Site Supervisors Bennett Sheldon and Wesley Sheldon,

who have a combined total of 36 years working in the diving industry. A total of 4 DASH boats, 2 hand harvesting boats, and a transport barge were deployed in the lake this year.

## Disposal Efforts

Disposing of close to 68 tons of Eurasian Watermilfoil was a significant part of making sure the project was a success. Roger Smith, Lake George Park Commission Conservation Operations Supervisor, coordinated the disposal and dumping of strategically placed trailers sites. This sometimes required his attention several times per week. Working mostly with local transfer stations or farms to receive the biomass, Roger also coordinated with local highway departments throughout the watershed to assist.

*Figure 7: Transport Barge brining Eurasian Watermilfoil plants to assigned disposal sites. Picture by Wesley Sheldon. Copyright 2021. All rights reserved.*

## Bottom Barrier Removal

As recommended by AE Commercial Diving Services, Inc. in 2021, bottom (or benthic) barriers were removed from Gull Bay. Removal occurred over the course of two days after the harvesting season was completed.

## 2021 New Data Collection Collaboration

Over the summer of 2021, staff from the Warren County Planning Department, (Ethan Gaddy, Assistant County Planner, Sara Frankenfeld, GIS Administrator and Amanda Beck, Junior Planner), implemented a real-time GPS-enabled data collection method for the milfoil harvesters working on Lake George.

This method, using ESRI's Survey123 and ArcGIS Online software, proved successful on several fronts. First, it streamlined and simplified the data reporting procedures for the harvest contractors. Next, it allowed stakeholders to view data collection progress in real-time. Finally, it resulted in much more accurate and comprehensive milfoil location, density, and volume data.

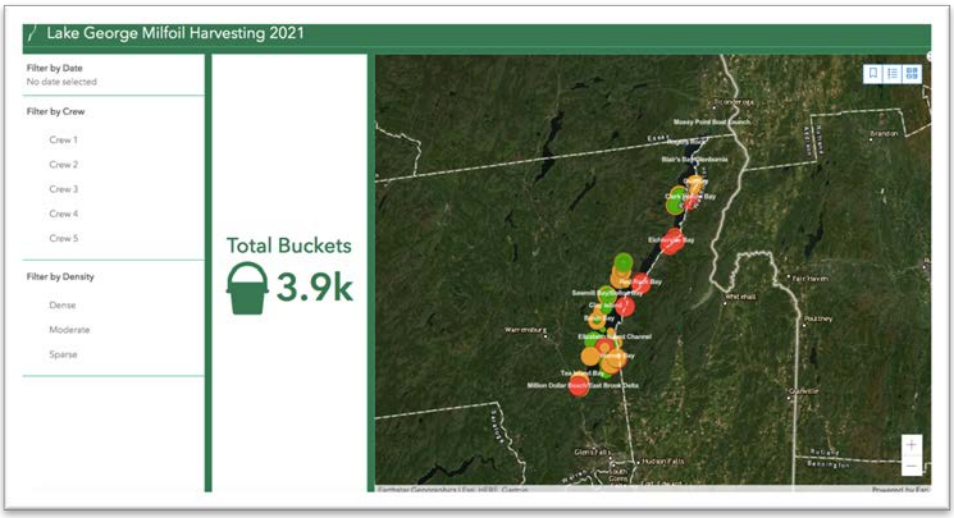



*Figure 8: Screen Shot of the new GIS data collection system provided by the Warren County Planning Department. (Photo curtesy of Sara Frankenfeld. Copyright 2021. All Rights Reserved.)*

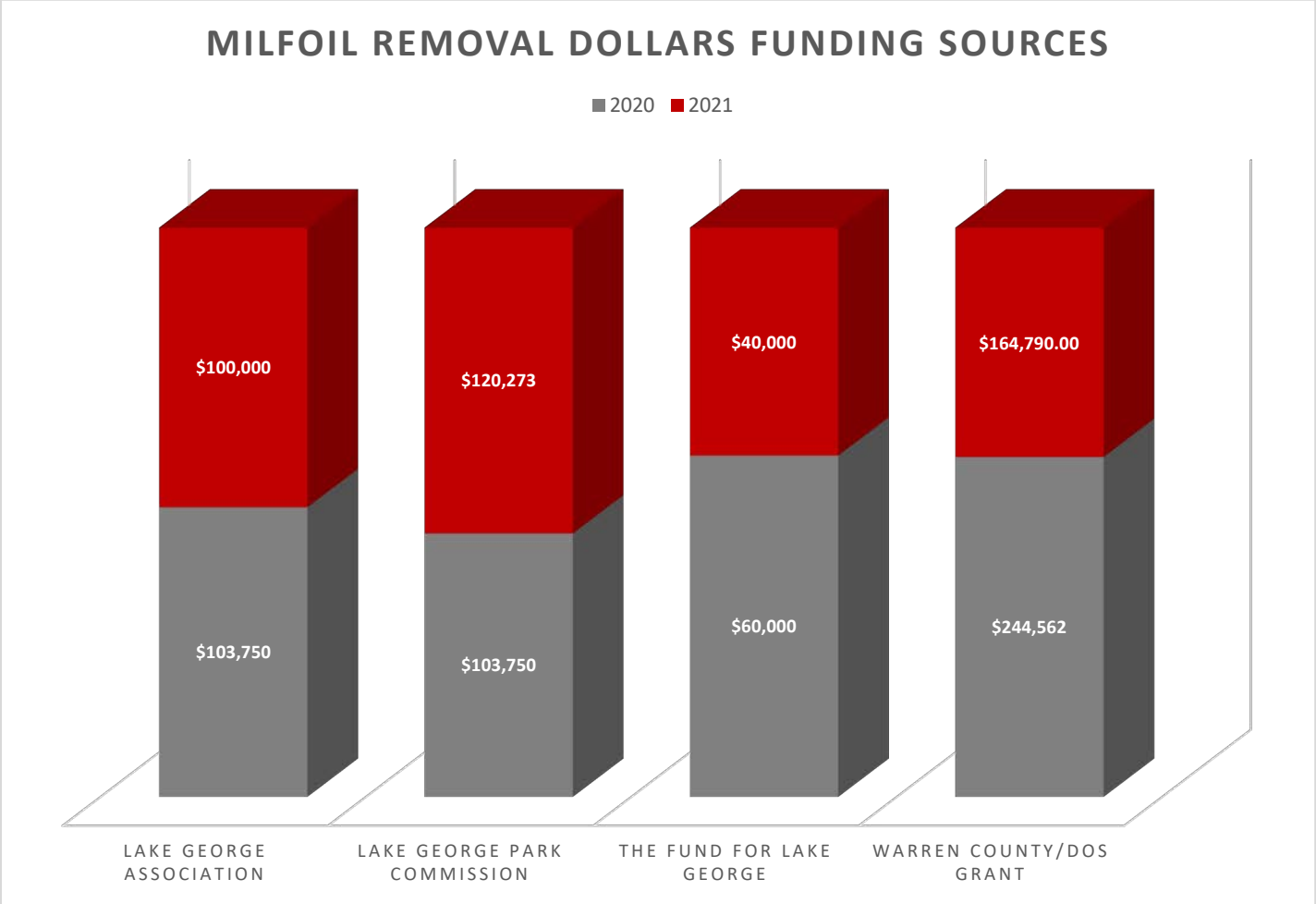
Handheld devices were provided by the Planning Department for each harvesting vessel to record data on daily. Sara Frankenfeld and Amanda Beck completed the data analysis using the survey platform and helped to curate the data into maps, charts, and data summaries. The improved data, which is stored in the County's Geographic Information System, will allow stakeholders to quantify progress with milfoil eradication over time and ensure that funds are being used effectively. An online dashboard provides real-time access to the field data.

## 2021 Funding for Removal Efforts

The total amount spent on removal of Eurasian Watermilfoil was slightly lower in 2021. A total of $425,062 was spent by the project partner organizations for removal of Eurasian Watermilfoil. All payments to AECDS utilizing NYS Department of State grant funds were advanced by the Lake George Association, and this was a great assistance to this project. There were four distinct funding sources in 2021:

**Warren County/DOS Grant:** $164,790
**Lake George Park Commission**: $120,273
**Lake George Association**: $100,000
**The Fund for Lake George**: $40,000

**2021 Funding TOTAL: $425,063**



# Lake George Milfoil Harvest 2021

## Density

Sparse

Dense

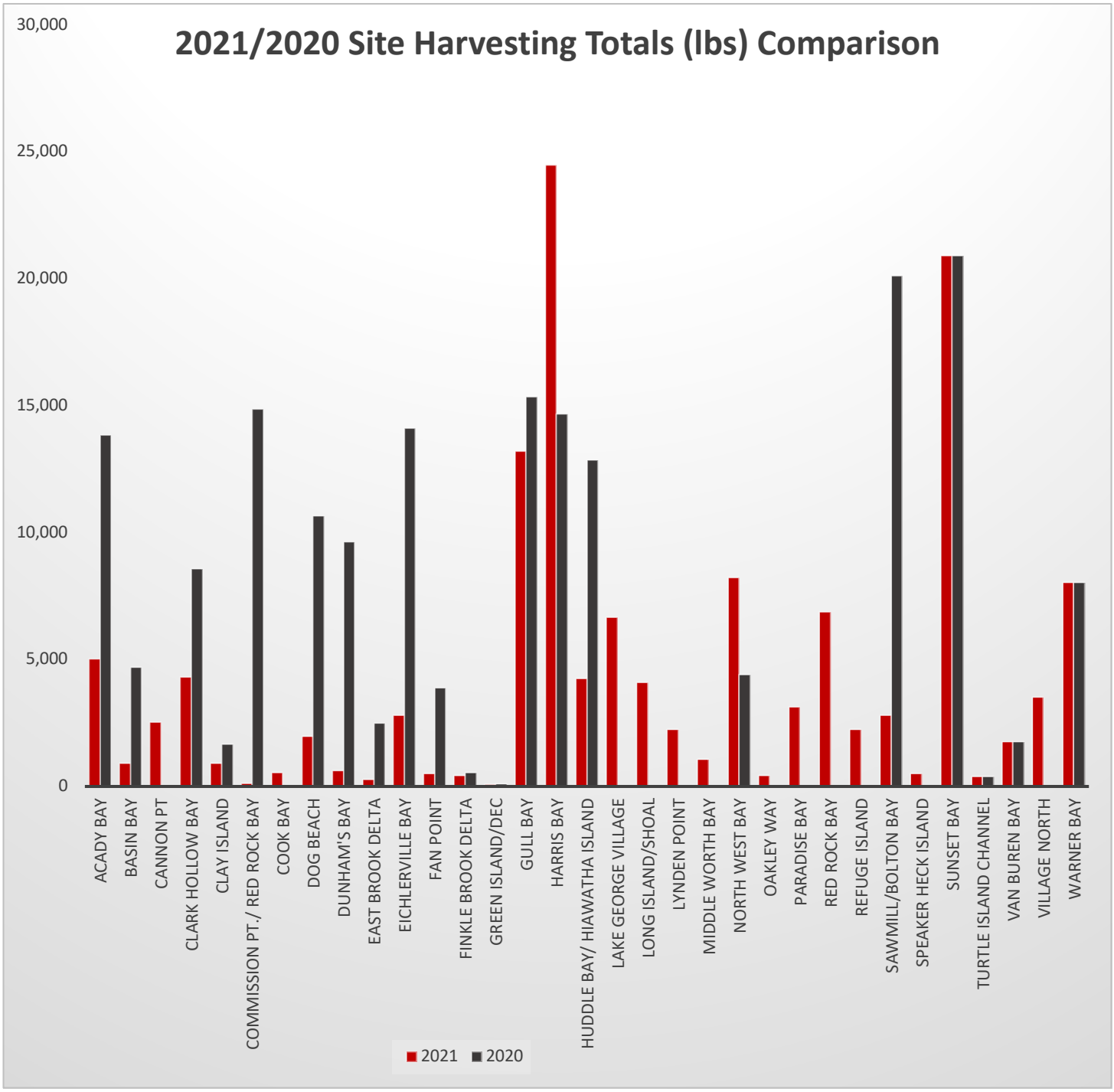
| Bay | Buckets | Days | Density |
|---|---|---|---|
| Arcady Bay | 143 | 9 | Sparse to Moderate |
| Basin Bay | 25.5 | 3 | Sparse to Moderate |
| Clark Hollow Bay | 123 | 4 | Moderate to Dense |
| Clay Island | 26 | 9 | Very Sparse to Sparse |
| Commission Point/Red Rock Bay | 3 | 2 | Sparse to Dense |
| Dog Beach | 56 | 5 | Sparse to Moderate |
| Dunham's Bay | 17.5 | 3 | Sparse to Moderate |
| Eichlerville Bay | 80 | 4 | Dense |
| Fen Point | 14 | 2 | Moderate |
| Finkle Brook Delta | 12 | 4 | Sparse |
| Green Island/DEC | 2 | 1 | Sparse |
| Gull Bay | 377 | 20 | Sparse to Moderate |
| Harris Bay | 699 | 26 | Sparse to Dense |
| Huddle Bay/Hiawatha Island | 121 | 17 | Sparse to Moderate |
| Lake George Village | 190 | 8 | Dense |
| Long Island/Shoal | 117 | 8 | Moderate to Dense |
| Middleworth Bay | 30 | 3 | Sparse |
| Million Dollar Beach/East Brook Delta | 7.5 | 4 | Sparse to Moderate |
| Lyndan Point | 64 | 3 | Dense |
| Northwest Bay | 235 | 17 | Sparse to Moderate |
| Oakley Way | 12 | 3 | Sparse to Moderate |
| Paradise Bay | 89 | 2 | Dense |
| Refuge Island | 64 | 3 | Dense |
| Sawmill Bay/Bolton Bay | 80 | 11 | Sparse |
| Speaker Heck Island | 14 | 3 | Moderate |
| Sunset Bay | 597 | 14 | Moderate to Dense |
| Turtle Island Channel | 11 | 3 | Sparse to Moderate |
| VanBuren Bay | 50 | 5 | Sparse to Moderate |
| Warner Bay | 229 | 12 | Sparse to Moderate |
| Cannon Point | 72 | 2 | Moderate |
| Red Rock Bay | 196 | 4 | Dense |
| Cook Bay | 15 | 1 | Dense |
| Village North | 100 | 6 | Moderate to Dense |

**Total harvest: 3871.5 buckets**

prepared by Warren County GIS
November 2021 with data collected by
AE Diving Summer 2021
corrected: 11/9/21

## Data Analysis

Total Sites Worked: 33 sites (including 10 new sites)
Total Weight Removed: 135,502.5 lbs or 67.75 tons

