Appendix F-2

EcoLogic Memorandum

TO: Margaret Murphy, Anchor QEA
FROM: Kerry Thurston, EcoLogic
RE: Onondaga Lake 2013 Macrophyte Monitoring Results
DATE: February 12, 2014

This memorandum summarizes the 2013 Onondaga Lake macrophyte monitoring results. The annual macrophyte monitoring program consists of two elements: aerial photographs and field verification. The maps are collected at the end of this memorandum. The topics discussed in this memorandum are:

1. Aerial photography methodology
2. Ground-truthing (field verification) methodology
3. Results – 2013 aerial photography interpretation
4. Trends in aerial photography interpretation
5. Results – ground-truthing (field verification)
6. Verification – aerial photograph interpretation and ground-truthing
7. References

One of the sites – Site 6 – was relocated due to remediation activities being conducted by Honeywell. During the 2012 program, Site 6 was relocated south and east of the dredge area. The dredging work continued in adjacent areas during 2013, again encroaching into the area where Site 6 had been re-located in 2012. For 2013, Site 6 was re-located to a position along the opposite shoreline, between Sites 3 and 4.

The dredge area was digitized from aerial images using the visible silt curtains as a guide. In 2012, the dredge area digitized encompassed approximately 63.7 acres, while in 2013, the area digitized was approximately 64.9 acres. The two adjacent dredge areas (Map 1) represent a total of approximately 128.6 acres that, due to dredging activities, were not assessed for macrophyte coverage in the 2013 analysis.

In addition, based on conversation with Chris Gandino of the Onondaga County Department of Water Environment Protection (OCDWEP), other areas at the southeastern end of the lake were also being modified by dredge and capping activities. Additional silt curtains were digitized from the aerial images (Map 1). The extent of the impact – if any - to the vegetation in these areas at the time of the aerial fly-over is not certain. However, a map provided by Anchor QEA shows where dredging and capping activities occurred near DestiNY USA, the Metro Treatment Plant, and Harbor Brook (see Section 4.2).

1. *Aerial Photography Methodology*

Aerial photographs were taken on August 24 2013 by Air Photographics Inc. Prior to the flight, ten field verification, or ground-truthing, sites were marked in the lake with large buoys, which are visible as orange dots in the photographs. The photographs were transferred to digital format, georeferenced and copied to a DVD that was sent to EcoLogic. The georeferenced photographs were imported into ArcGIS and the margins of the macrophyte beds were manually delineated using heads-up digitizing technique.

Two types of macrophyte area were delineated: dense and sparse. As in previous years' analyses, the overall acreage of macrophytes was calculated as the total dense area plus 30% of the total sparse area. The area of the littoral zone used to calculate lake-wide percent coverage was 777 acres.

2. *Ground-truthing (Field Verification) Methodology*

On September 3 2013, ten days after shooting the aerial photographs, a ground-truth sampling effort was conducted by OCDWEP. OCDWEP staff visited each of the ten ground-truthing sites (Map 1) and collected data on species composition and relative abundance. These data were used to verify that objects delineated in the air photographs were macrophyte beds.

Ground-truthing Site 6, formerly located near the mouth of Tributary 5A, was moved to the opposite shore for the 2013 macrophyte monitoring program. The original location of Site 6 was within the Honeywell dredging remediation area.

Macrophyte growth may be affected by substrate type and wave energy. These two factors were used in 2000 to divide the lake into five distinct strata as indicated in Map 1, based on substrate type and wave energies (EcoLogic 2001).

3. *Results – 2013 Aerial Photography Interpretation*

A total of 387 acres of macrophytes were digitized from the 2013 aerial photographs (Map 2). As described above, an area of approximately 128.6 acres impacted by Honeywell's 2012 and 2013 dredging activities were not assessed for macrophyte cover due to the continuing impact by the remediation activities.

Dense macrophyte beds were observed within each of the five strata; the least dense macrophyte areas were located in Strata 3 and the southern end of Strata 4. As discussed in previous memoranda, there is little correlation between macrophyte bed density and substrate. Work conducted by Madsen et al (1996) concluded that finer-grained sediments typically support a greater abundance and variety of macrophytes, whereas oncolite sediments produce less. In 2000, EcoLogic conducted a stepwise multiple linear regression to determine if significant trends existed between sediment composition and plant percent cover or biomass. Sediment was categorized as silt, fine sand, medium sand, coarse sand, or oncolites based on grain size analysis. Based on this regression analysis, oncolites did not exhibit a significant correlation with plant cover or biomass, whereas fine sand was positively and significantly correlated with both percent cover and biomass (EcoLogic, 2001).

The 2013 density of macrophyte growth in oncolite substrate - Strata 1 and 5 (Map 3) and Stratum 4 (Map 6) - suggests that oncolite substrate does not inhibit plant cover or biomass. A portion of Strata 2 (Map 4), in the vicinity of the wastebeds and Ninemile Creek, exhibited less dense macrophyte cover. The substrate of Stratum 2 was characterized as Wastebeds, which in 2000 was described as a hard crust covering much of the area. This crust may limit plant establishment along the wastebeds in this stratum. (Note that the Honeywell dredging area is located toward the southern end of Stratum 2; as described above; this area was not assessed for macrophyte cover). Stratum 3, exhibiting the least density of macrophyte cover of the five strata, is characterized by fine sediment; therefore plant growth in Stratum 3 (Map 5) may not be limited by the substrate. At this end of the lake, there are likely other factors – potentially including remedial capping and dredging activities - contributing to the relatively less dense macrophyte growth than that seen in previous years (see Section 4.2).

Wave energy was another factor used to define the strata of Onondaga Lake. Strata 1, 4 and 5, exhibiting the most dense macrophyte beds, are characterized with different wave energy:

Stratum 1 is Low Energy, Stratum 5 is Medium Energy, and Stratum 4 is High Energy. The visual appearance of consistent density of macrophyte beds within all three Energy types in these strata suggests that wave action does not substantially limit macrophyte growth in these areas. The wave energy in Strata 2 and 3, where the relatively less dense macrophyte beds were located in 2013, are characterized as Medium and High, respectively. The plant growth in Stratum 2 may be limited by a combination of substrate and wave energy, while plant growth in Stratum 3 may be limited by wave energy.

4. <u>Trends in Aerial Photography Interpretation</u>

The overall coverage of macrophytes in 2013 (387 acres) was less than that observed in 2012 (505 acres), a drop in percent coverage of the littoral zone of approximately 15%. However, the estimated percent coverage of 50% in 2013 was consistent for the three years prior to 2012 – 2009 through 2011 (Figure 1).