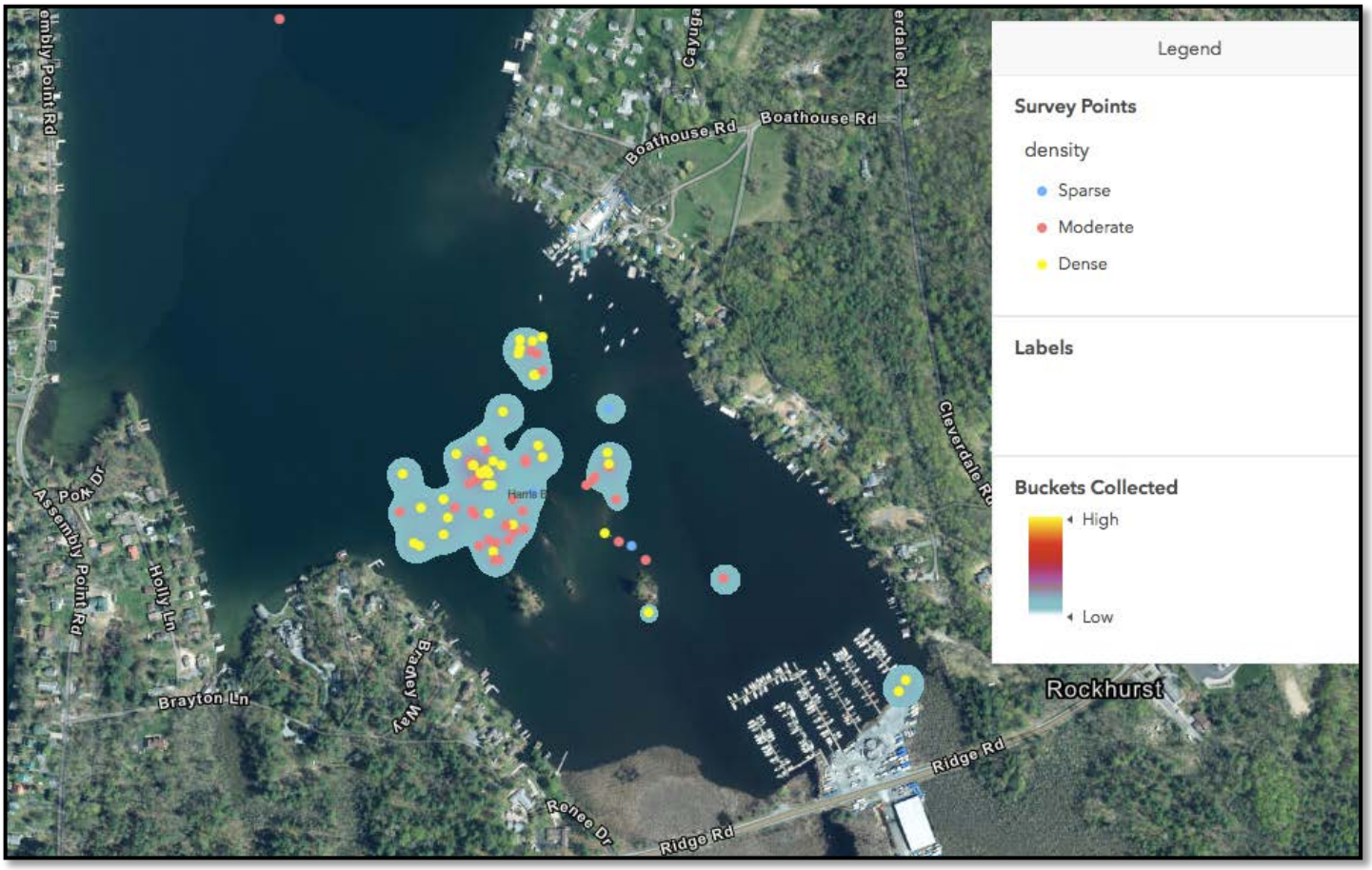


## PART II: Harvesting Site Totals Annual Comparison

(10 Hours = 1Day)

| # | Site Name | 2021 # of Crew Days | 2021 Pounds (AECDS) | 2020 # of Crew Days | 2020 pounds (AECDS) | 2019 # of Crew Days | 2019 pounds (AECDS) | 2018 pounds (AECDS) |
|---|---|---|---|---|---|---|---|---|
| 1 | Harris Bay | **26** | **24,465** | 21.9 | 14,670 | 12 | 4,665 | 2,820 |
| 2 | Sunset Bay | **14** | **20,895** | 16.7 | 12,780 | 47.5 | 18,375 | 22,720 |
| 3 | Gull Bay | **20** | **13,195** | 20.7 | 15,330 | - | - | - |
| 4 | Northwest Bay | **17** | **8,225** | 10.8 | 4,390 | 19.5 | 7,400 | 36,750 |
| 5 | Warner Bay | **12** | **8,015** | 9 | 8,040 | 12.5 | 4,530 | 52.5 |
| 6 | Red Rock Bay | **4** | **6,860** | - | - | - | - | - |
| 7 | LG Village | **8** | **6,650** | - | - | - | - | - |
| 8 | Arcady Bay | **9** | **5,005** | 16 | 13,830 | - | - | - |
| 9 | Clark Hollow Bay | **4** | **4,305** | 8 | 8,560 | - | - | - |
| 10 | Huddle Bay/ Hiawatha Island | **17** | **4,235** | 11.2 | 12,840 | - | - | - |
| 11 | Long Island Shoal | **8** | **4,095** | - | - | 10 | 1,515 | 8580 |
| 12 | Village North | **6** | **3,500** | - | - | - | - | - |
| 13 | Paradise Bay | **2** | **3,115** | 4 | 4,890 | - | - | - |
| 14 | Eichlerville Bay | **4** | **2,800** | 18 | 14,100 | 12 | 4,970 | - |
| 15 | Sawmill Bay/Bolton Bay | **11** | **2,800** | 35.1 | 20,010 | - | - | - |
| 16 | Cannon PT | **2** | **2,520** | 3.8 | 2,040 | 13 | 6,885 | 1,925 |
| 17 | Lynden Point | **3** | **2,240** | - | - | - | - | - |
| 18 | Refuge Island | **3** | **2,240** | - | - | - | - | - |
| 19 | Dog Beach | **5** | **1,960** | 22 | 10,650 | 1 | 150 | - |
| 20 | Van Buren Bay | **5** | **1,750** | 20 | 1,380 | - | - | - |
| 21 | Middleworth Bay | **3** | **1,050** | - | - | - | - | - |
| 22 | Clay Island | **9** | **910** | 8.3 | 1,650 | 33.5 | 13,205 | - |
| 23 | Basin Bay | **3** | **892.5** | 3.7 | 4,680 | - | - | - |
| 24 | Cook Bay | **1** | **525** | - | - | - | - | - |
| 25 | Fan Point | **2** | **490** | 3.8 | 3,870 | - | - | - |
| 26 | Speaker Heck Island | **3** | **490** | - | - | - | - | - |
| 27 | Finkle Brook Delta | **4** | **420** | 2.6 | 540 | 9 | 1,555 | 10,135 |
| 28 | Oakley Way | **3** | **420** | - | - | - | - | - |
| 29 | Turtle Island Channel | **3** | **385** | 7.8 | 3,000 | - | - | - |
| 30 | M.D.B/East Brooke Delta | **4** | **262.5** | 5.5 | 2,490 | 16.5 | 6,135 | - |
| 31 | Commission Point/ Red Rock Bay | **2** | **105** | 12.5 | 14,850 | - | - | - |
| 32 | Dunham's Bay | **3** | **105** | 15 | 9,630 | 12 | 3,765 | 140 |
| 33 | Green Island/DEC | **1** | **70** | 1 | 90 | 1.5 | 570 | - |
| | TOTAL: | **161** | **135,502.5 lbs or 67.75 tons** | 238.5 | 186,590 | 200 | 84,333 | 49,706 |

1. Harris Bay:



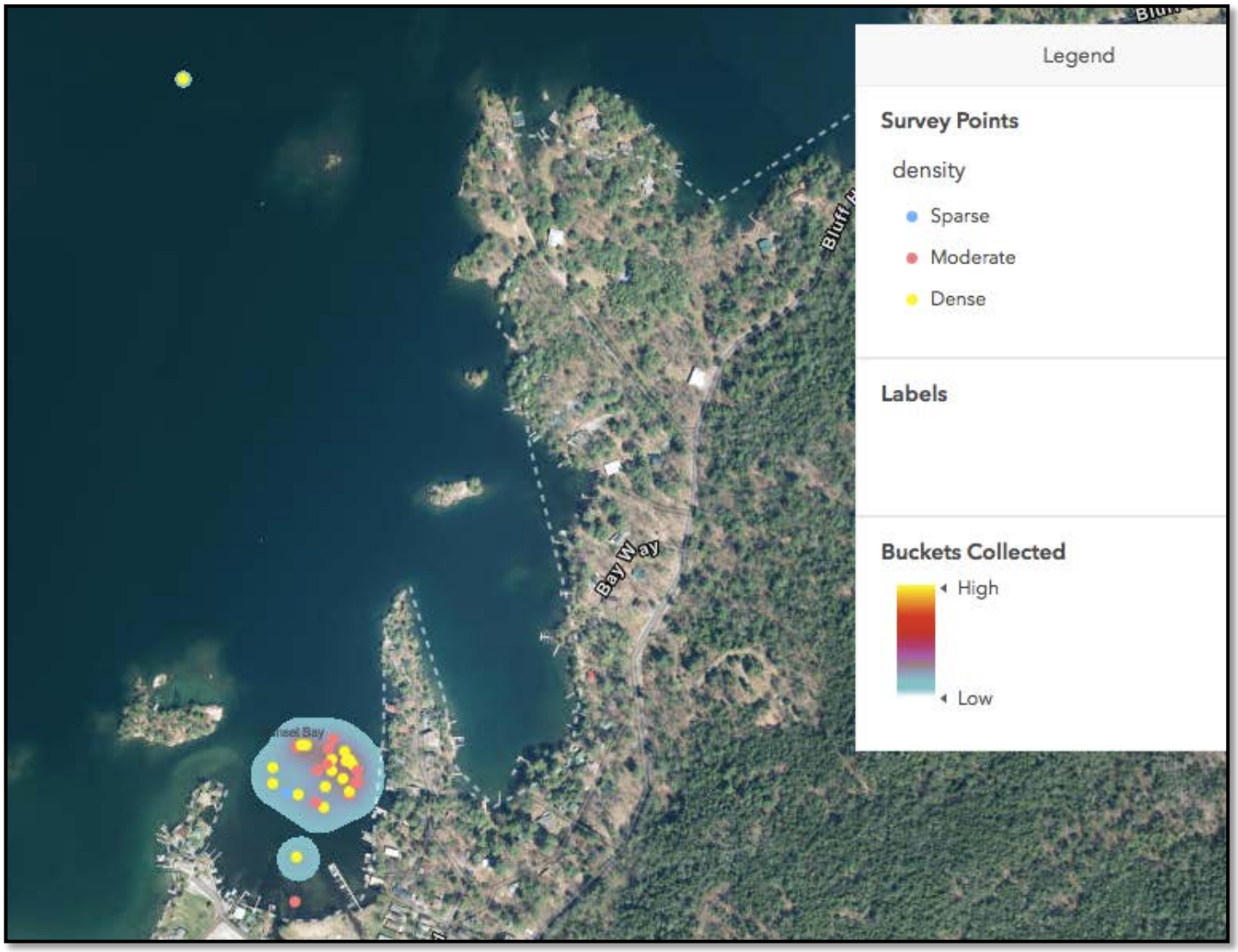

Days Allotted in 2021: 26
Total Pounds Harvested: 24,465

Summary:
The focus this year for Harris Bay was to remove the dense, moderate, and sporadic beds of EWM that are spread over a large area. Harris Bay also has a variety of bottom compositions, topography, and sediment, making it difficult to remove the plants and their roots system. As a result, the regrowth potential is high and will require on going monitoring. The areas of soft sediment show improvement every season and are more easily controlled while the rocky areas around the islands prove more challenging. The bay also has large flat sections where the sediment and water depth are ideal conditions for invasive weed growth. Large dense beds of EWM can quickly take over on these large "plane-like" sections if they are not monitored each season.

Recommendations:

Harris Bay is one of the more complex project sites on Lake George and will require vigilance to maintain and control. Ongoing discussion regarding the site is recommended to ensure future progress and to determine the level of effort needed each season.

2. Sunset Bay:




Days Allotted in 2021: 14
Total Pounds Harvested: 20,895

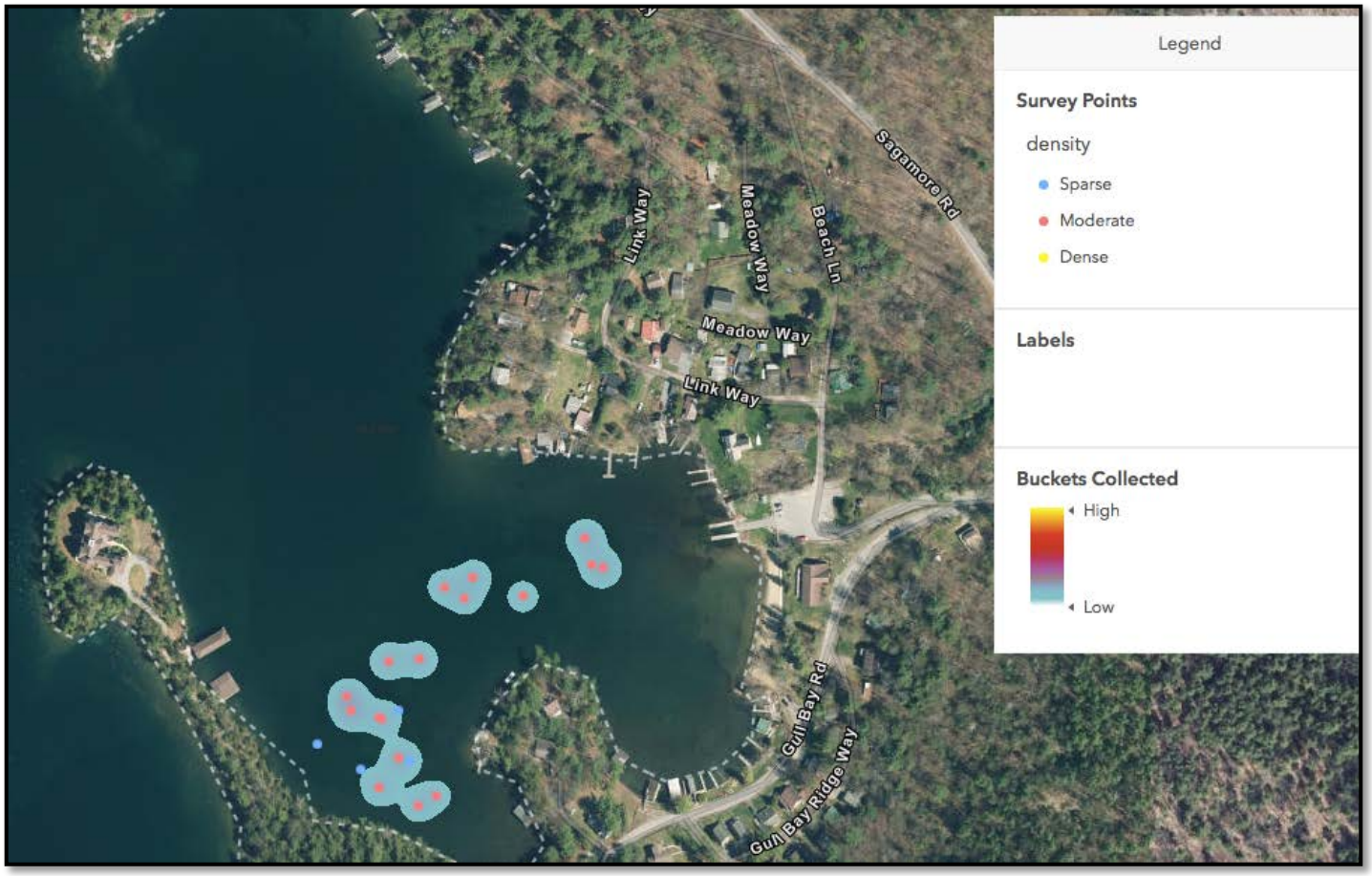
Summary:

This site was completely harvested in 2018- 2021. However, divers continue to see a regrowth rate which is unusual for this type of site. The bottom composition is ideal for the removal of root systems and there is an abundance of native vegetation that can take over once invasive EWM is removed. However, divers continue to see regrowth, even with total removal of the root systems and stems. This suggests to us that a larger, yet undiscovered patch may be seeding this area.

Recommendations:

A survey of the surrounding areas to check for a large bed that may be seeding Sunset Bay is recommended.

3. Gull Bay:




Days Allotted in 2021: 20
Total Pounds Harvested: 13,195

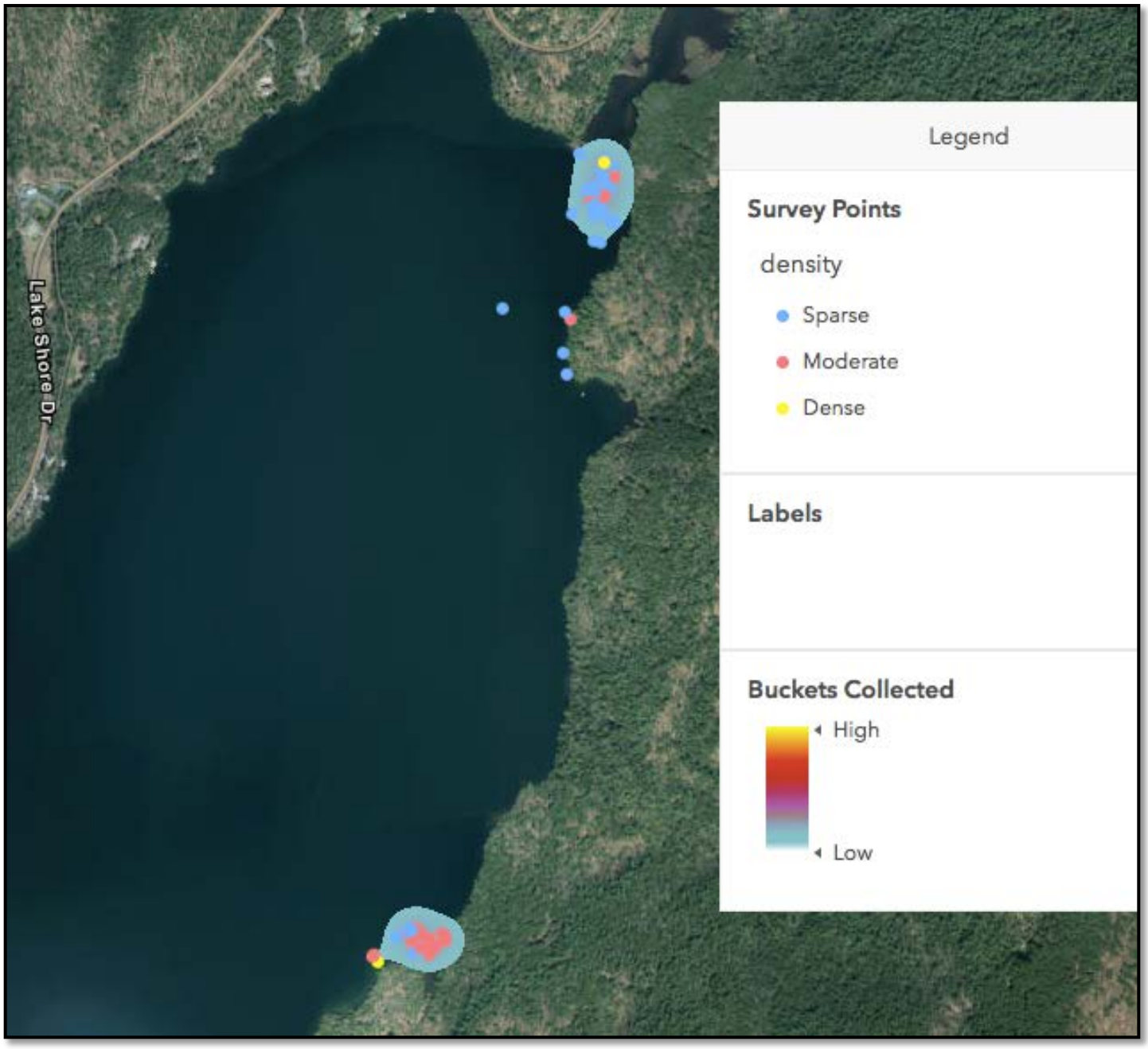
Summary:

This was the second season that AECDS harvested in Gull Bay. The bottom composition was made up of sand and softer sediment and the working depth was between 10 and 18 feet. EWM growth was moderate and extensive around and on top of the existing benthic bottom barriers at the site. The barriers were removed at the end of the season and regrowth was apparent around the barriers. Removing these barriers was a significant step forward in reducing EWM at this site.

Recommendations:

An early season survey to determine the extent of the regrowth and the level of effort needed in 2022 is essential.

4. Northwest Bay:




Days Allotted in 2021: 17
Total Pounds Harvested: 8,225

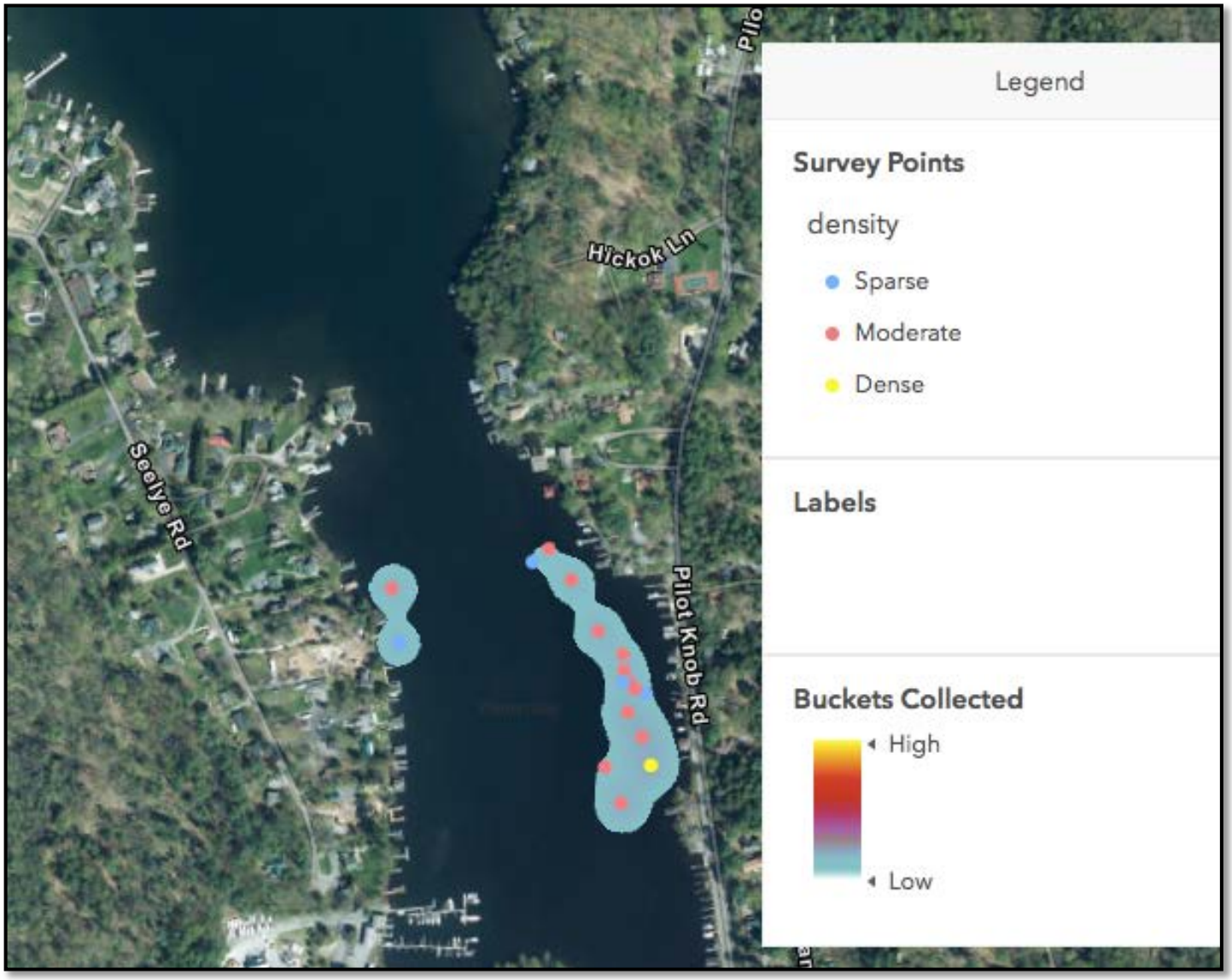
Summary:

Northwest Bay has a variety of bottom composition depending on the sites being worked. The two sites in this bay were completed in 2020 as well as again in 2021. The plants harvested were regrowth from the previous season and were moderate to patchy.

Recommendations:

Due to the boat traffic and fishing activities in this bay, we recommend it be an area checked yearly for regrowth.

5. Warner Bay:




Days Allotted in 2021: 12
Total Pounds Harvested 8,015

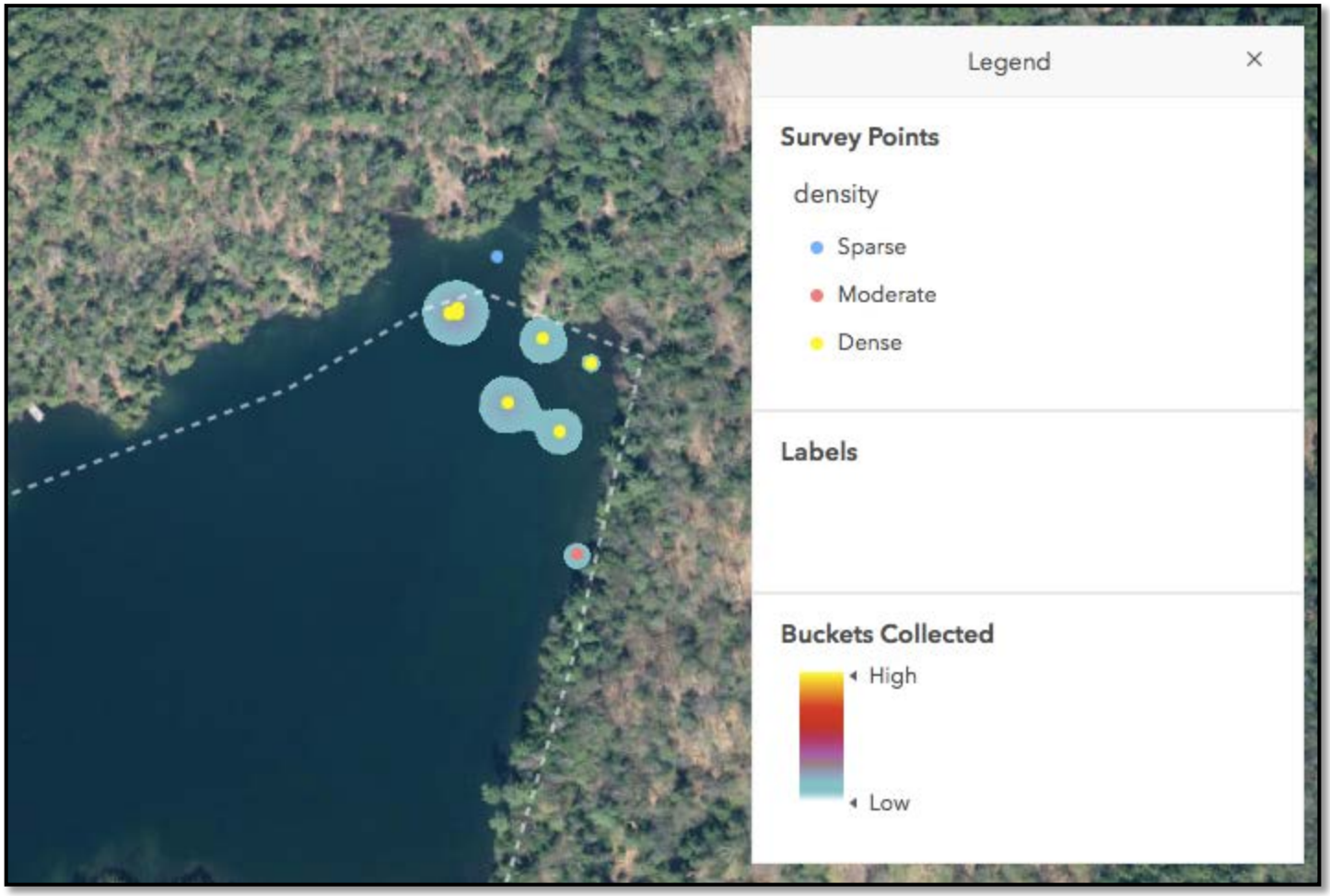
Summary:

In general, this bay has improved. This area was completely harvested in 2019, 2020, and again in 2021. The middle of the bay, (when surveyed), appeared to be free of EWM, as it has in past years. In 2021, the west shoreline was clear of EWM for the most part with sporadic EWM growth in the southwest corner and along the east shoreline.

Recommendations:

The native plant life in the bay makes it challenging and time consuming to work. The site is thick with native plant life that is punctuated with Eurasian Watermilfoil. Removing the invasive plants without damage or destruction of these native plants is very difficult and leads to a situation where divers are sorting through stems at the bottom of the lake and in poor visibility conditions due to the inlet and the depth of the water. As in most project sites where there is a large amount of native plant life, a percentage of unintended native bycatch is a certainty and will contribute to the overall numbers each season.

6. Red Rock Bay:




Days Allotted in 2021: 4
Total Pounds Harvested: 6,860

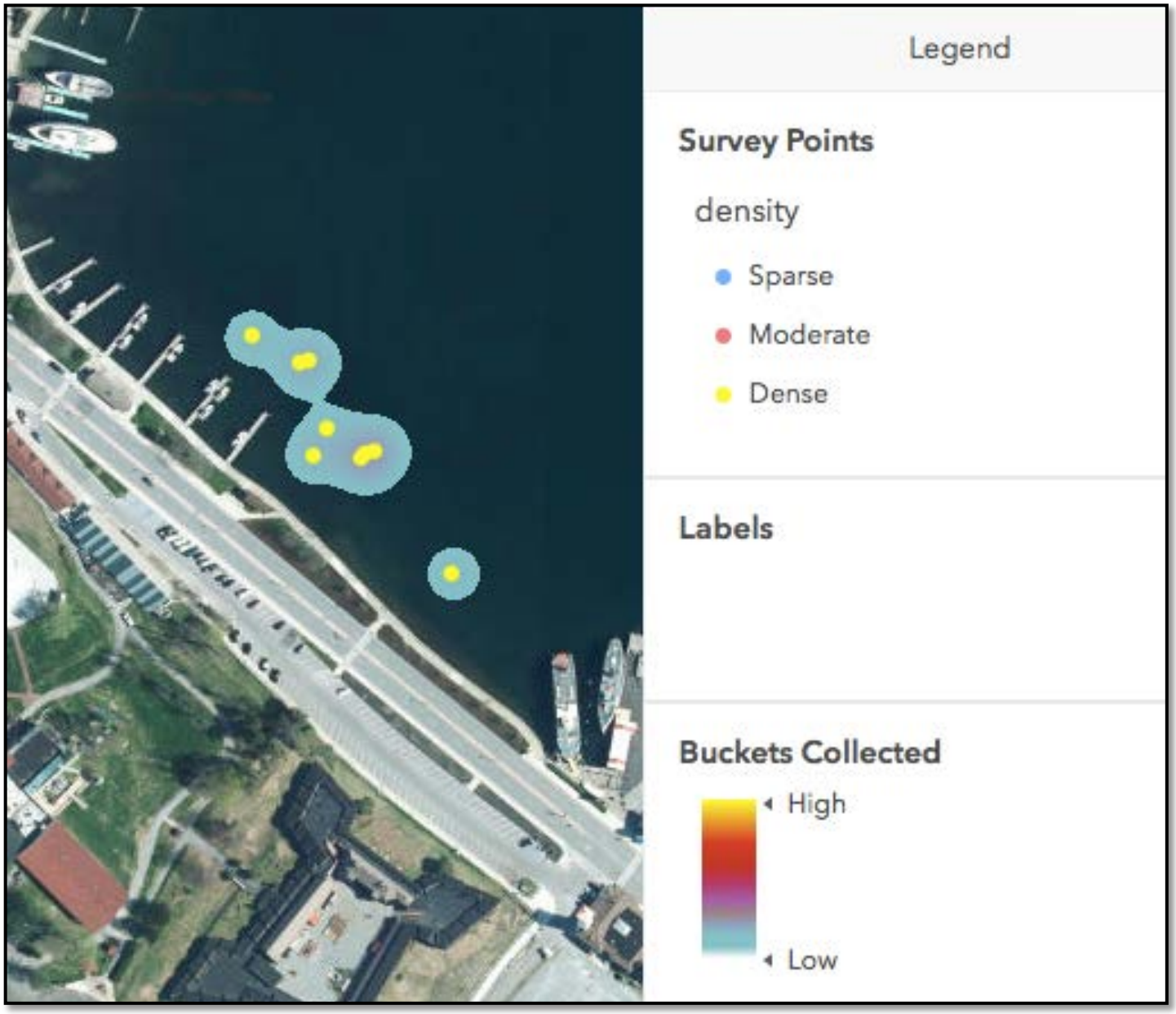
Summary:

This was the first year that divers from AECDS worked in Red Rock Bay. Divers found small dense patches of EWM were found in isolated areas scattered in the bay.

Recommendations:

This bay should be checked for regrowth early in the season.