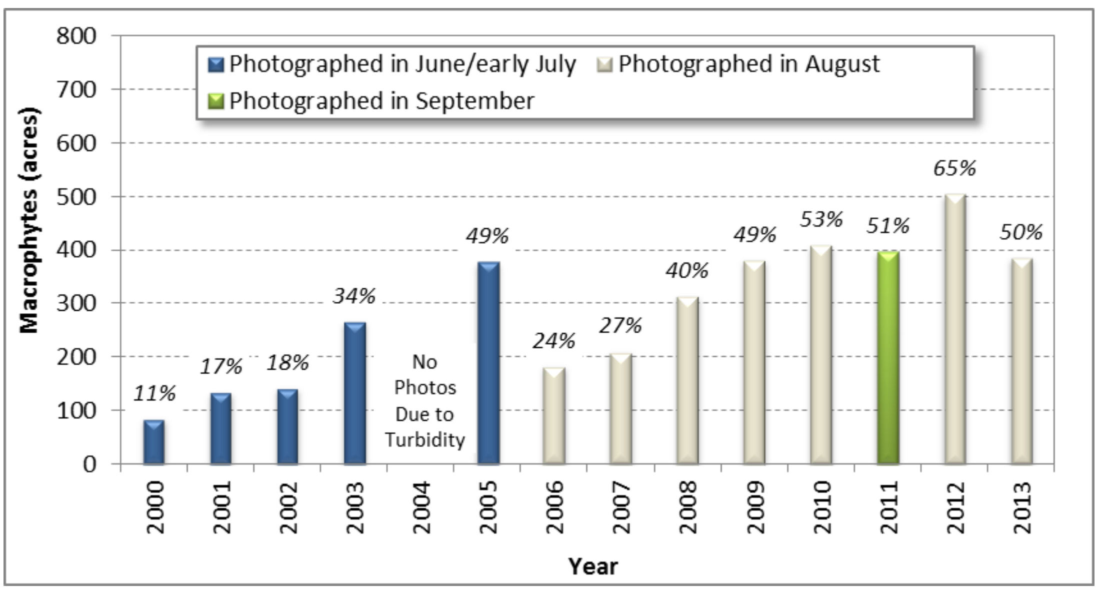


Figure 1. Acreage of macrophytes in Onondaga Lake, as digitized from aerial photography, for 2000 through 2013.

4.1 Seasonal Effects

Since the inception of the aerial photography fly-overs in 2000, the timing of the flight has changed. To obtain the best quality photographs, the right combination of clear flying weather, clear water and well-established macrophytes must be met. Starting in 2000 and through 2005, photographs were taken in June or early July. There were no photographs taken in 2004 due to high turbidity. From 2006 to 2010, photographs were taken in August. In 2011, the photographs were taken on September 19. In 2012 and 2013, photographs were taken on August 24. These different timeframes – June/early July, August, and September – are color-coded in Figure 1. The changes in density and distribution of macrophytes since the second aerial photography fly-over in 2001 are also evident in Figure 2.

As noted in previous reports, the drop in overall coverage observed between 2005 and 2006 (Figure 1) may be attributable to seasonal variability in plant growth between June 2005 and August 2006, or some other unidentified event. Seasonal differences are usually evident in a plant community as different species will be expanding or declining at a slightly different times of the growing season. Despite the seasonal differences that may exist when comparing the photographs taken at different points in the growing season, it is clear from the aerial images that coverage of macrophytes has steadily increased through 2009 (Figure 2). The acreage stabilized from 2009 through 2011, at around 400 acres, then increased in 2012 to just over 500 acres. In 2013, the acreage returned to levels comparable to the 2009 through 2011 time period.

4.2 Dredging and Capping Disturbance

Note that the areas within the dredging zone in 2012 and 2013 were not assessed due to the disturbance. The percent cover values in Figure 1 reflect the calculated plant coverage area, excluding the dredged area, divided by the total littoral zone area of 777 acres. Therefore, these percent cover values include the assumption that the dredging area is absent of plants. For comparison, the littoral zone percent covers for 2012 and 2013 were re-calculated, by using the area of the littoral zone as the difference between the total littoral zone and the dredging area not assessed:

	2012	2013
Dredge area not assessed (acres)	63.7	128.6
Littoral zone area minus the dredge area not assessed (acres)	713.3	648.4
% Cover based on entire littoral zone (777 acres)	65%	50%
% Cover based on assessed littoral zone only	71%	60%

Dredging areas for 2012 and 2013 are shown relative to the ground-truthing sample locations in Map 1. The dredge areas were digitized based on silt curtain deployment, and were located predominantly in Stratum 2. However, additional capping work was conducted in 2013 in Stratum 3.

A map provided by Anchor QEA (Figure 3) shows the extent of dredging and capping activities in the area near DestiNY USA, the Metro Treatment Plant, and the mouth of Harbor Brook – all situated in Stratum 3. These areas were included in the digitizing of macrophyte beds, since there were no elements visible in the aerial images (such as silt curtains) to suggest these areas were actively being remediated. The remedial activities occurring in Stratum 3 may account for the reduced area of vegetation cover extending out to 6m contour line in 2013 as compared with 2012 (Figure 2).

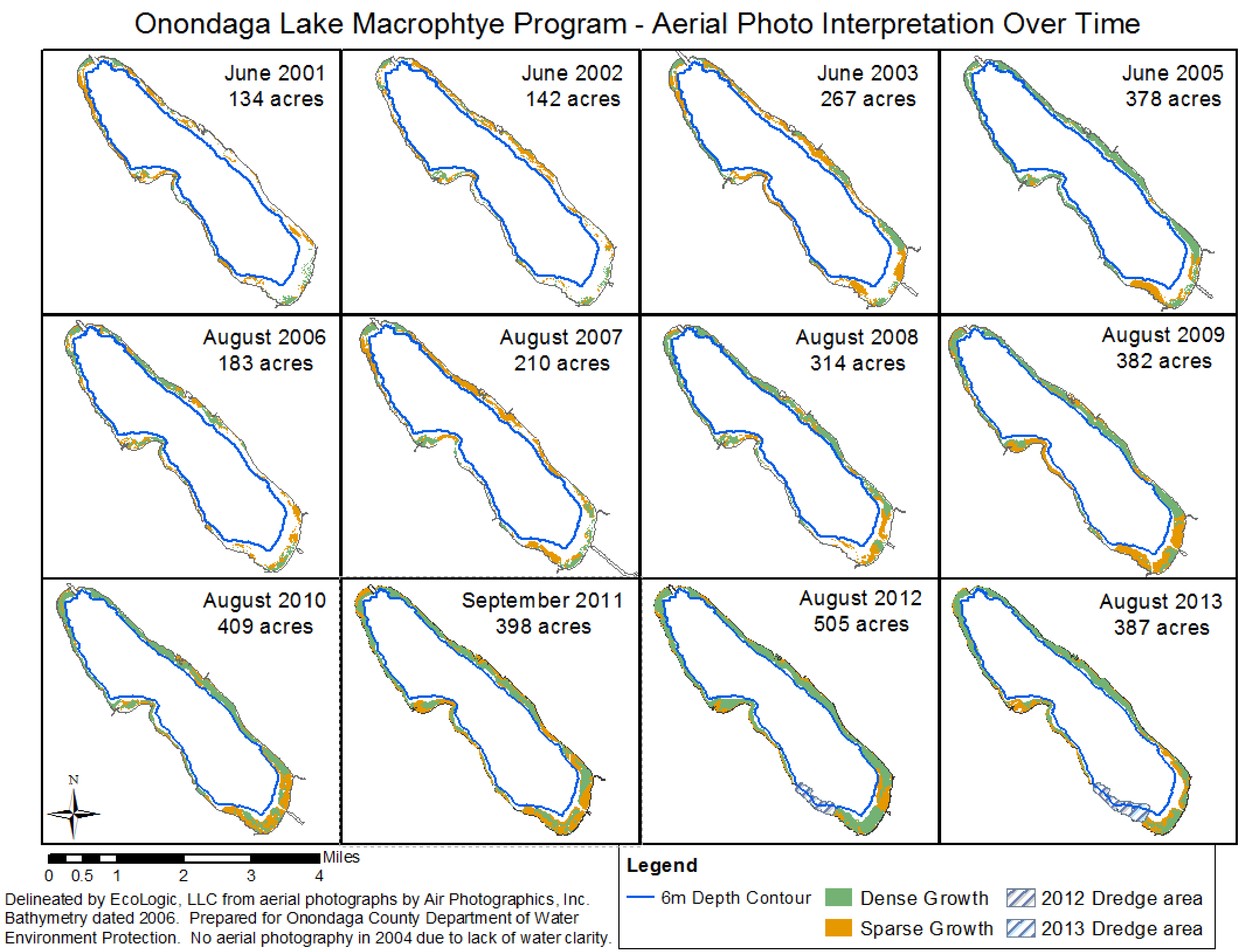


Figure 2. Onondaga Lake macrophyte aerial photograph interpretation over time.