7. Lake George Village:




Days Allotted in 2021: 8
Total Pounds Harvested: 6,650

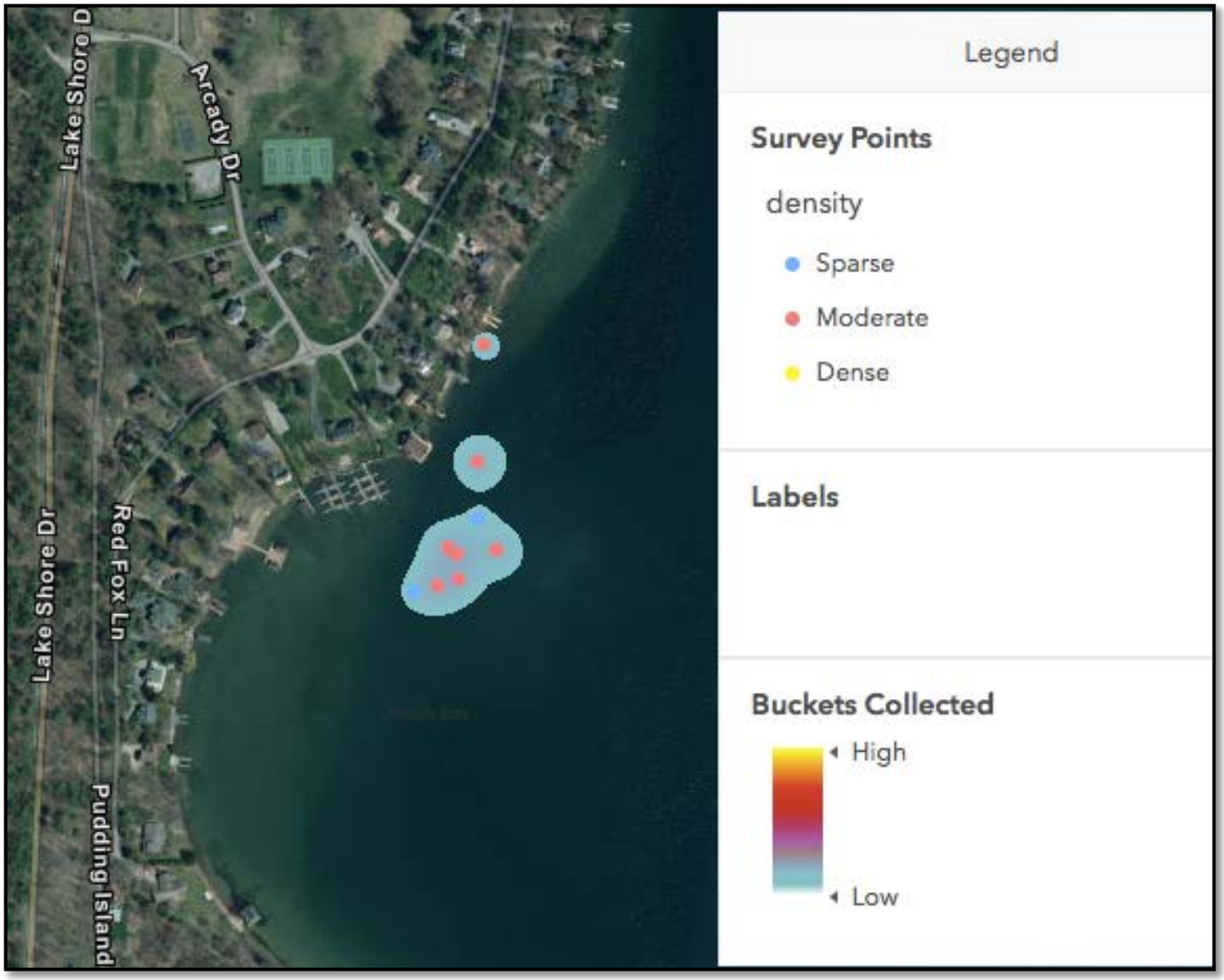
Summary:

This was the first year that divers from AECDS worked this site. There were three fairly dense patches that extend from the steam boats all the way to the Marine Patrol Dock.

Recommendations:

Work will need to be continued in this site as harvesting was not completed this year. It would be best to plan to work in this site during the off season due to the high boat traffic.

8. Arcady Bay:




Days Allotted in 2021: 9
Total Pounds Harvested: 5,005

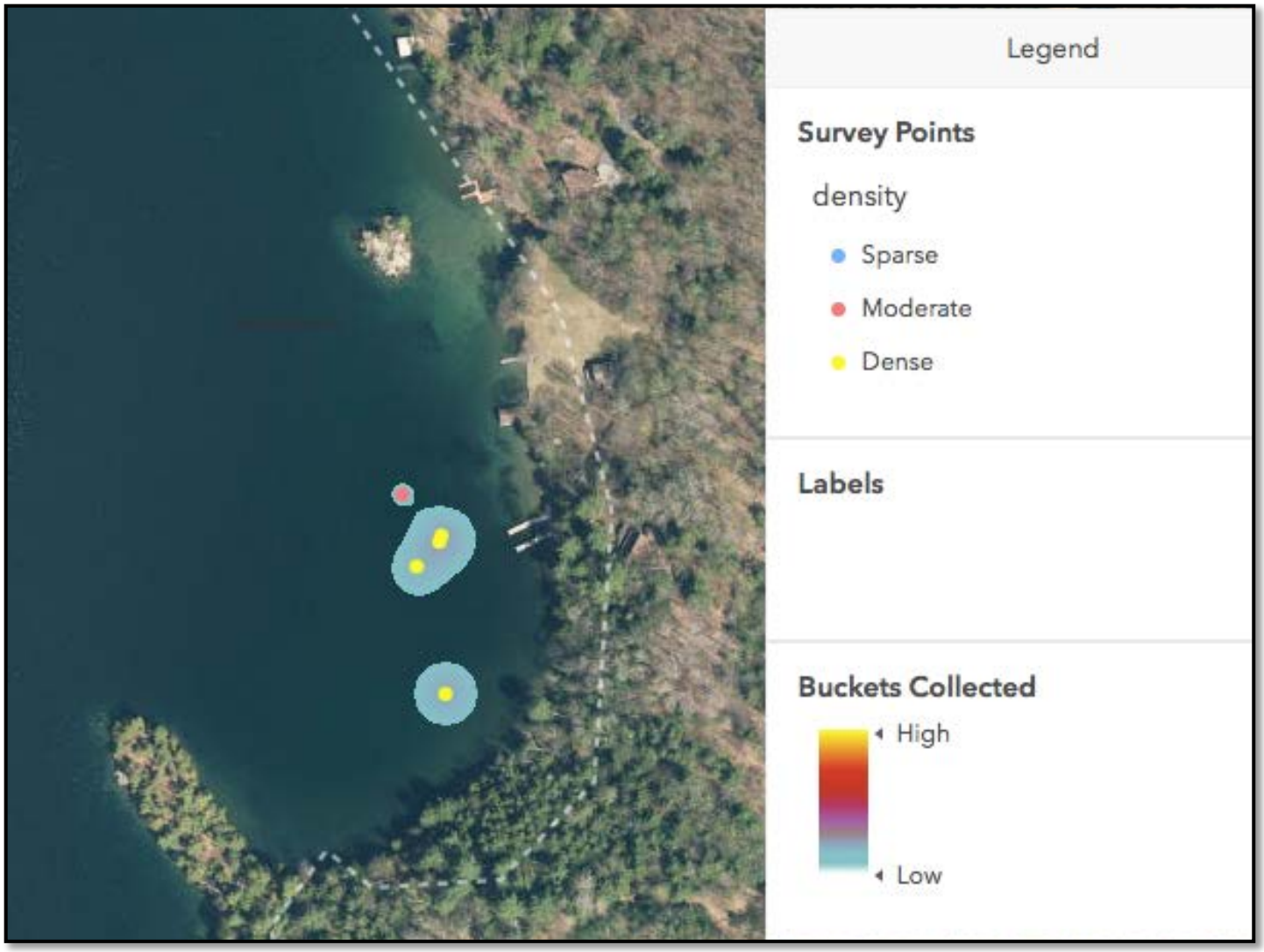
Summary:

The bottom composition, comprised of soft sediment, the exposed nature of this site, which allows for high winds, and the heavy chop make working this site difficult at times. There was a moderate regrowth in areas previously harvested, primarily in front of the main dockage area.

Recommendations:

**The high winds, soft bottom composition, and boat traffic all join in making this an area that will need close monitoring in the coming seasons.**

9. Clark Hollow Bay:




Days Allotted in 2021: 4
Total Pounds Harvested: 4,305

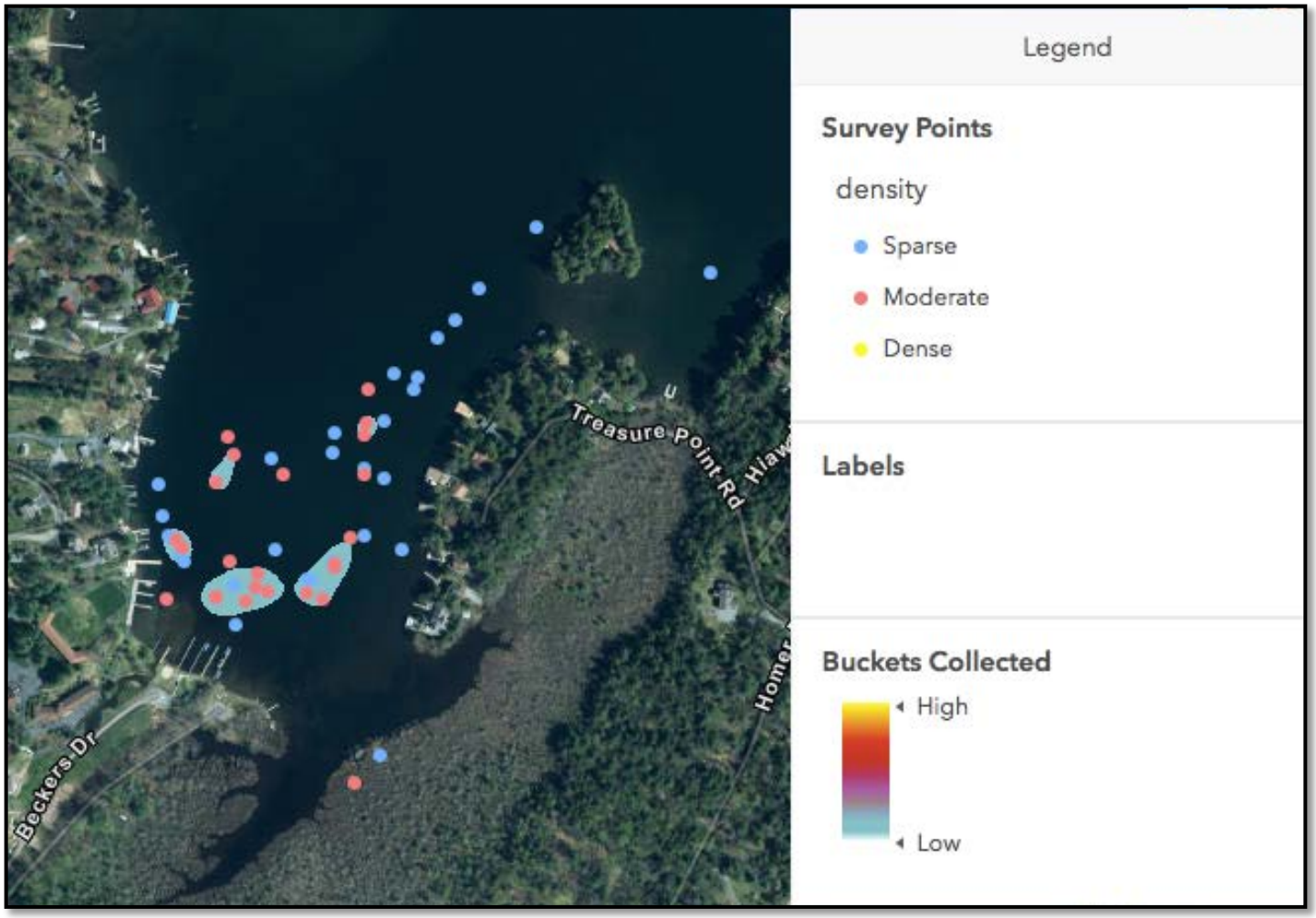
Summary:

Clarks Hollow continues to be problematic in that regrowth has occurred after the heavy harvesting efforts in 2020. One challenge seems to be that current and wind drive fragments possibly from Arcady Bay into Clark Hollow, suggesting that in order to keep Clarks Hollow clear, Arcady Bay must be kept in check.

Recommendations:

We recommend that this site continue to be closely monitor to prevent a repeat of 2020's large bed discovery.

10. Huddle Bay/Hiawatha Island:




Days Allotted in 2021: 17
Total Pounds Harvested: 4,235

Summary:

Huddle Bay work site is very fertile and has a large surface area to cover, being that is relatively shallow. The EWM plants tend to grow very quickly and are typically at the surface in early summer. The water depth, size of the bay, the rate of EWM growth, chronic poor visibility, and the heavy boat traffic are ideal for fragmentation and dispersal of EWM throughout the bay and surrounding area.

Hiawatha Island, also part of the site, had sporadic EWM growth along the eastern and western shoreline that was removed very quickly.

Recommendations:

We recommend that this site be tackled as early in the season as possible prior to native plant life growth.

11. Long Island Shoal:

Days Allotted in 2021: 8
Total Pounds Harvested: 4,095

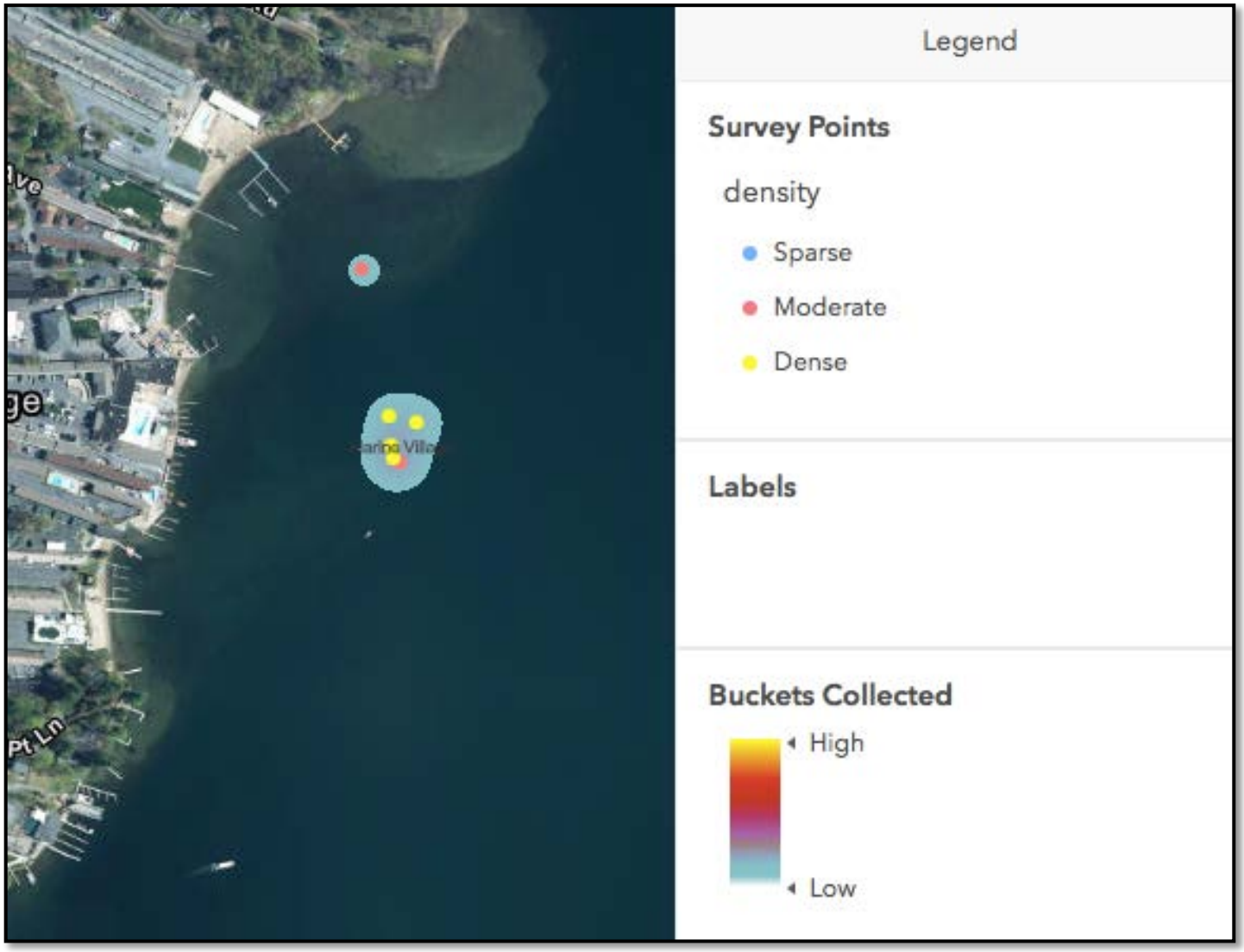
Summary:

This was a new work area within the larger Long Island site. The original work area at the site has greatly improved. This new site was cleared, but there is more growth heading south along the island.

Recommendations:

This area should be addressed sooner in the season to remove growth not addressed in 2021 and to ensure the area trends in the right direction.

12. Village North:




**Days Allotted in 2021:** 6
**Total Pounds Harvested:** 3,500

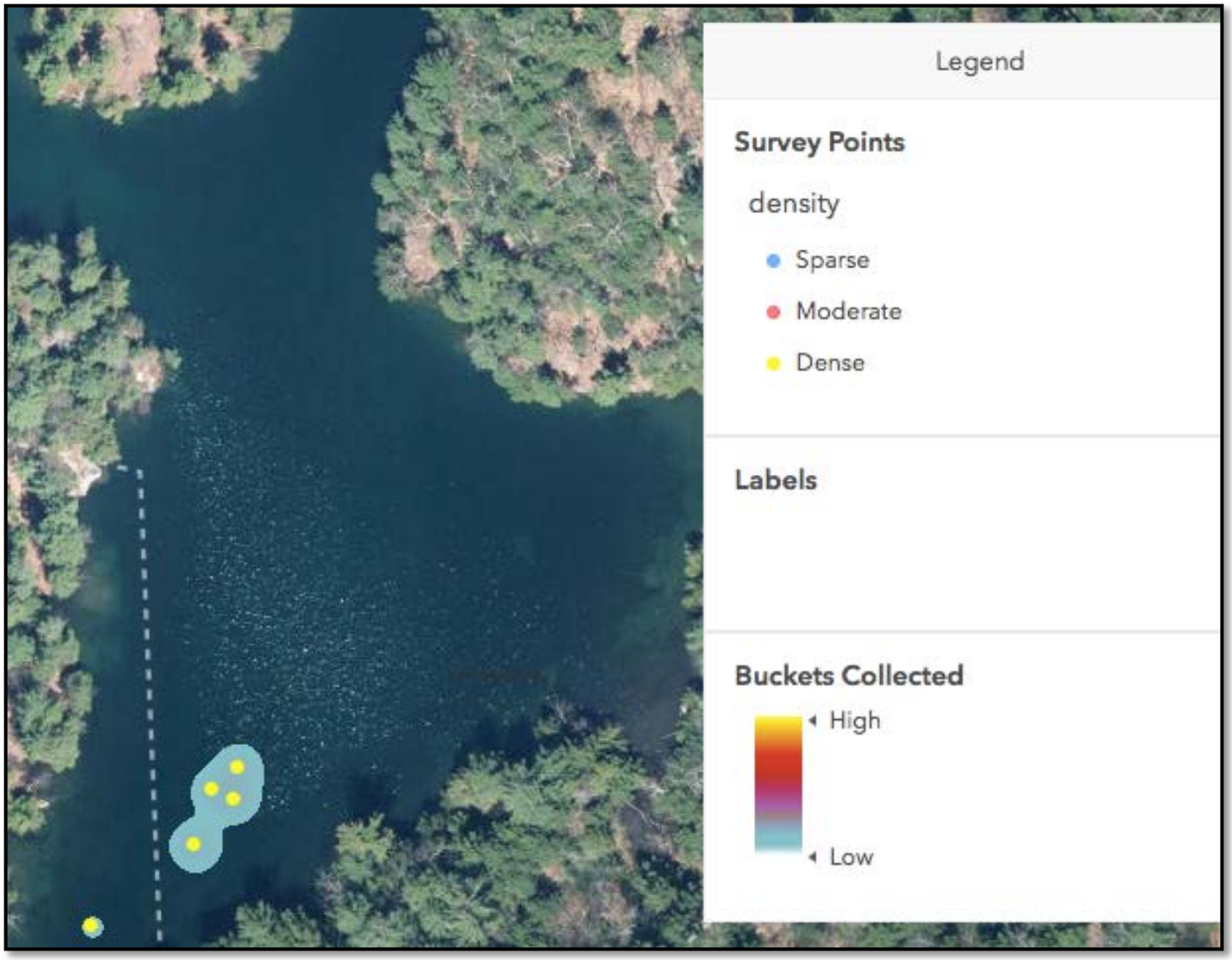
**Summary:**

This was the first year that divers from AECDS worked this site. The patch was fairly dense but seemed to be isolated with few sporadic plants at the margins. The patch was completely harvested.

**Recommendations:**

Due to the nature of the boat traffic in this area, we recommend vigilance for this site in 2022.

13. Paradise Bay:




Days Allotted in 2021: 2
Total Pounds Harvested: 3,115

**Summary:** Paradise Bay presented with small, dense patches of EWM in the south western corner. This area was cleared.

**Recommendations:** We recommend that this site be checked in 2022 for regrowth.

14. Eichlerville Bay:

Days Allotted in 2021:4
Total Pounds Harvested: 2,800

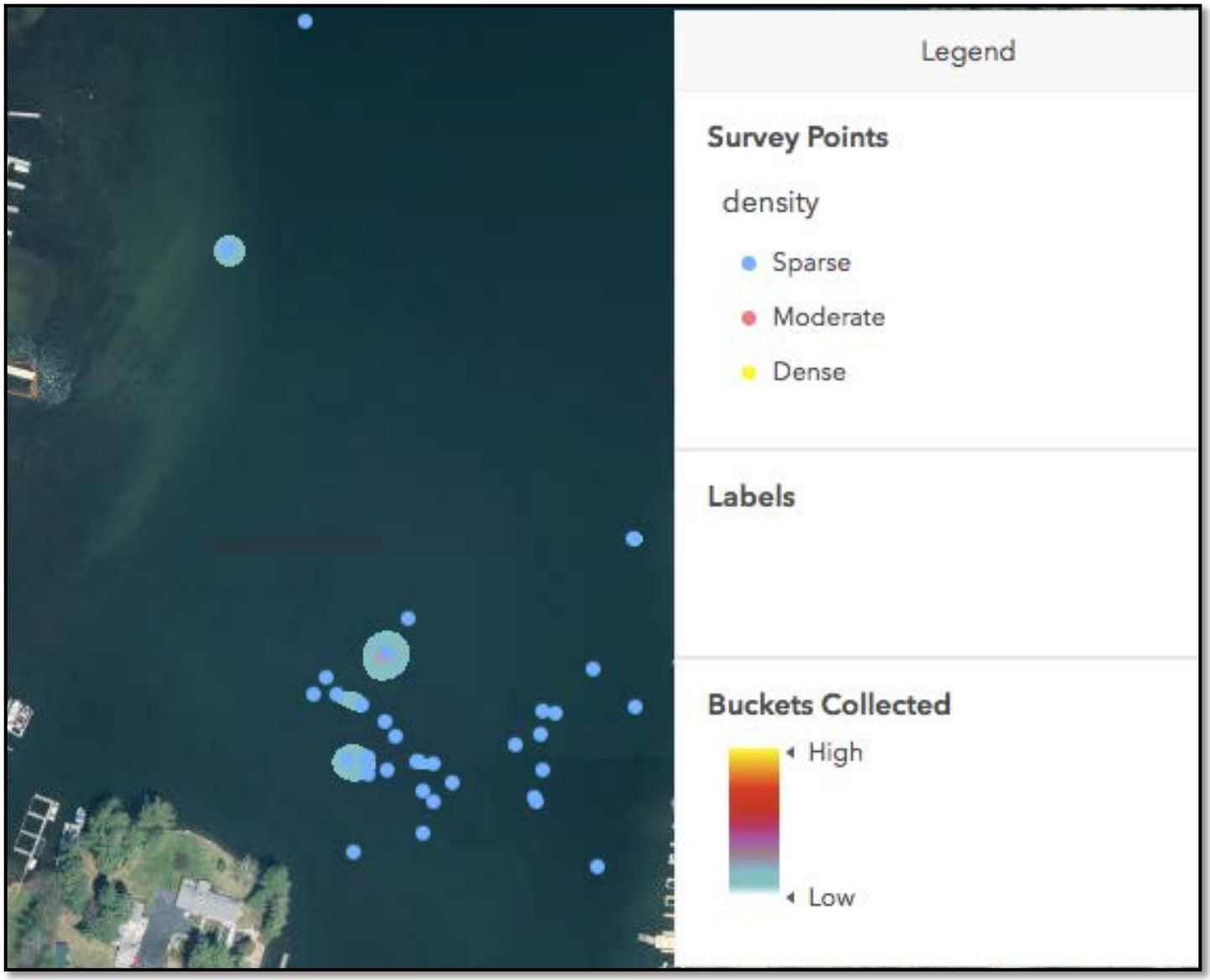
Summary:

Eichlerville Bay showed a huge improvement from 2020. In 2020, it took 18 days to remove the 14,100lbs of invasive EWM biomass from the bay. In 2021, divers found and removed only 2,800lb of EWM, and were able to remove it in just 4 days, despite the difficult, rocky bottom composition.

Recommendations:

In order to continue the positive trend in Eichlerville Bay, we recommend a continued vigilance of the site in 2022.

15. Sawmill Bay/Bolton Bay:




Days Allotted in 2021: 11
Total Pounds Harvested: 2,800

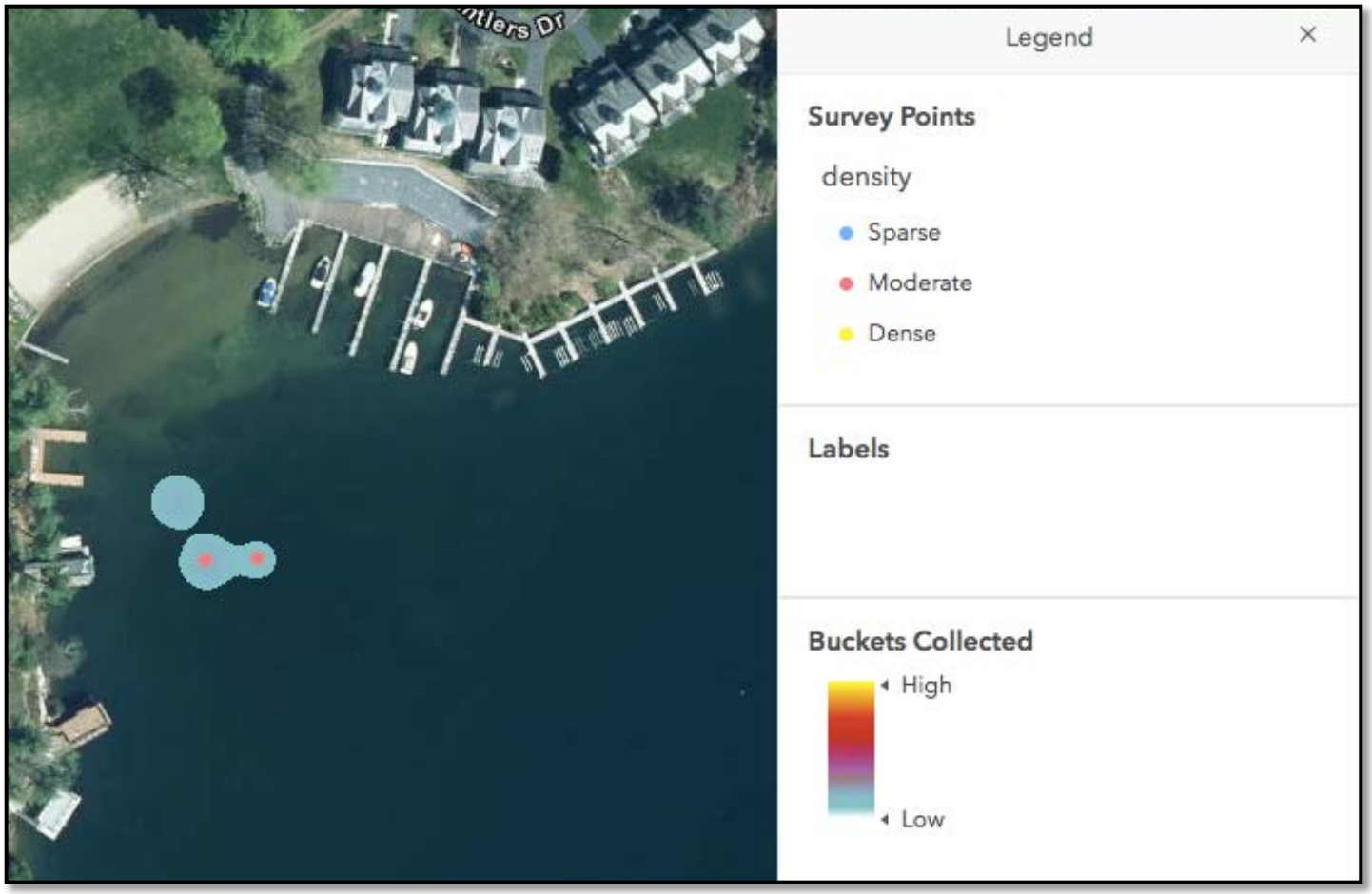
Summary:

Sawmill Bay/Bolton Bay continues to trend in the right direction with an 86% decrease in EWM since 2020. EWM plants were found were in areas of high boat traffic, something which did not surprise the dive team.

Recommendations:

Because of the high boat traffic in this area, Sawmill Bay/Bolton Bay will always require maintenance to ensure plant counts continue to trend downward.

16. Cannon Point:

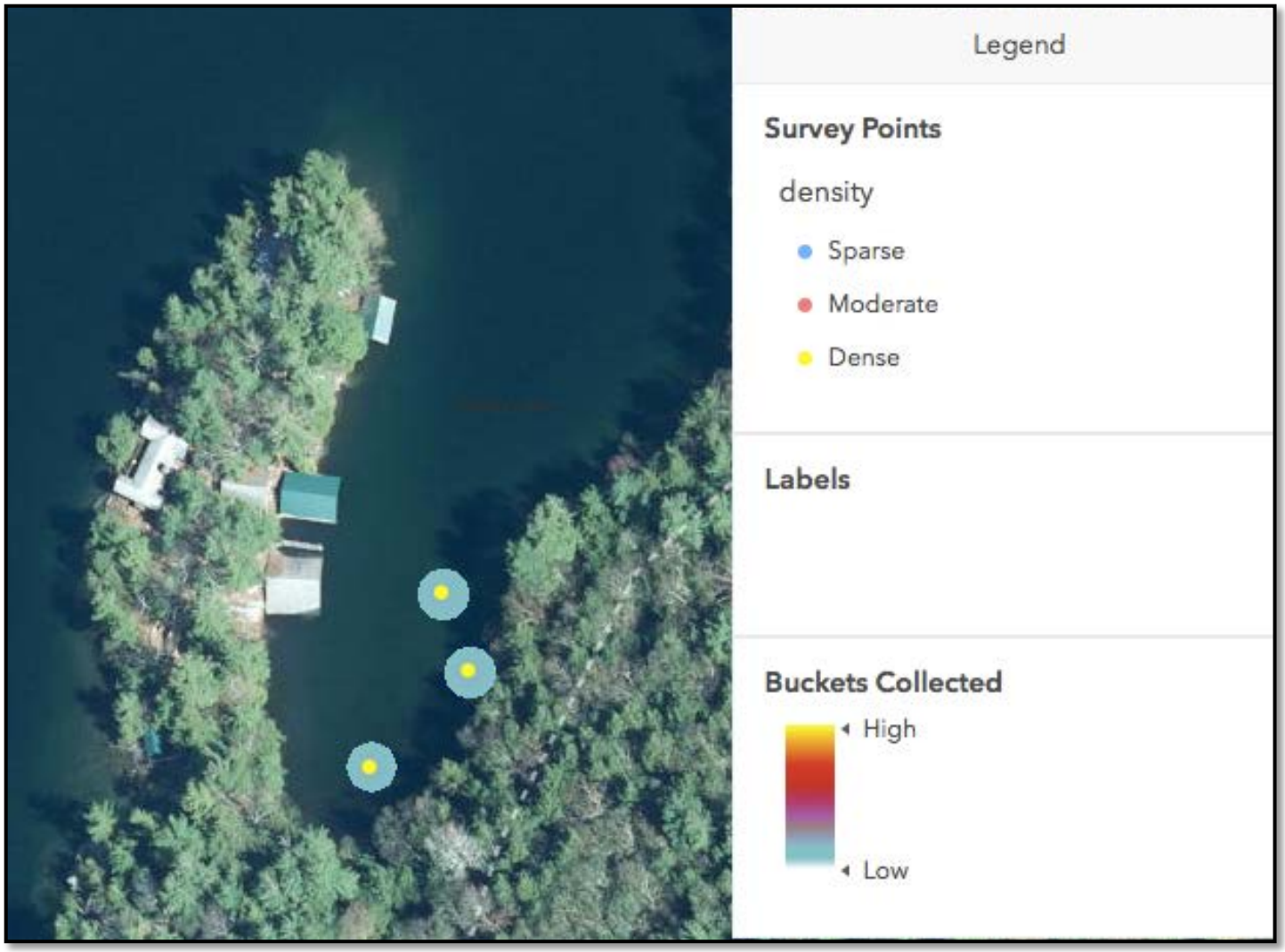



Days Allotted in 2021: 2
Total Pounds Harvested: 2,520

Summary:
Cannon Point showed progress in 2021 from the year before, despite a greater volume of plants being pulled. Most of the EWM removed were smaller plants, suggesting they were regrowth from seeds or partial root balls that couldn't be fully removed in 2020. It is a site which has seen a reduction in big plant growth and heavy root balls, and this is a significant step in the right direction.