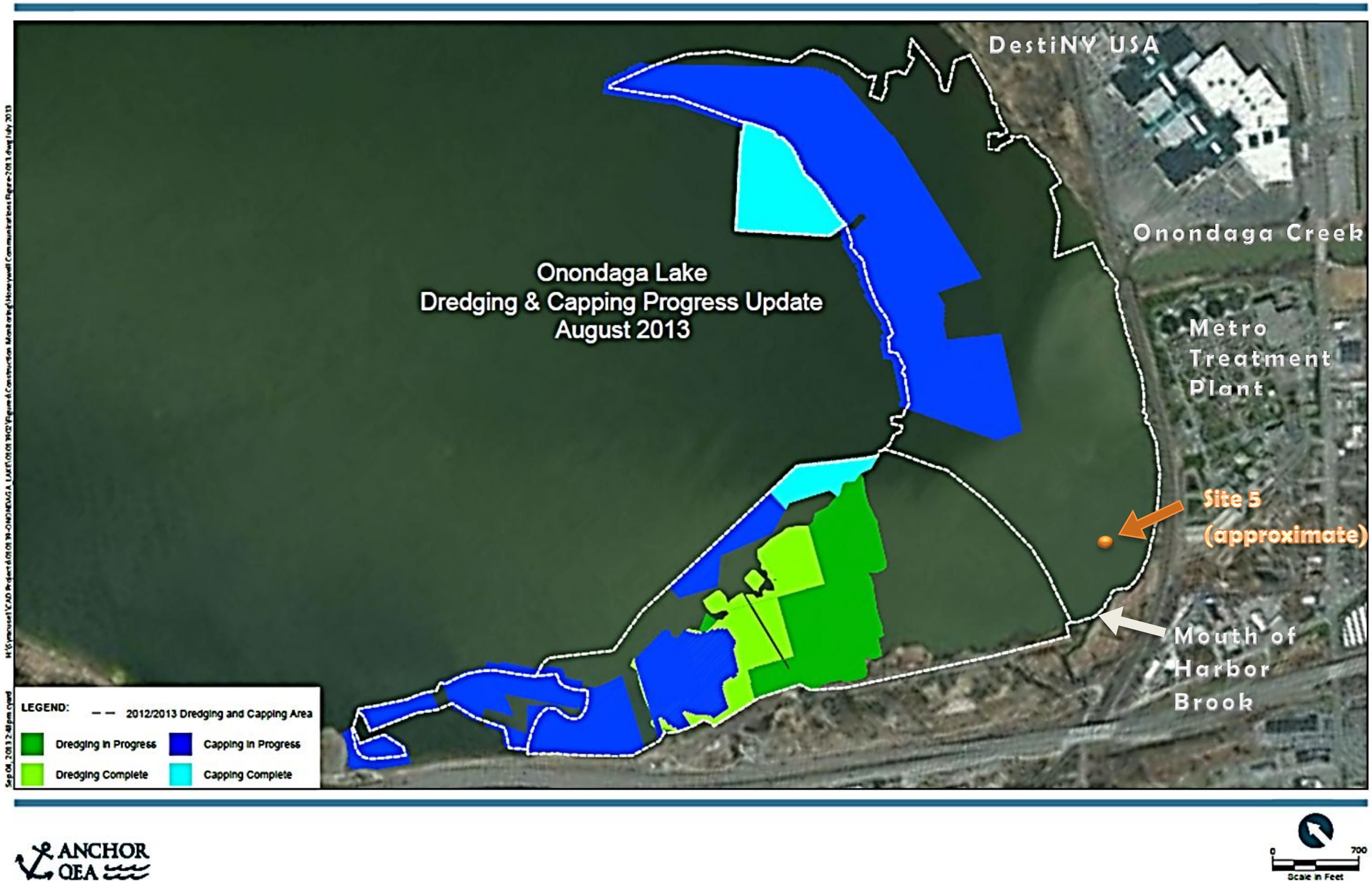


Figure 3. Ground-truthing Site 5 and adjacent areas of dredging and capping activities in Stratum 3 during in August 2013.

4.3 Discerning Macrophytes at Depth in Aerial Images

As was reported for 2011 and 2012, during digitizing of the macrophyte beds from the 2013 aerial photographs there were areas where it was more difficult to discern the edges of the beds at greater water depths. It is possible that the edges of the beds extended deeper than could be ascertained in the aerial images. The memorandum documenting the 2011 delineation noted that the depth at which aquatic plants have been documented in Onondaga Lake has increased since 2000. Overall, the maximum depth at which plants were found in 2010 – the year of the last macrophyte survey – was 6.2 meters. In each stratum in 2010, the average of maximum plant depths of transects ranged from 4.1 to 5.9 meters.

To assess the discernibility of macrophyte beds relative to approximate water depth, the 2006 bathymetric contours were super-imposed on the 2013 aerial images. Similar to 2011 and 2012, the edges of macrophyte beds that were discernible in the aerial image approximately corresponded to the 4-m to 6-m contour range. The field observations in 2010 identify the maximum depth of plant growth generally between 4 and 6 meters. Based on this correspondence between the field observations and aerial images, it appears as though the methodology for delineating macrophyte beds yields results consistent with real-world observations. For this to continue to be true in the future, the importance of highest possible water clarity on the day of the fly-over cannot be overstated. The ground-truthing data collection does not include assessing the deepest extent of plant cover at each site; this information would be useful in order to verify whether the maximum plant depths are within the 4-m to 6-m contour, as well as verify the visibility of plant growth at increasing water depth.

The water clarity is measured as Secchi disk transparency. Review of the data set from 2000 through 2013 resulted in the following tabulation of Secchi transparency at the time of the aerial photography fly-over for each year (Table 1). This summary provides a baseline in which the effect of water clarity on the visibility of the plants in aerial photos may be considered. There is insufficient information at this time to assess whether a difference in Secchi transparency from year to year translates into a significant impact to the visibility of macrophyte beds in the aerial photographs.

Table 1. Summary of Secchi Readings around the time of the aerial photography fly-over (2000-2013).

Year	Fly-Over Date	Secchi Date (N days from flight)	Secchi readings (m) *Nearshore Stations Average (min - max)*	*South Deep*
2000	6/20	6/21 (+1)	2.48 (1.5 – 2.9)	na
2001	6/26	6/26 (0)	1.68 (1.5 – 1.9)	na
2002	7/13	7/8 (-5)	1.43 (1.1 – 1.9)	na
2003	7/1	6/30 (-1)	2.10 (1.4 – 2.8)	na
2004	No flight	--	--	--
2005	6/23	6/22 (-1)	1.84 (1.0 – 2.3)	na
2006	8/9	8/7 (-2)	1.59 (1.4 – 1.8)	na
2007	8/1	7/23 (-8)	1.68 (0.9 – 2.5)	1.5
2008	8/20	8/18 (-2)	na	4.2
2009	8/8	8/3 (-5)	>1.2 to >1.4*	5.8
2010	8/17	8/16 (-1)	>1.3 to >1.5*	2.5
2011	9/19	9/16 (-3)	2.00 (1.7 – 2.2)	na
2012	8/24	8/21 & 8/27 (+/-3)	1.46 (>1.2 - 2.3)*	2.2
2013	8/24	8/23 (-1)	1.73 (0.90 – 2.7)	1.7
2000-2012	Jun-Sep	Jun-Sep	1.72 (0.9 – 2.9)	3.2

- Aerial fly-over dates obtained from prints of aerial images.
- Secchi dates are measurements taken on sample dates closest to the aerial fly-over date. Where two dates are equidistant from the fly-over date, the data are averaged.
- na = indicates no Secchi reading available for this date.
- Asterisk (*) indicates nearshore readings were reported with Secchi disk visible on the bottom; in 2012, 16 of 20 measurements taken over two days were reported as ">"; e.g., the disk was on the bottom of the lake and still visible. The average measurement of the 4 readings that were not on the bottom was 2.2 m.