Recommendations:
Vigilance is recommended in order to continue seeing progress at the Cannon Point Site.

17. Lynden Point:




Days Allotted in 2021: 3
Total Pounds Harvested: 2,240

Summary:

This was the first year in which AECDS divers worked Refuge Island. Small, dense patches of EWM were quickly located and removed from the basin.

Recommendations

Fragments were observed and removed in the basin prior to harvesting, which suggests this is a site which will need annual reinspection for regrowth and possible new growth due to fragmentation.

18. Refuge Island:

Days Allotted in 2021: 3
Total Pounds Harvested: 2,240

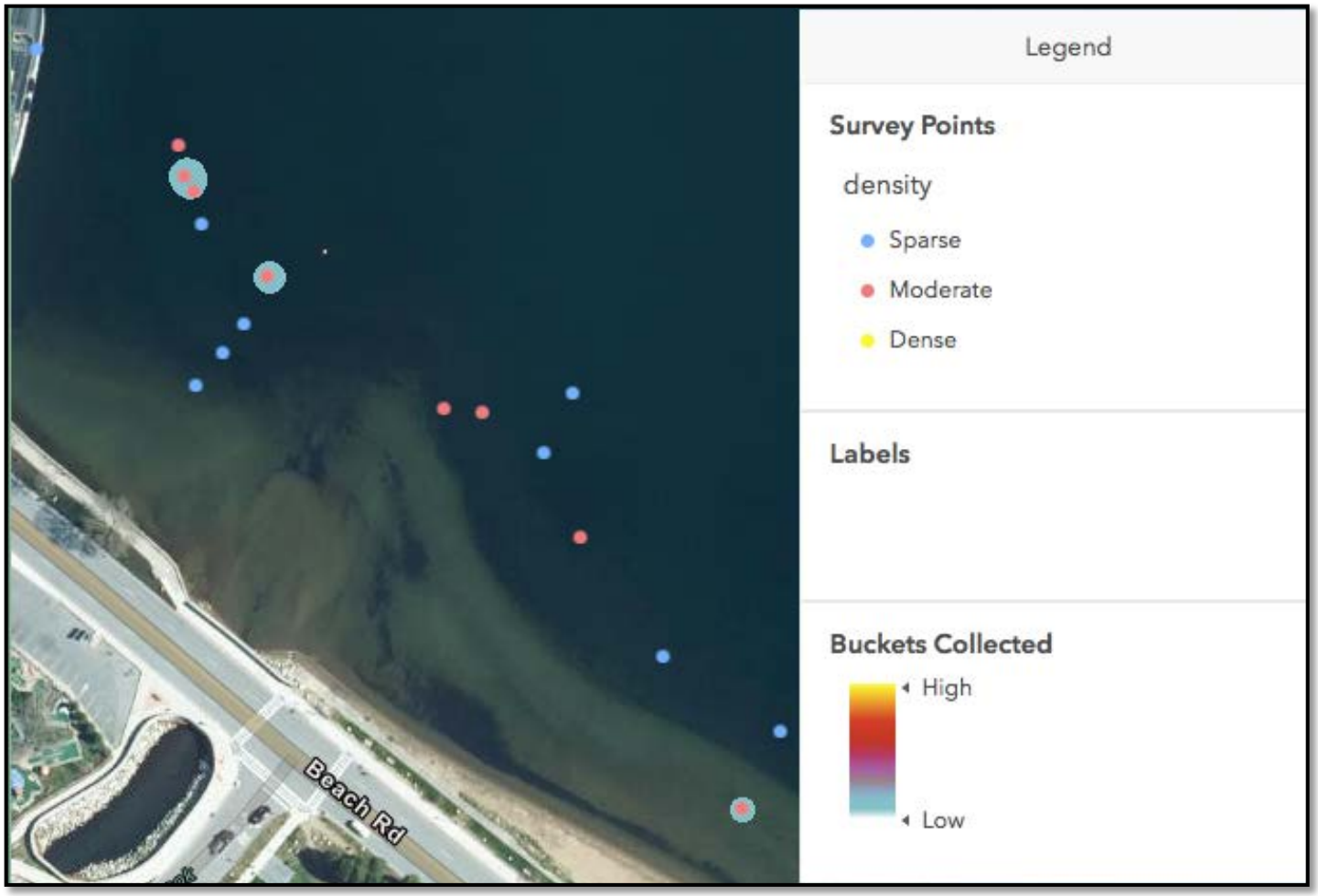
Summary:

This was the first year that divers from AECDS worked the Refuge Island site. The majority of the EWM was removed east of the island in the center of the bay, with some closer to the point.

Recommendations:

This site seems to be a recipient of fragments coming from a yet-to-be identified patch or bed that is sending fragments into the area. We recommend a survey of the area north of this site to determine where these fragments originate.

19. Dog Beach:




Days Allotted in 2021: 5
Total Pounds Harvested: 1960

Summary:

Dog beach has improved significantly since 2020, with an 85% decrease in EWM found and harvested. This site has a dense sandy bottom composition, which can sometimes make removal difficult and regrowth certain. However, this area has responded well to the treatment plan.

Recommendations:

We recommend that this site be monitored for regrowth as it is a high traffic area for both boating and other human activities and plant fragmentation could lead to an escalation, which could set this site back quickly.

20. Van Buren Bay:

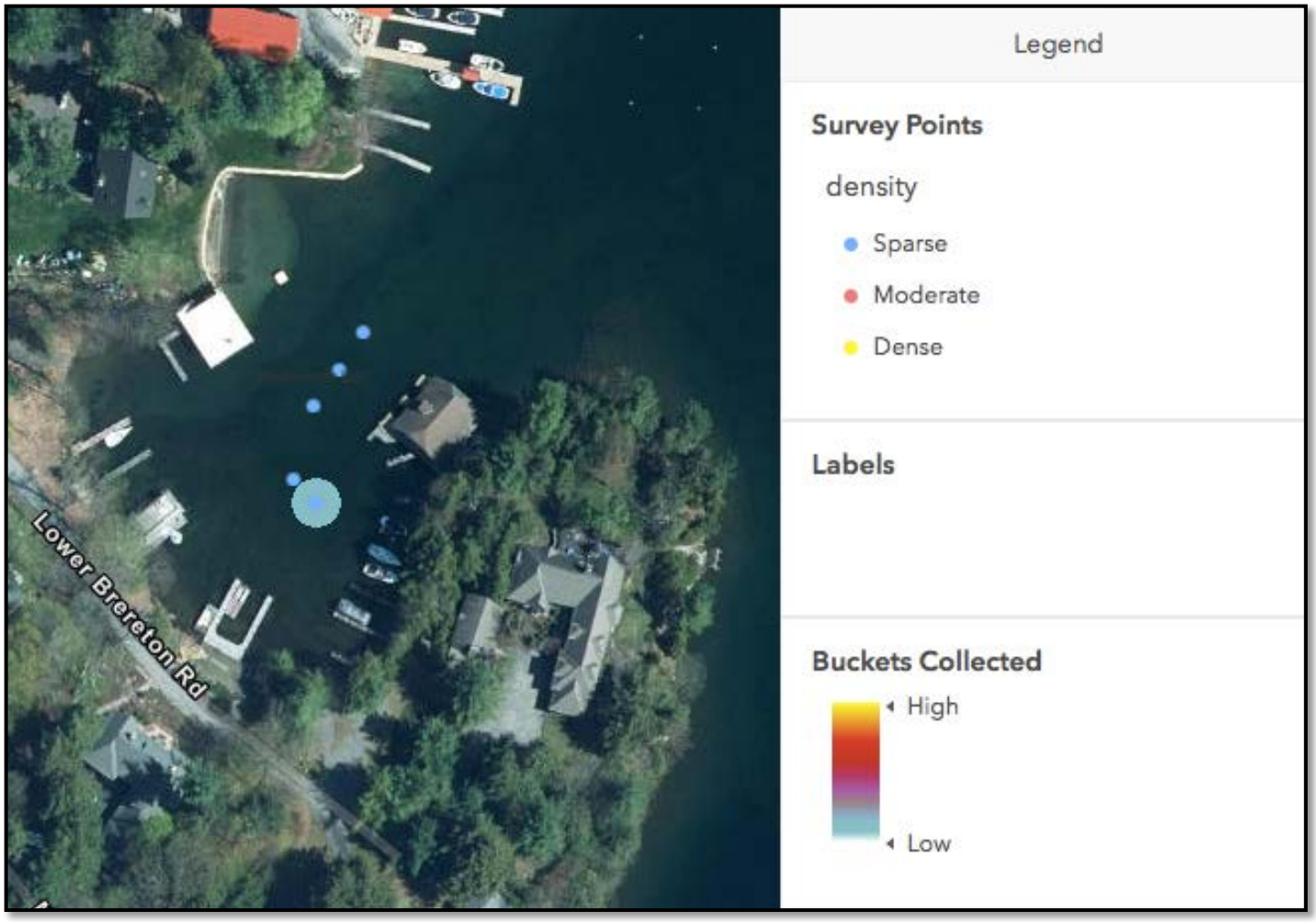
Days Allotted in 2021: 5
Total Pounds Harvested: 1750

Summary:
Plant regrowth in this area was more than expected. Two moderately dense beds were cleared quickly, however, several fragments were observed coming into the bay prior to harvesting occurring. This suggests that regrowth is possibly being added by fragmentation from either the old work area in this site or deeper beds offshore.

Recommendations:

We recommend an early season survey in this site and adjacent areas to prevent regrowth and the site sliding back towards dense growth.

21. Middleworth Bay:




Days Allotted in 2021: 9
Total Pounds Harvested: 910

Summary:

This was the first year that divers from AECDS harvested at Middleworth Bay. Most of the EWM removed was found under dockage and boats located in the bay.

Recommendations:

We recommend an early season survey in order to assess the regrowth in this bay and its harvesting needs.

22. Clay Island:

Days Allotted in 2021: 3
Total Pounds Harvested: 1,050

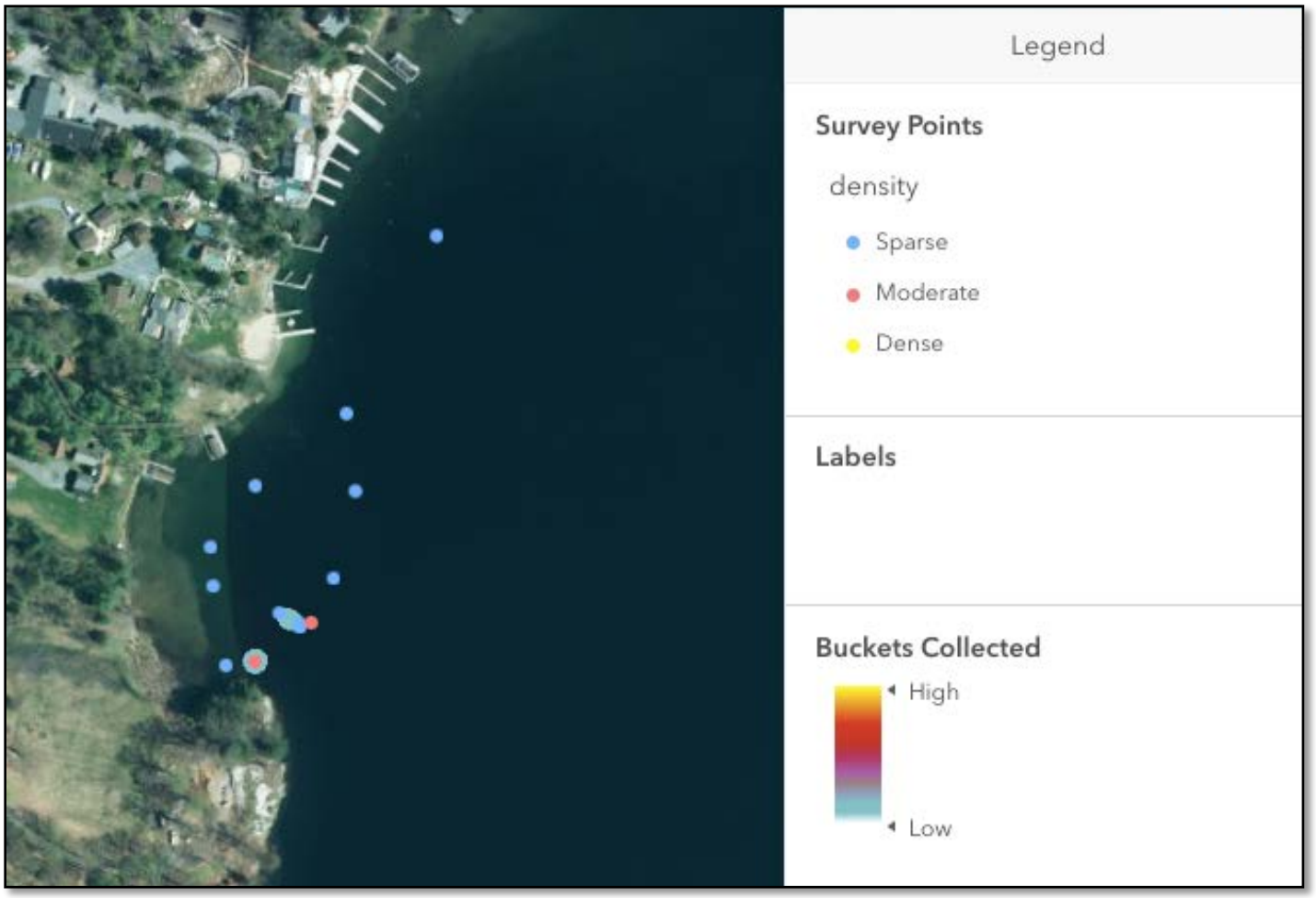
Summary:

This is the third year working the Clay Island Site. Within the last three years, harvest totals have been reduced by 12,295 pounds, or 93%. This is a perfect example of how DASH, when applied properly, can reduce the presence of EWM, and successfully control it.

Recommendations:

We recommend that continued attention be paid to this site until harvesting data reveals the maintenance level of both days and EWM biomass to keep this site controlled. We do not believe this can be determined yet.