5. *Results – Ground-Truthing (Field Verification)*

The ground-truthing effort identified eight taxa at ten sites (Table 2). Coontail and water stargrass were the most widely distributed species, found at 80% of the sites. Species found at 50% to 60% of the sites were Eurasian water milfoil, southern naiad and common waterweed. Sago pondweed and stonewort were found at 40% and 30% of sites, respectively. A water crowfoot (*Ranunculus* species) was found at one site, and tentatively identified in the field notes as Threadleaf crowfoot (*Ranunculus trichophyllus*). However, this identification was determined to be uncertain, therefore this plant was categorized simply as a water crowfoot (*Ranunculus* species). A more detailed macrophyte survey is planned for 2014, which will verify the species of *Ranunculus* in the lake.

Relative abundance where present was greatest for stonewort (76%), and water stargrass (40%). Relative abundance was lowest for southern naiad (5.6%) and common waterweed (5.6%). Water stargrass had the highest overall (lakewide) relative abundance (32%), with stonewort (23%) and coontail (21%) as second and third in overall relative abundance; the remaining species were present at 10% or less.

Table 2. 2013 Ground-Truthing Results

Species	Where Present		Overall
	Percent of Sites	***Relative Abundance***	**Relative Abundance**
Coontail (*Ceratophyllum demersum*)	80%	26%	21%
Water stargrass (*Zosterella dubia*)	80%	40%	32%
Eurasian water milfoil (*Myriophyllum spicatum*)	60%	9.8%	5.9%
Common water weed (*Elodea canadensis*)	50%	5.6%	2.8%
Southern naiad (*Najas quadalupensis*)	50%	5.6%	2.8%
Sago pondweed (*Stuckenia pectinata*)	40%	26%	10%
Common stonewort (*Chara vulgaris*)	30%	76%	23%
Water crowfoot (*Ranunculus* spp.)	10%	20%	2.0%

The field notes indicated that algae growth was sparse at nine of the 10 sites; at Site 2, field notes indicated algae growth as “moderate”.

6. *Verification – Aerial Photograph Interpretation and Ground-truthing*

There was generally very good agreement between the results of the ground-truthing compared to the digitized macrophytes (Maps 7 through 16). Field notes often indicated “moderate” for plant cover, rather than either “dense” or “sparse”. Since the digitizing method identified only “dense” or “sparse” cover, “moderate” cover in the field notes was assumed to correlate well with “dense” cover in the aerial images. In two cases (Sites 6 and 10), the buoy was located on the aerial images at a point close to a border between the digitized “dense” and “sparse” polygons. These were considered to be very close in agreement.

Two locations - Site 4 and Site 5 were digitized within an area that appeared to be “dense” vegetation in the aerial images. However, the field notes indicated the vegetative cover was “sparse”. Both sites are in the area being actively impacted by the dredging and capping remedial activities. Additionally, the ground-truthing field effort occurred 10 days after the aerial fly-over. It is feasible that in those 10 days, remedial activities in the lake affected the density of the macrophyte cover at these sites.

In the aerial image taken by Air Photographics on August 24, 2013, it is clear that Site 4 is located close to where remedial activities are taking place (Figure 4). Since ground-truthing occurred 10 days after the image was captured, it is conceivable that the adjacent remedial activities may have impacted macrophytes in the area.

A map received from Anchor QEA showing the dredging and capping progress update for August 2013 (Figure 3) shows an area impacted from near DestiNY USA along the shoreline to a point approximately a mile west of the mouth of Harbor Brook. Based on this map, it appears that Site 5 was not impacted directly by remedial activities in August 2013. However, it is clearly in a zone in which such activities are likely to occur.

Overall, however, the ground-truthing seems to verify that the photo delineations are a reasonable interpretation of macrophyte distribution in the lake.

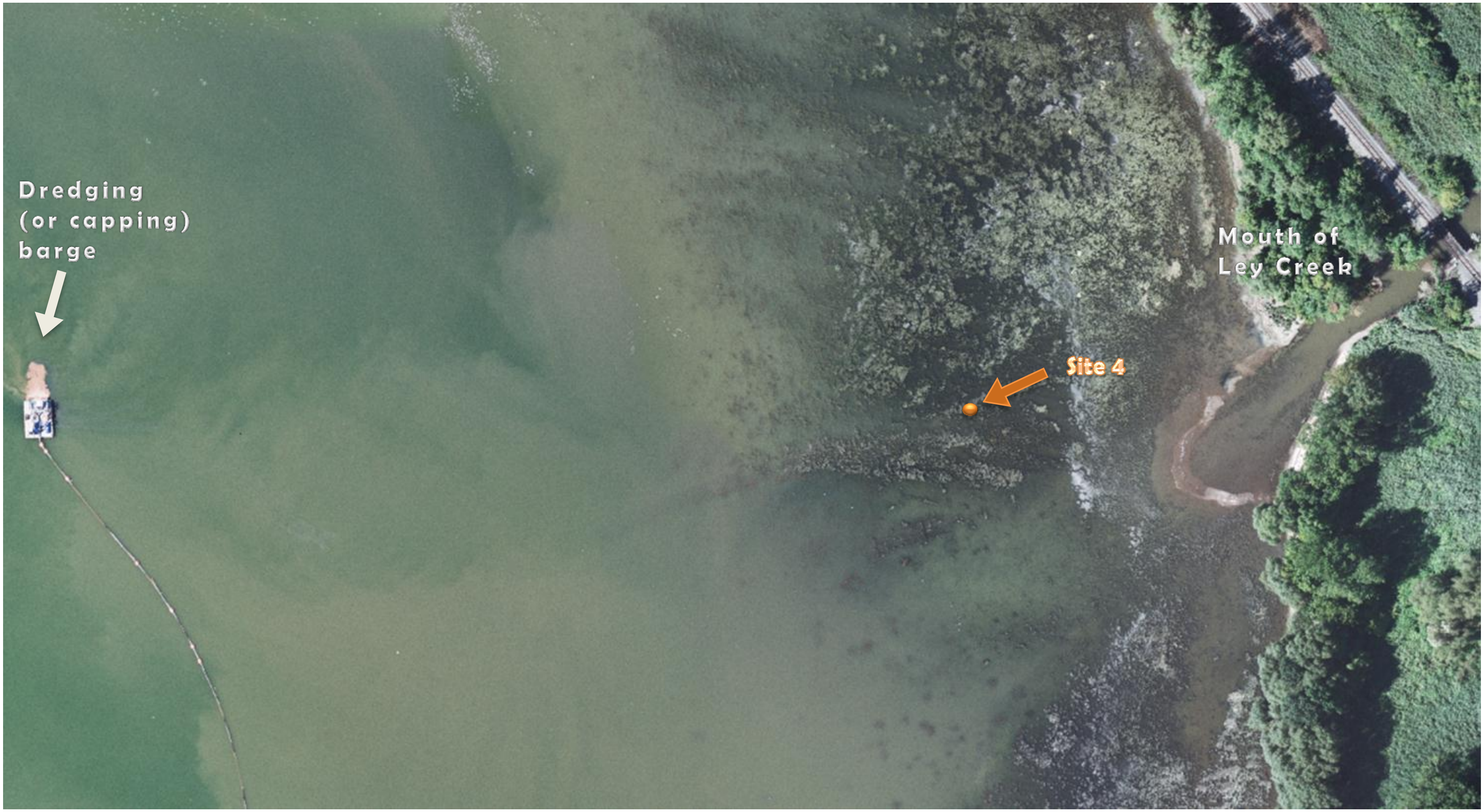


Figure 4. Site 4 adjacent to mouth of Ley Creek and a dredging (or capping) barge. Sediment is evident in the water column not far from Site 4.

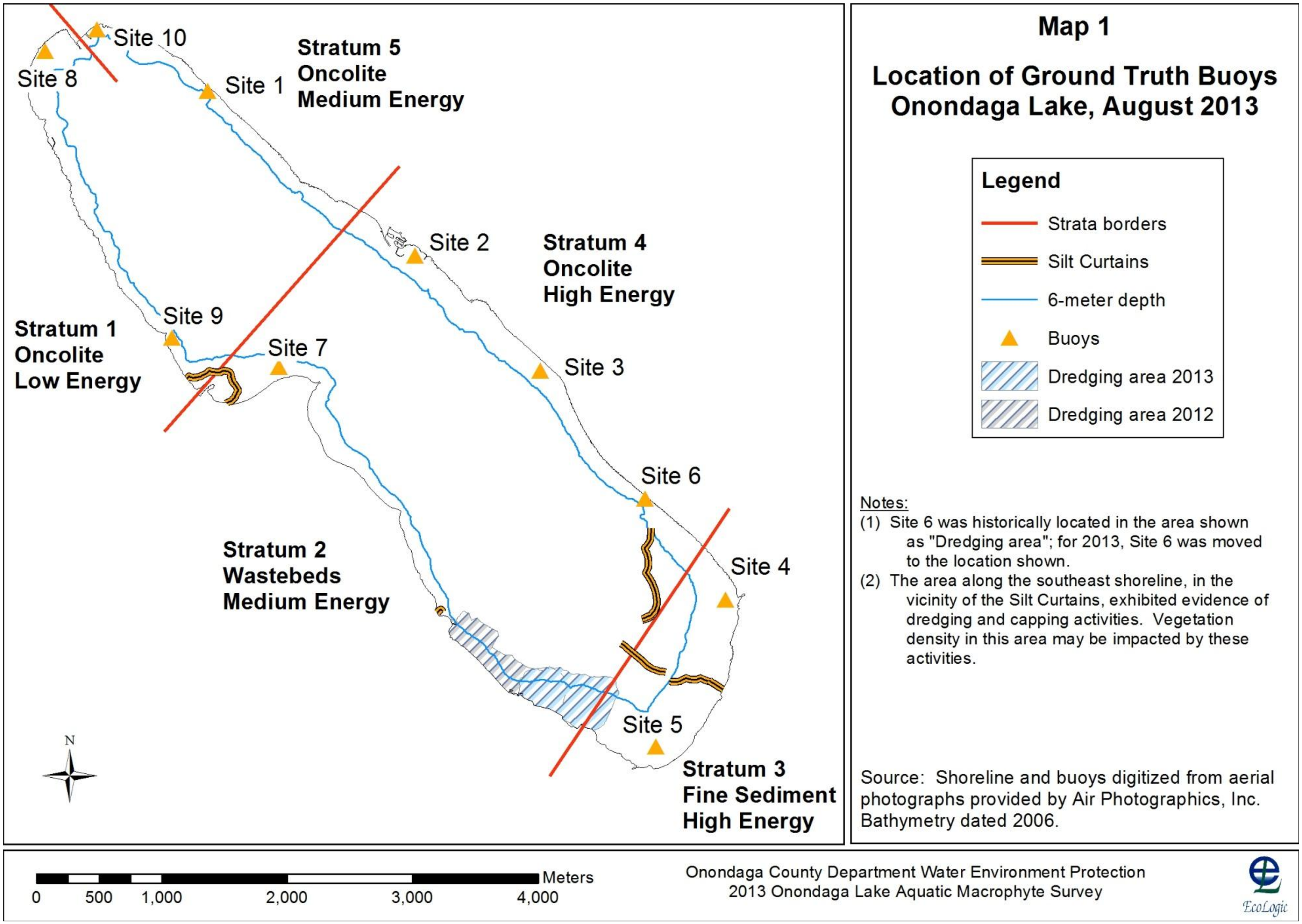
7. *References*

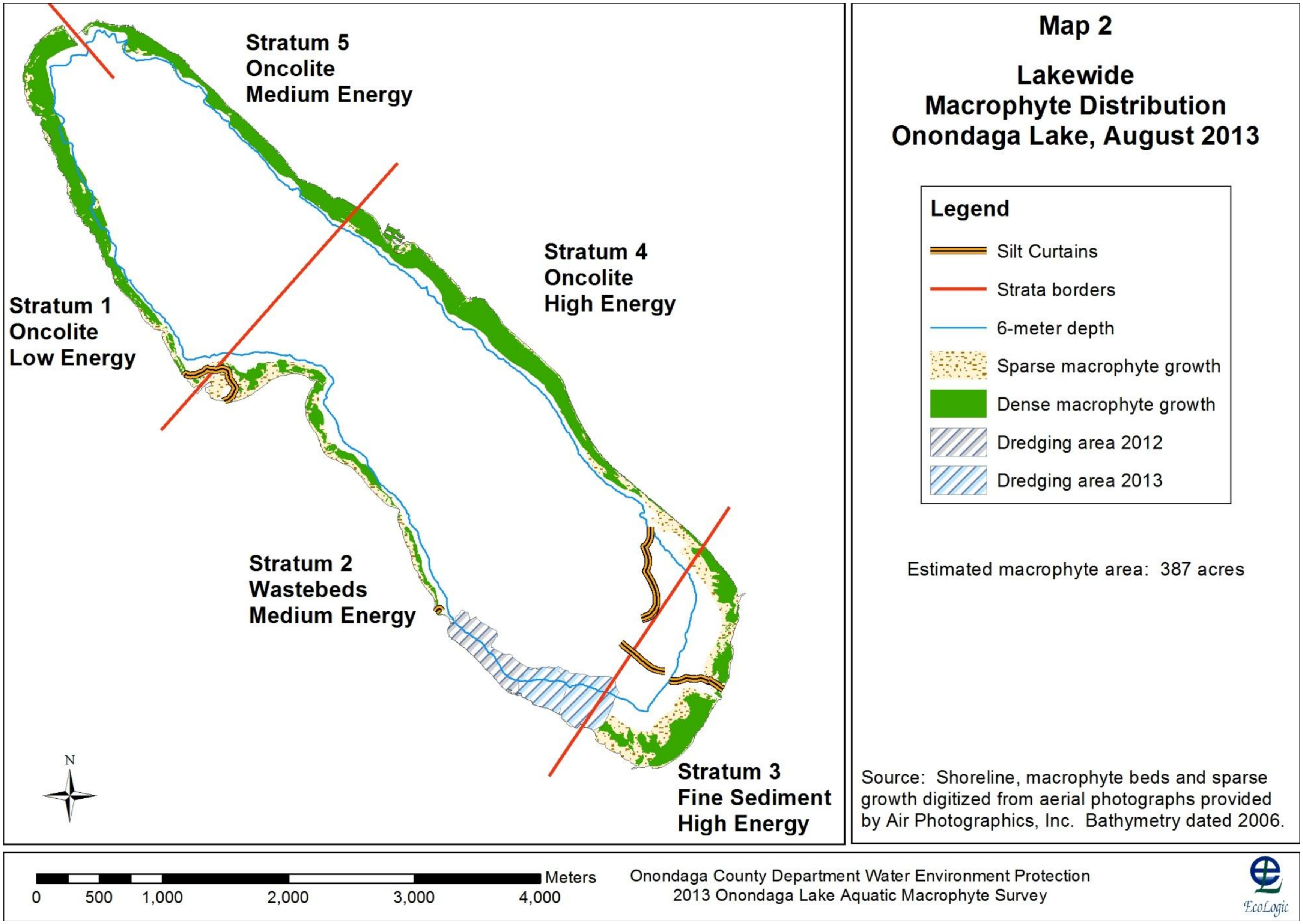
Madsen, J.D., J.A. Bloomfield, J.W. Sutherland, L.W. Eichler and C.W. Boylen. 1996. The aquatic macrophyte community of Onondaga Lake: Field Survey and Plant Growth Bioassays of Lake Sediments. Lake and Res. Mgmt. 12(1): 59-71.