23. Basin Bay




Days Allotted in 2021: 3
Total Pounds Harvested: 892.5

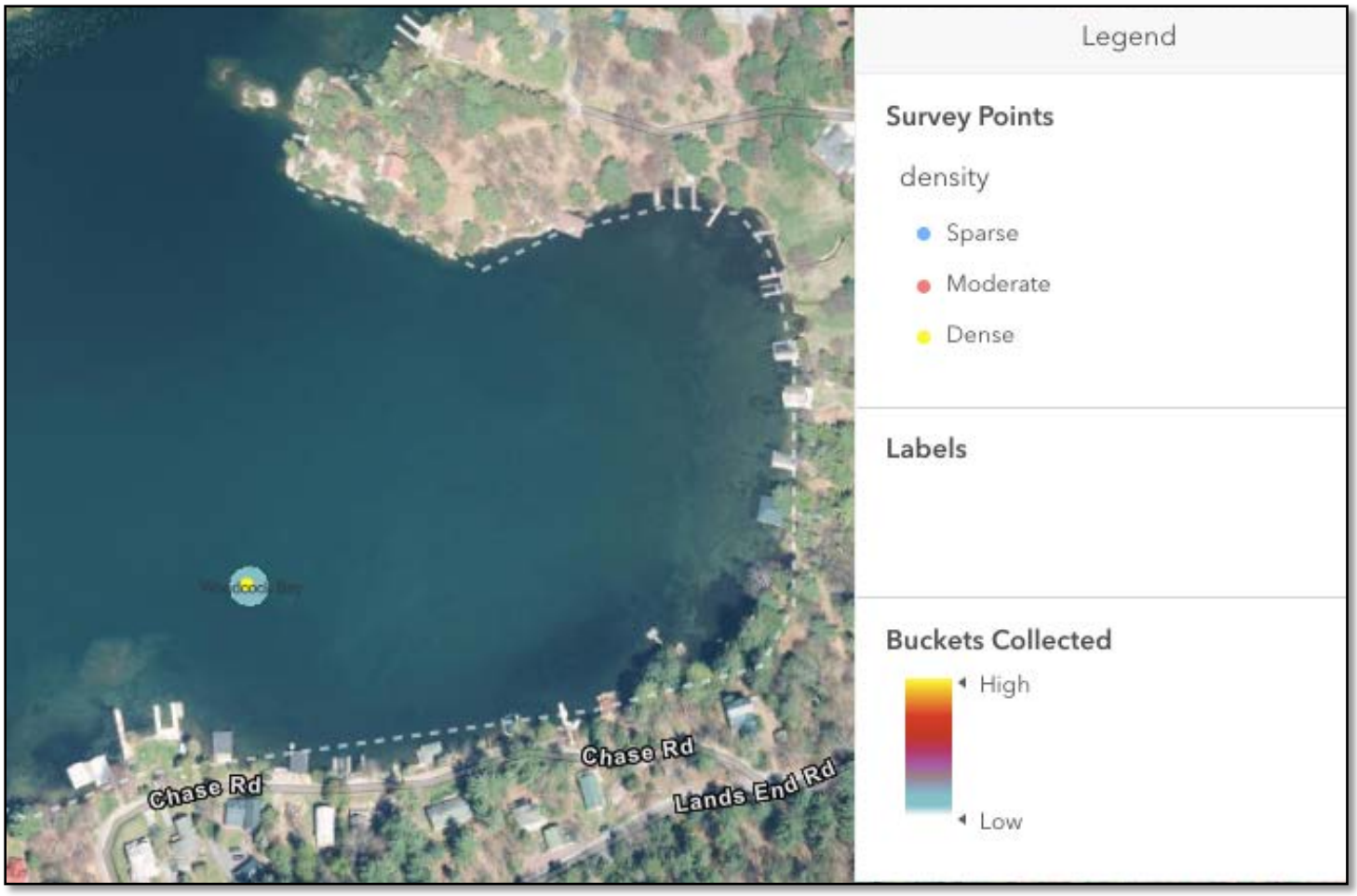
Summary:

This is the second year working the Basin Bay site for AECDS. This site has shown a significant reduction in EWM removed.

Recommendations:

Days required for a thorough survey should be considered in the future when days are allotted for this site to ensure the continued control of this site.

24. Cook Bay




Days Allotted in 2021: 1
Total Pounds Harvested: 525

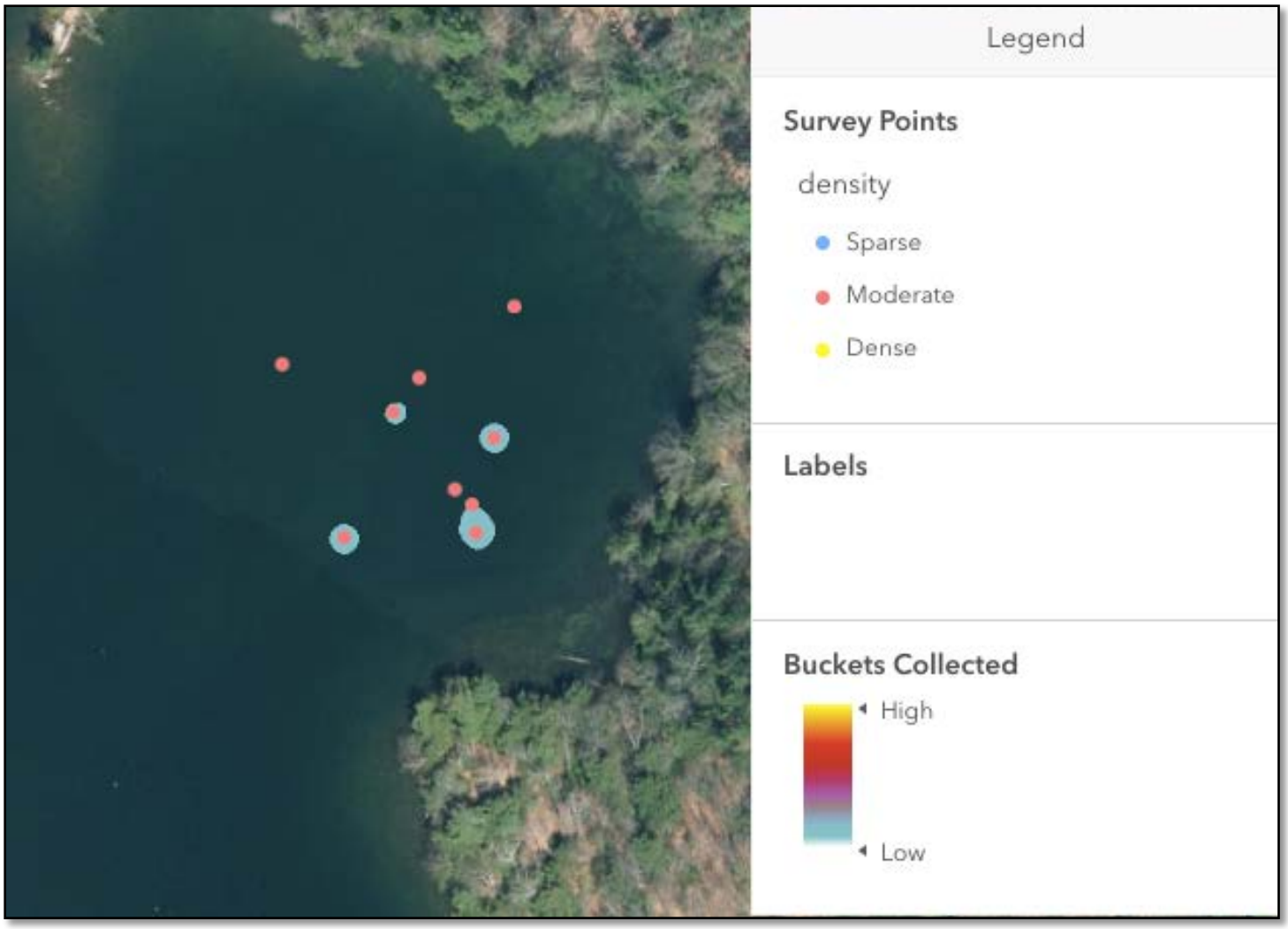
Summary:

This is the first year working the Cook Bay Site. A small, dense patch was quickly removed and was made easy due to the soft bottom composition.

Recommendations:

We do not anticipate heavy regrowth in this area as the bottom composition made removal quick and efficient. However, it is recommended that this site be recheck as this same bottom composition would also make new growth from any fragmented plants spread quickly.

**25. Fan Point**




Days Allotted in 2021: 2
Total Pounds Harvested: 490

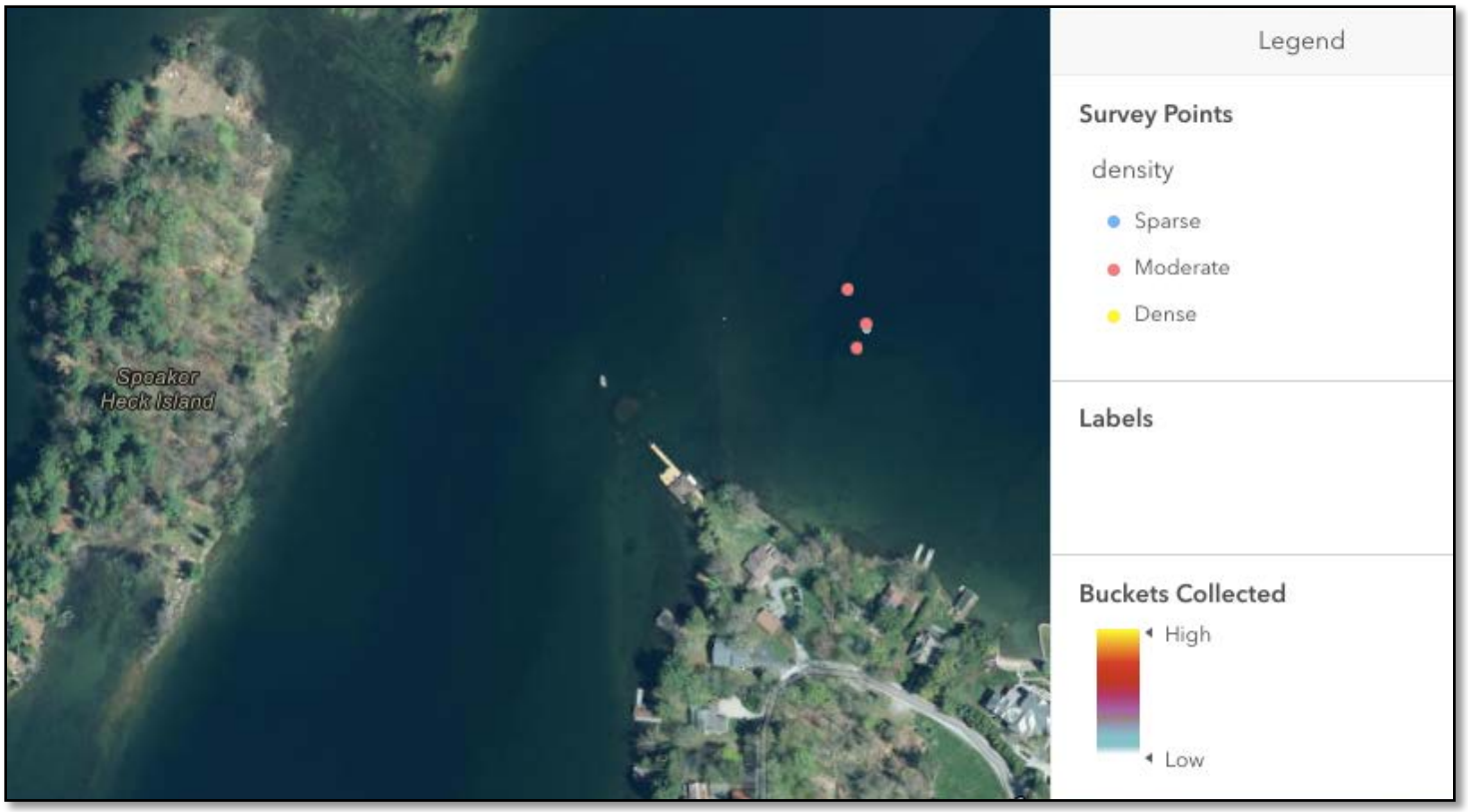
**Summary:**

This site showed an 87% reduction in EWM removed from 2020. Plants were found growing in mostly small sporadic patches.

**Recommendations:**

We do not anticipate heavy regrowth in this area as the bottom composition made removal quick and efficient. However, it is recommended that this site be recheck as this same bottom composition would also make new growth from any fragmented plants spread quickly.

26. Speaker Heck Island




Days Allotted in 2021: 3
Total Pounds Harvested: 490

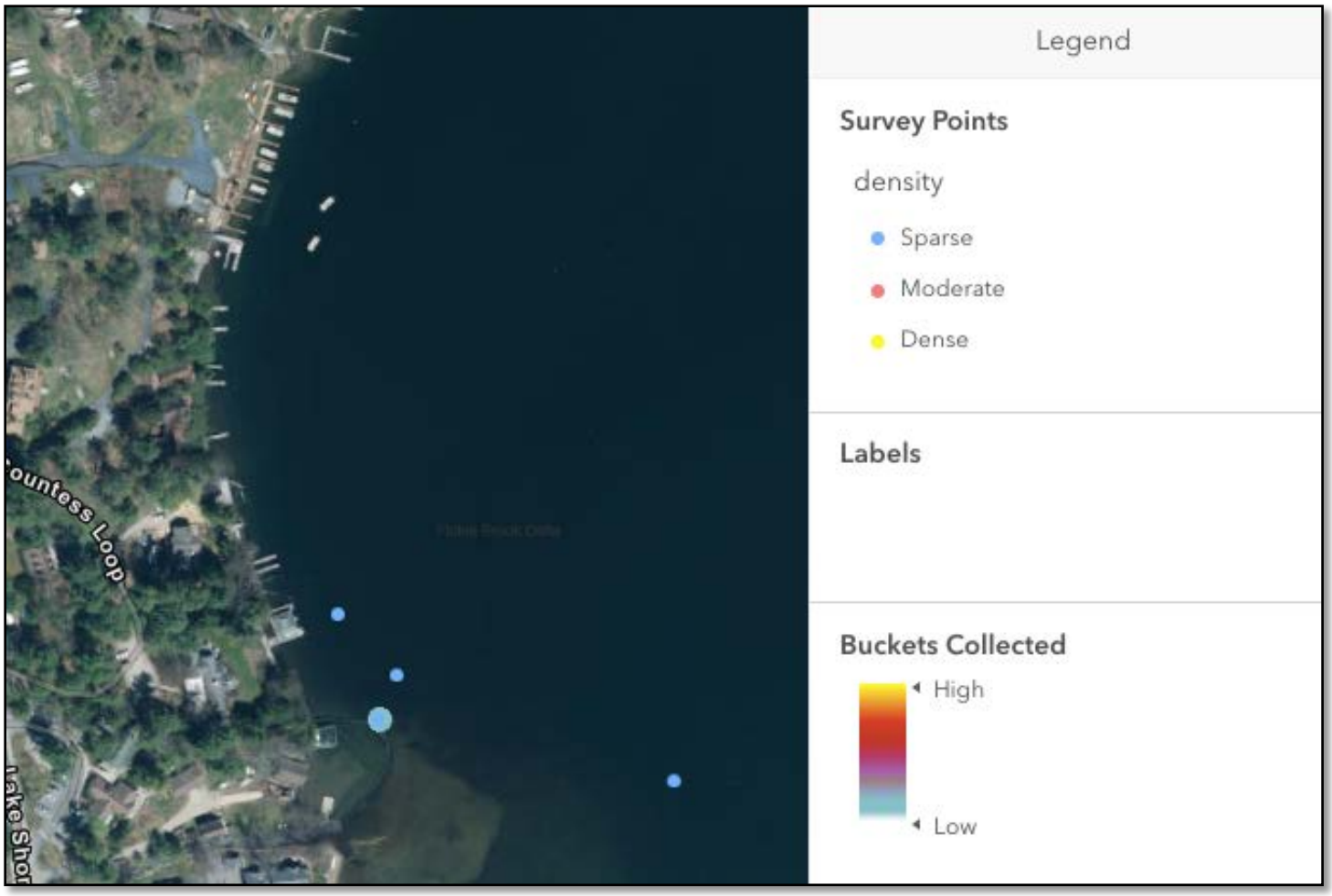
**Summary:**

This is the first year working the Speaker Heck Island site. This site is south of the Long Island site and while only 490 pounds of EWM was removed from the site, site supervisors believe this site is a direct result of fragments coming from the Long Island site.

**Recommendations:**

Growth at this site indicates to AECDS site supervisors that this area and the area between it and the Long Island site should be a high priority, especially due to boat traffic in the area.