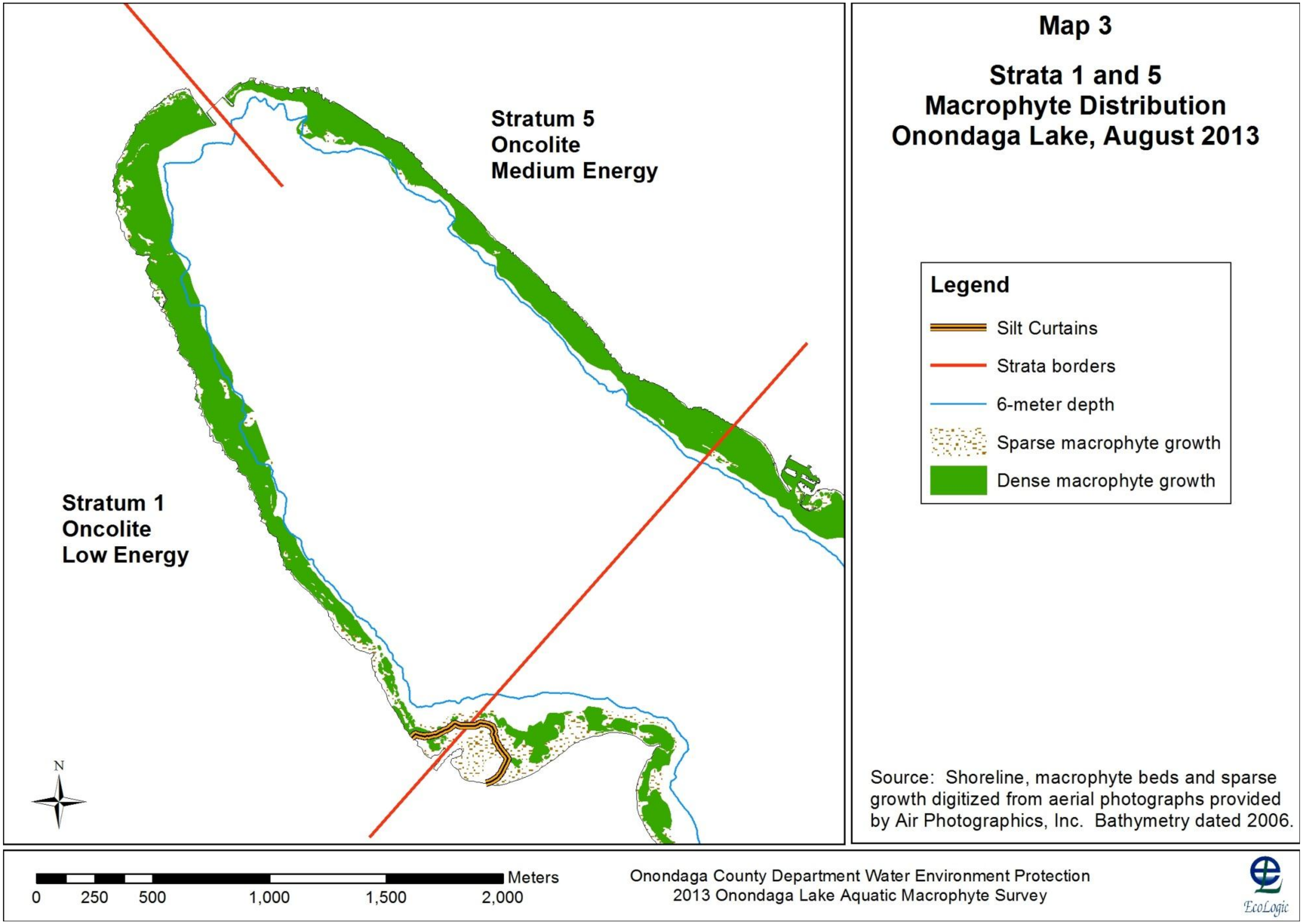
EcoLogic 2001. 2000 Onondaga Lake Aquatic Macrophyte Monitoring Program. October 2001. Prepared for Onondaga County Department of Drainage and Sanitation.

Onondaga Lake Macrophyte Program

2013 Aerial Photograph Interpretation Maps

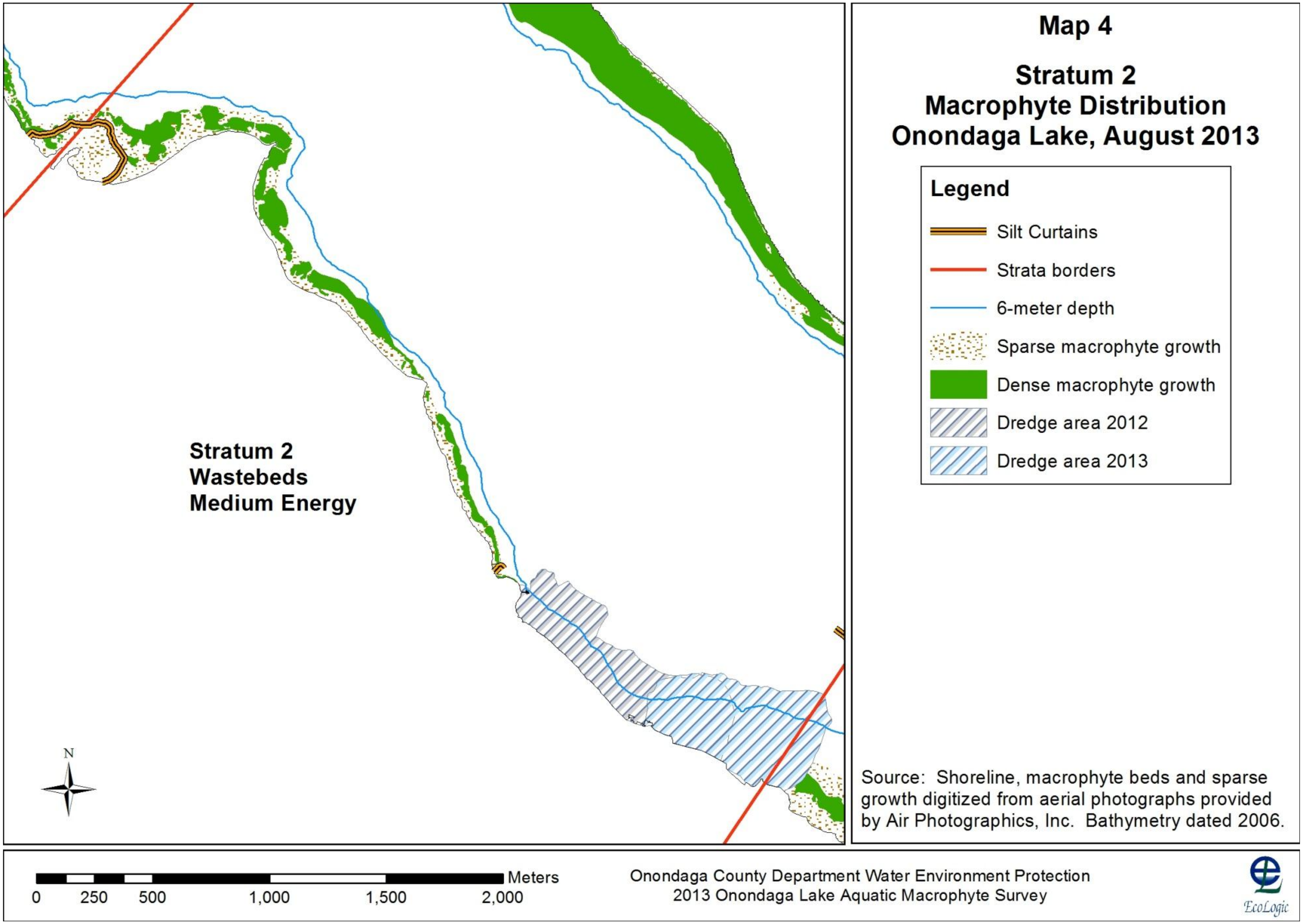

Map 1
Location of Ground Truth Buoys Onondaga Lake, August 2013
Legend
Strata borders
Silt Curtains
6-meter depth
Buoys
Dredging area 2013
Dredging area 2012
Notes:
(1) Site 6 was historically located in the area shown as "Dredging area"; for 2013, Site 6 was moved to the location shown.
(2) The area along the southeast shoreline, in the vicinity of the Silt Curtains, exhibited evidence of dredging and capping activities. Vegetation density in this area may be impacted by these activities.
Source: Shoreline and buoys digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.
Site 10
Site 8
Site 1
Stratum 5
Oncolite
Medium Energy
Site 2
Stratum 4
Oncolite
High Energy
Site 9
Stratum 1
Oncolite
Low Energy
Site 7
Site 3
Site 6
Site 4
Stratum 2
Wastebeds
Medium Energy
Site 5
Stratum 3
Fine Sediment
High Energy
N
0
500
1,000
2,000
3,000
4,000
Meters
Onondaga County Department Water Environment Protection
2013 Onondaga Lake Aquatic Macrophyte Survey
EcoLogic

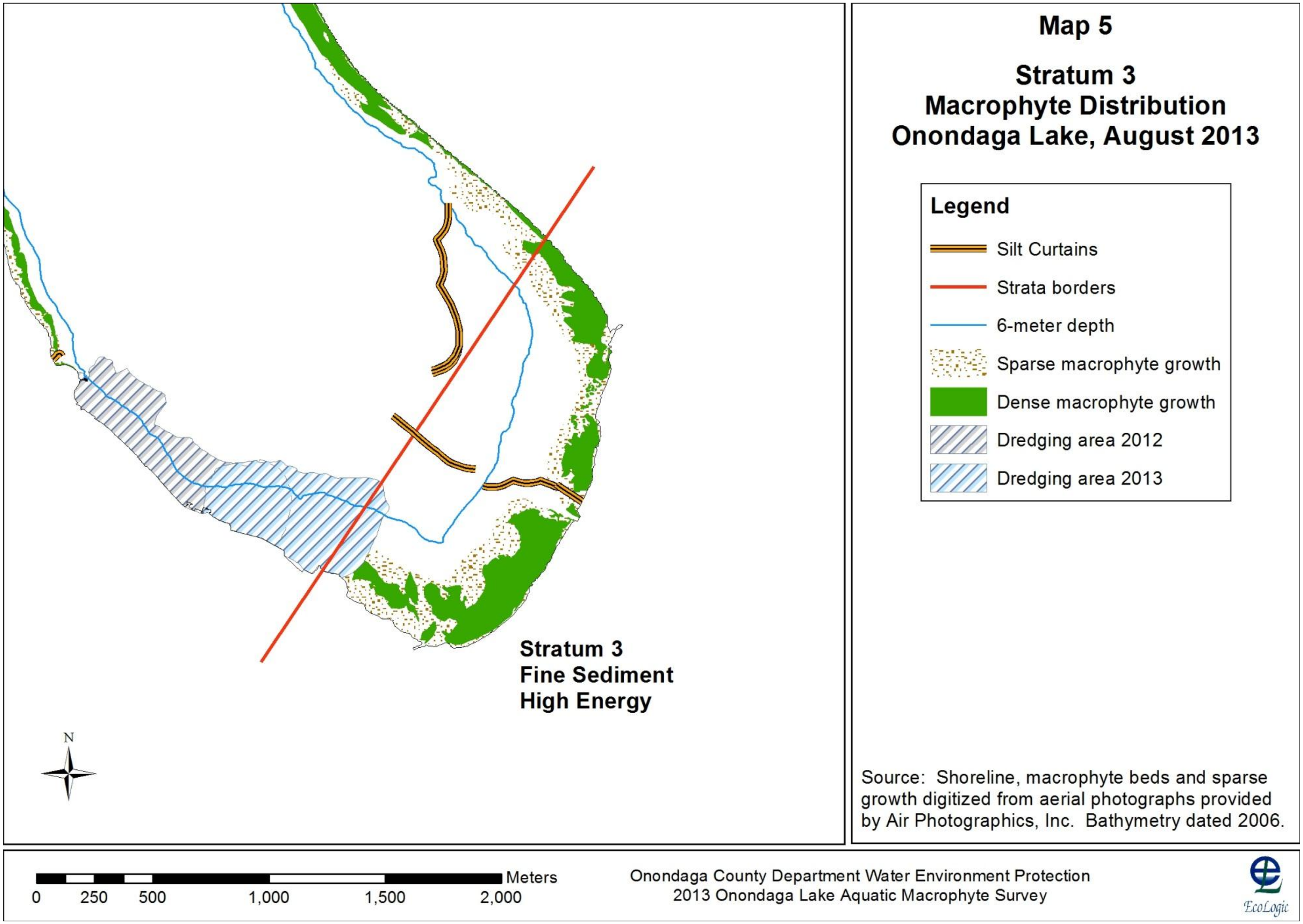

Map 2
Lakewide
Macrophyte Distribution
Onondaga Lake, August 2013
Legend
Silt Curtains
Strata borders
6-meter depth
Sparse macrophyte growth
Dense macrophyte growth
Dredging area 2012
Dredging area 2013
Estimated macrophyte area: 387 acres
Source: Shoreline, macrophyte beds and sparse growth digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.
Stratum 5
Oncolite
Medium Energy
Stratum 4
Oncolite
High Energy
Stratum 1
Oncolite
Low Energy
Stratum 2
Wastebeds
Medium Energy
Stratum 3
Fine Sediment
High Energy
N
0
500
1,000
2,000
3,000
4,000
Meters
Onondaga County Department Water Environment Protection
2013 Onondaga Lake Aquatic Macrophyte Survey
EcoLogic