27. Finkle Brooke Delta




Days Allotted in 2021: 4
Total Pounds Harvested: 420

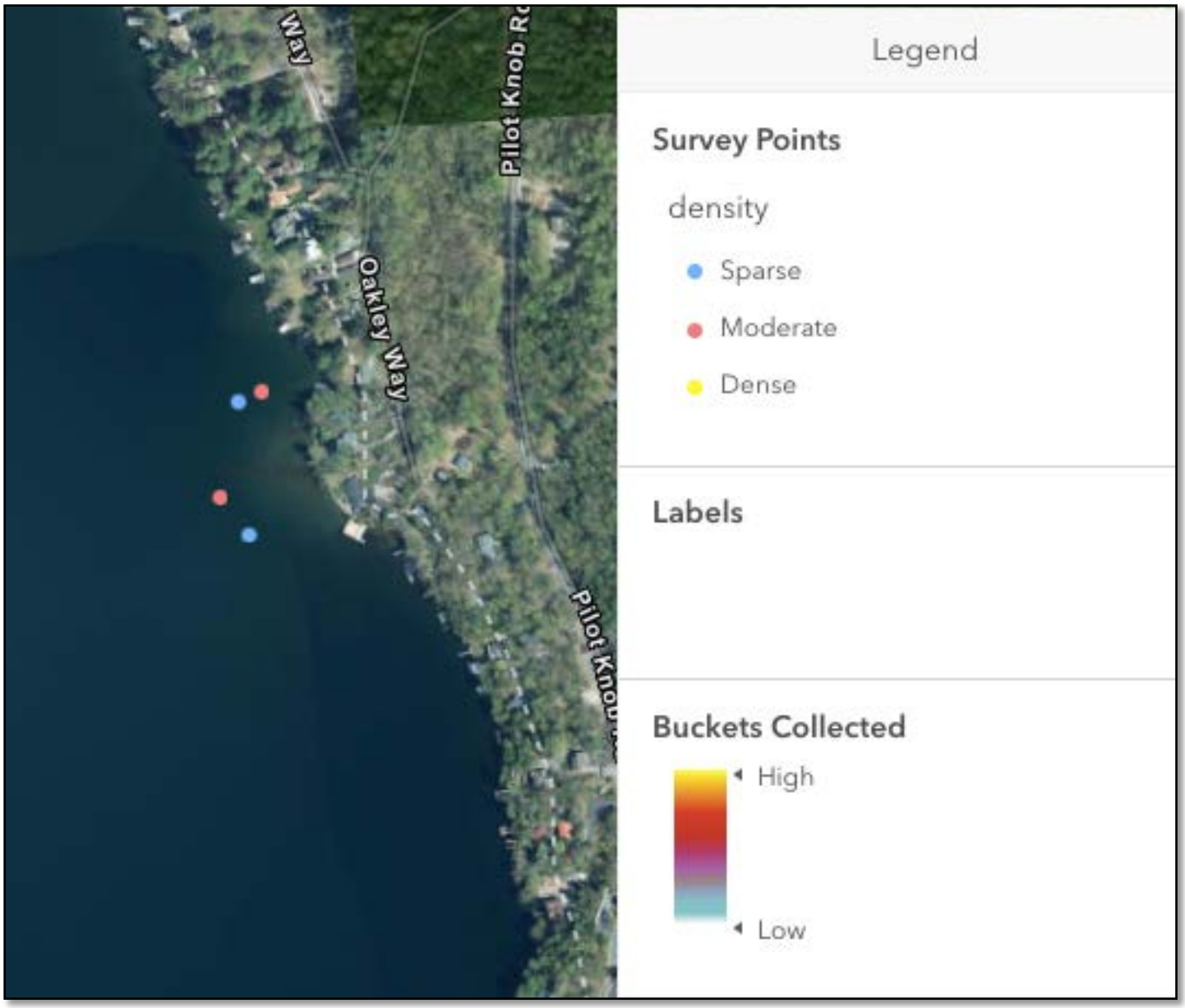
Summary:

Finkle Brooke Delta continues to show a decline in EWM growth.

Recommendations:

We recommend a survey of the site early in 2022 to find and remove any regrowth. The positive trend of this site can and should be maintained given the high boat traffic in the area.

28. Oakley Way




Days Allotted in 2021: 3
Total Pounds Harvested: 420

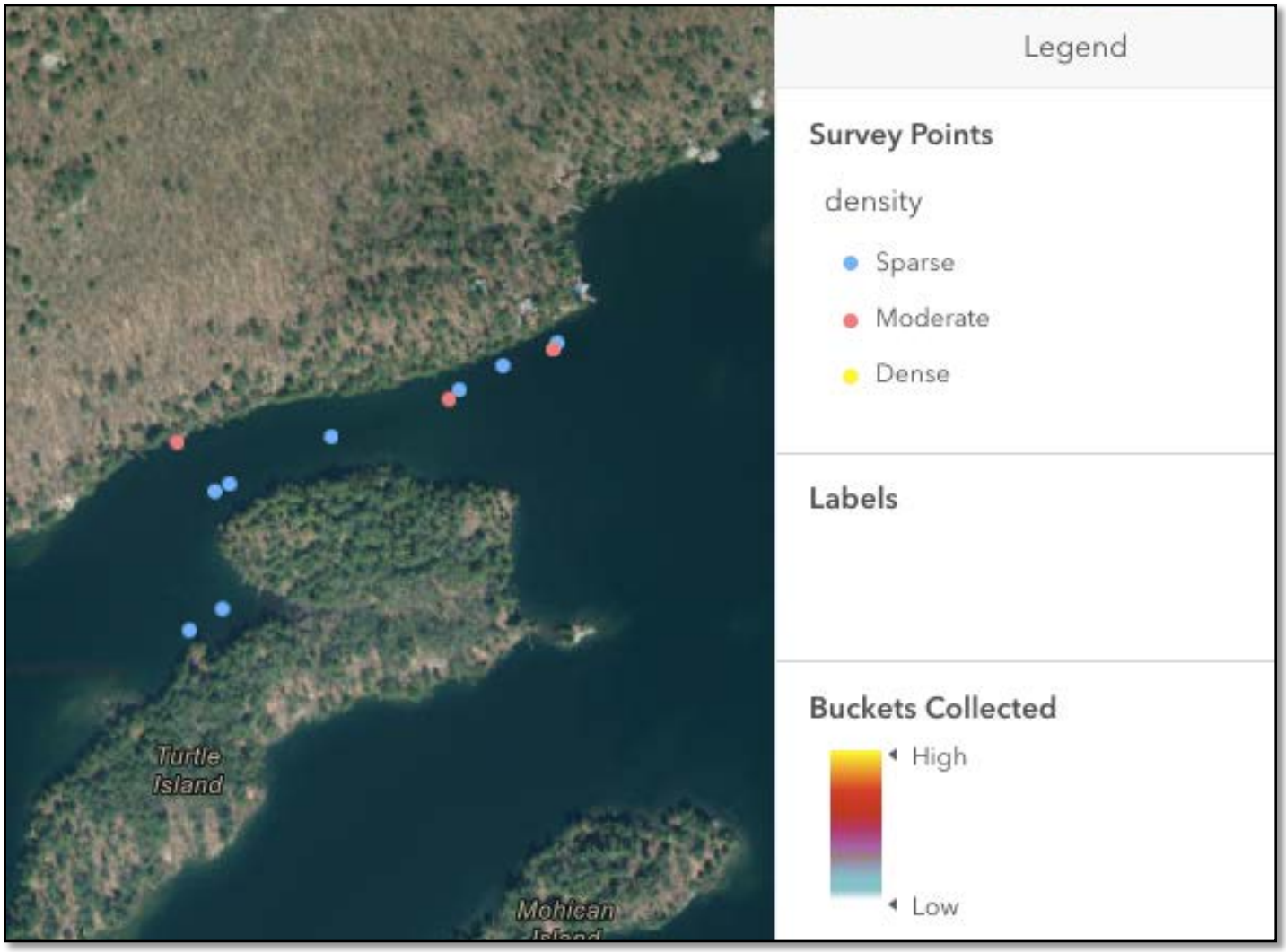
**Summary:**

The Oakley Way site showed little regrowth between harvesting phases in the 2021 season.

**Recommendations:**

This area should be checked again in 2021. However, we do not anticipate heavy regrowth in this area and feel any regrowth would be removed quickly and efficiently.

29. Turtle Island Channel




Days Allotted in 2021: 3
Total Pounds Harvested: 385

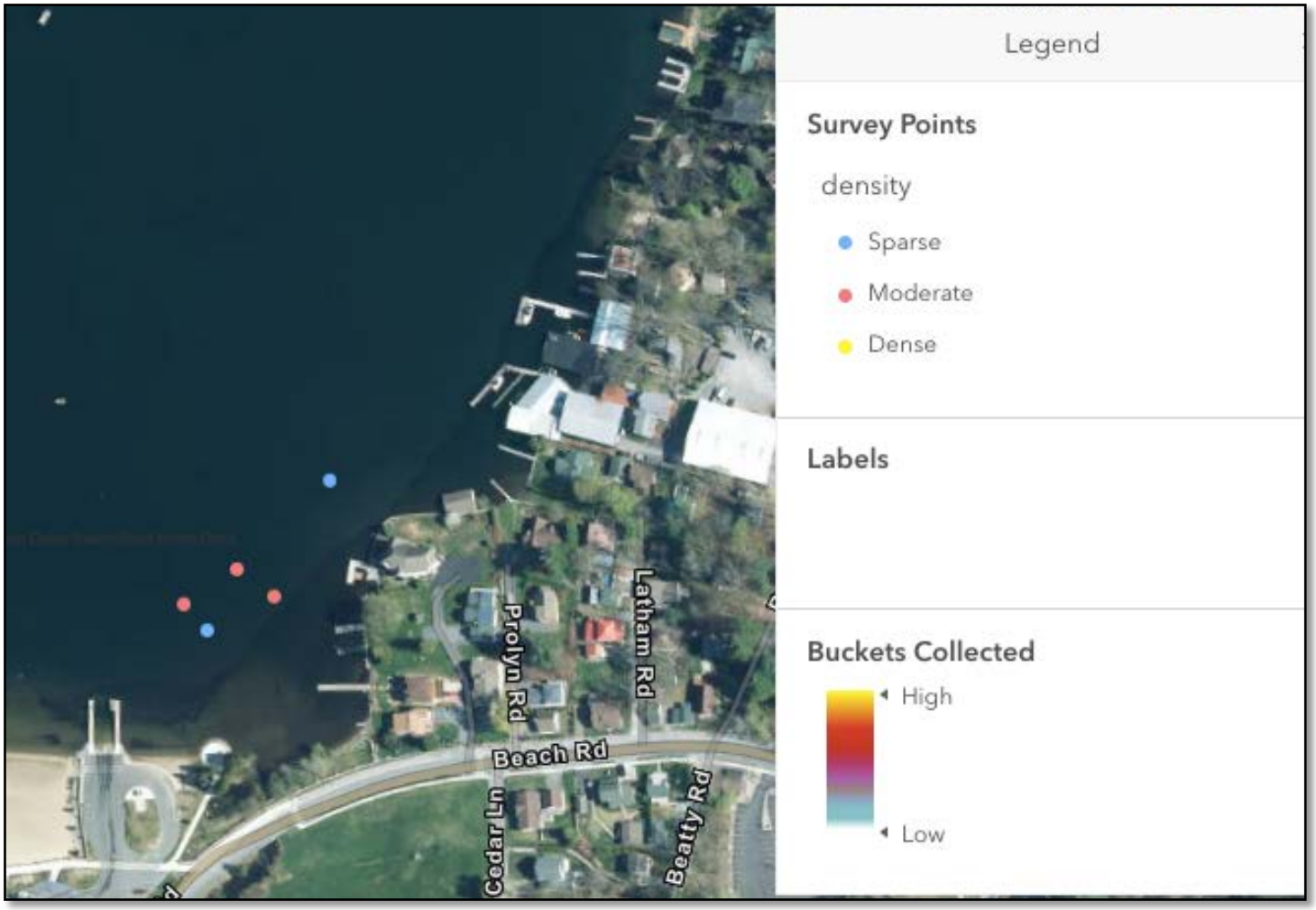
Summary:

The Turtle Island Channel site showed an 87% decrease in EWM harvested. However, divers found growth in the northern end of the channel which was not present in 2020.

Recommendations:

This site should be checked for regrowth in 2022, keeping in mind the historic locations of growth at this site.

30. **East Brooke Delta** *(formerly Million Dollar Beach)*




Days Allotted in 2021: 4
Total Pounds Harvested: 262.5

**Summary:**

East Brooke Delta showed a 89% decreased in harvested EWM in 2021. Very little regrowth was found and harvesting was done quickly, though searching for EWM took time due to boat traffic in the area.

**Recommendations:**

We do not anticipate heavy regrowth in this area. However, due to the high boat traffic in this area, it is vital to continue revisiting this site in order to survey for regrowth and removal of any EWM that is found.

31. Commission Bay:

Days Allotted in 2021: 2
Total Pounds Harvested: 105

Summary:

Commission Bay showed very little regrowth and almost a 99% reduction in EWM removed.

Recommendations:

We do not anticipate heavy regrowth in this area and feel the area is at a maintenance level for effort.

32. Dunham's Bay

Days Allotted in 2021: 3
Total Pounds Harvested: 105

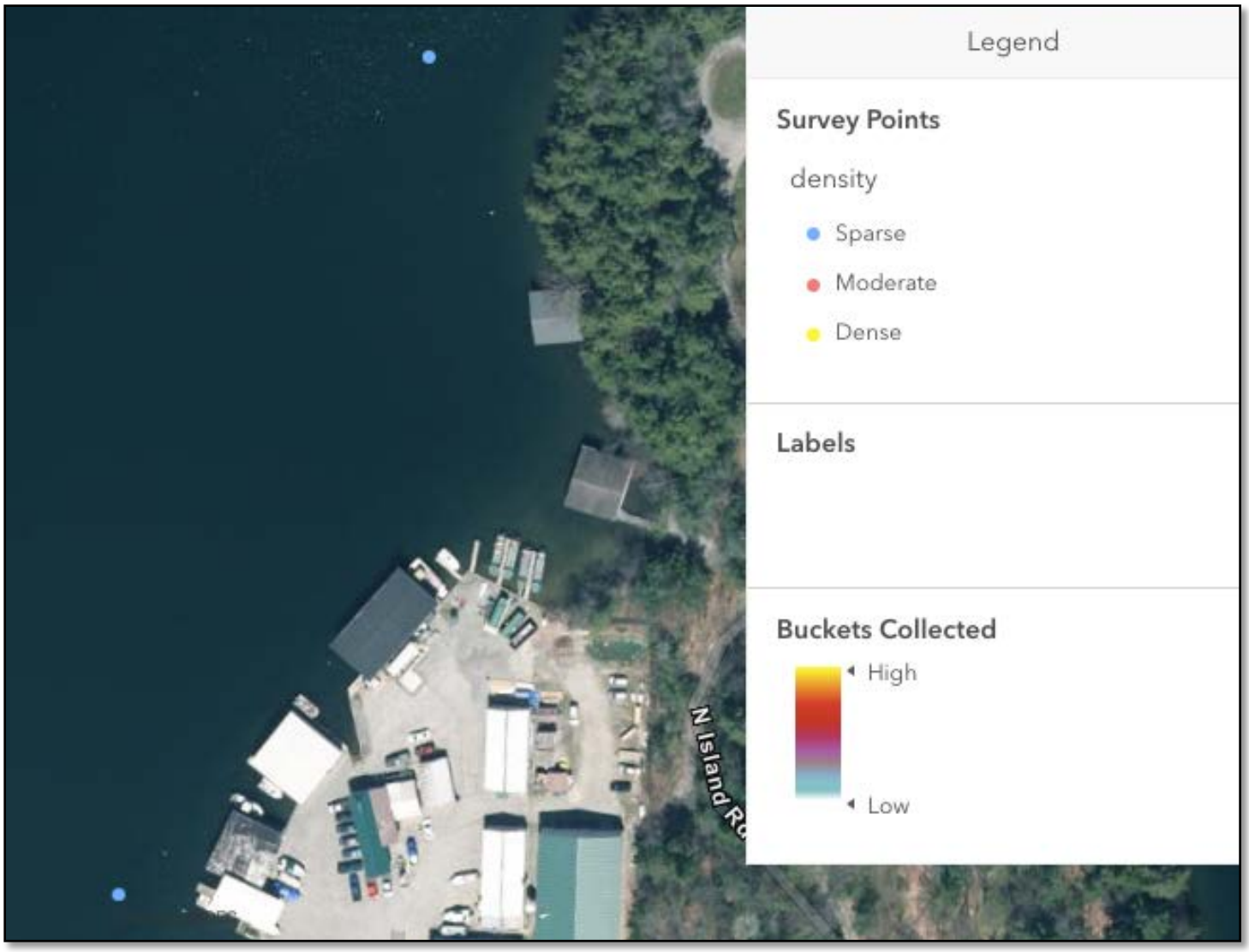
Summary:

Dunham's Bay showed a considerable reduction in growth and EWM removed. However, fragments were observed drifting into the site from the main basin of the lake after harvesting was completed.

Recommendations:

Dunham's Bay seems to have reached a maintenance level. We do not anticipate heavy regrowth in this area but recommend a 2022 survey to ensure fragments from the main basin of the lake do not take hold and re-infest the site.

33. Green Island/DEC




Days Allotted in 2021: 1
Total Pounds Harvested: 70

Summary:

The Green Island/DEC site has continued to experience minimal regrowth and seems to have reached a maintenance level only for the site

Recommendations:

We do not anticipate heavy regrowth in this area but recommend a survey in 2022 in order to identify any regrowth at the site, especially given the high boat traffic in the area.

(END)