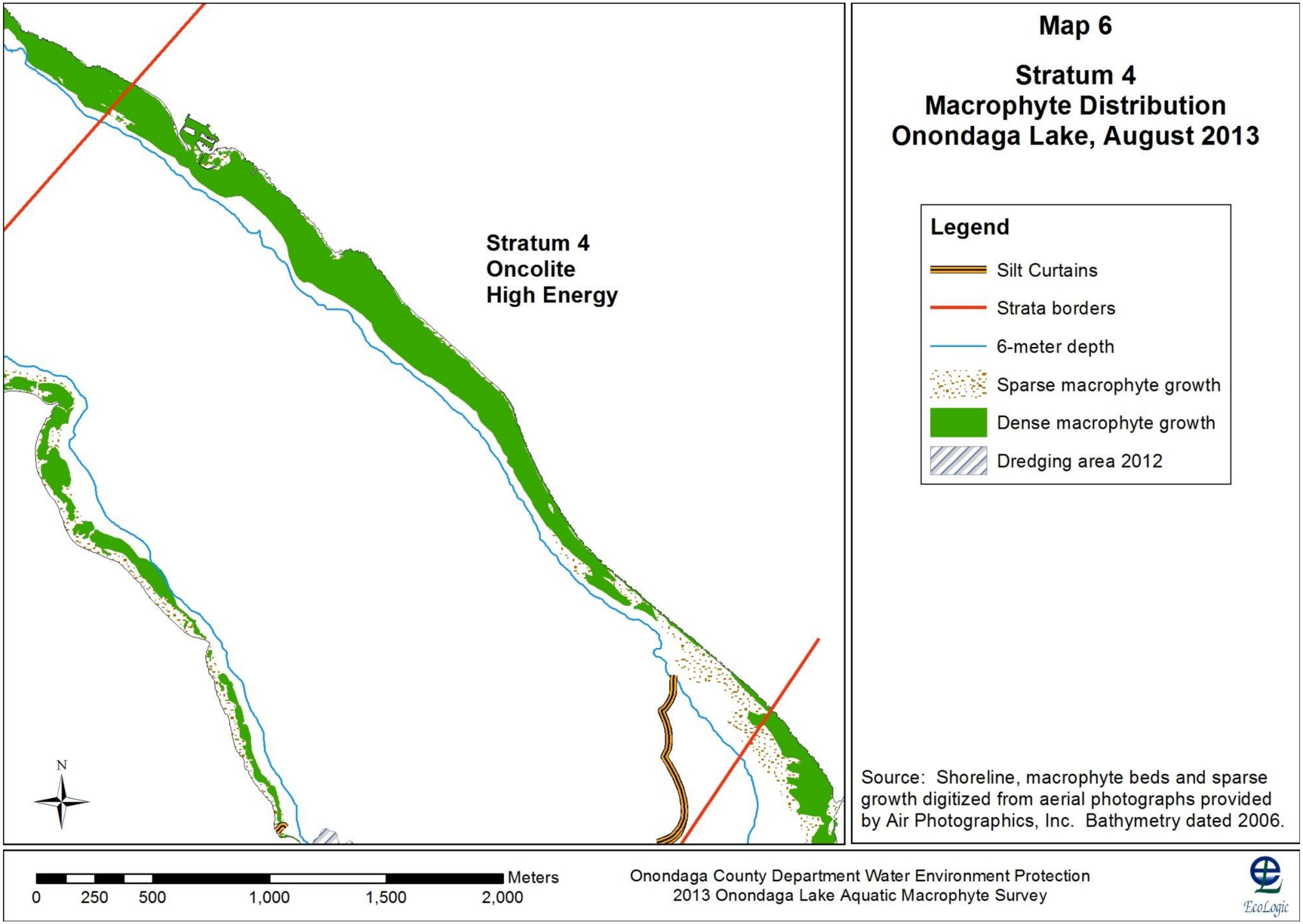


Map 3

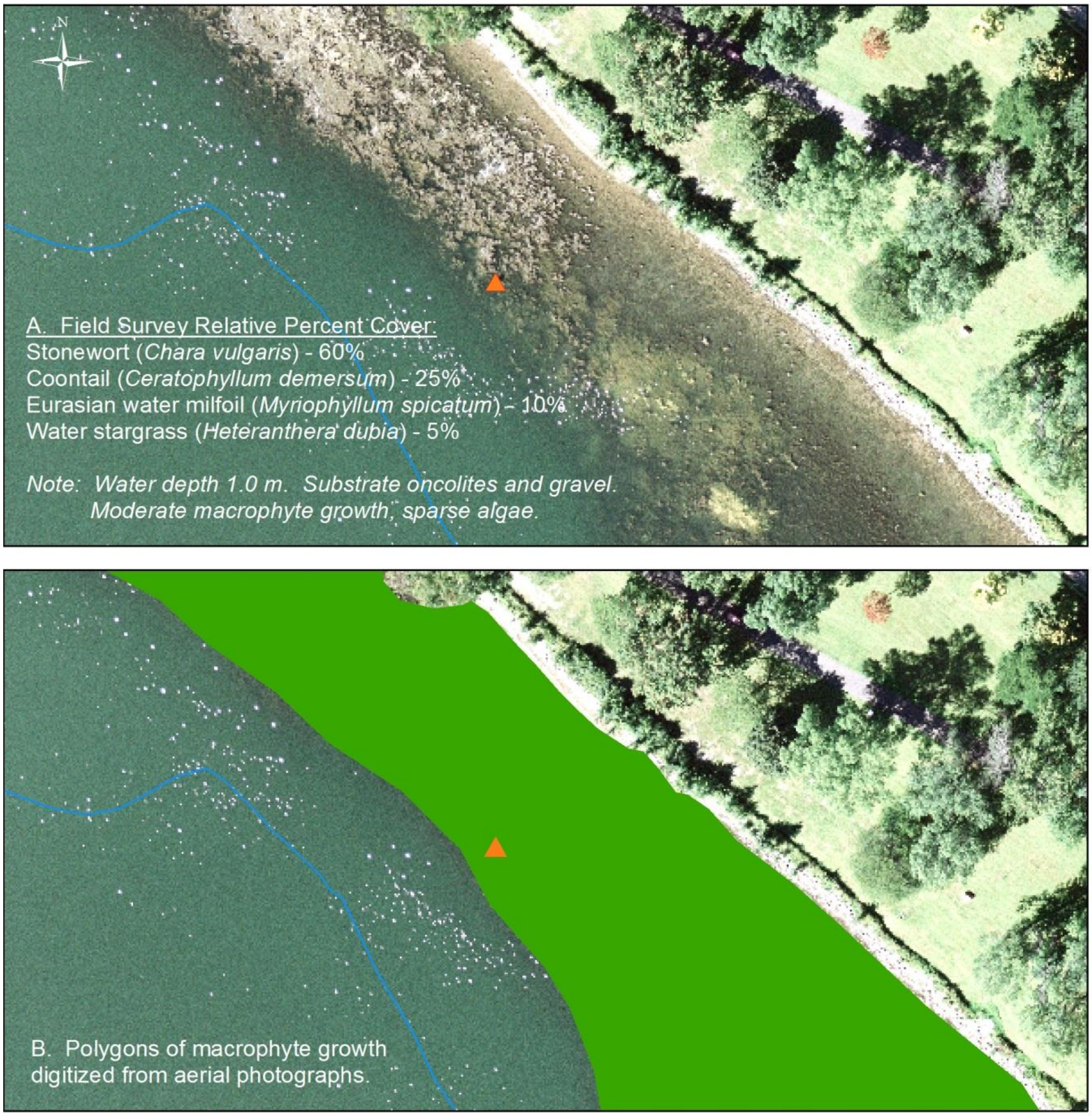
Strata 1 and 5 Macrophyte Distribution Onondaga Lake, August 2013

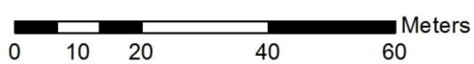

Map 4
Stratum 2
Macrophyte Distribution
Onondaga Lake, August 2013
Legend
Silt Curtains
Strata borders
6-meter depth
Sparse macrophyte growth
Dense macrophyte growth
Dredge area 2012
Dredge area 2013
Stratum 2
Wastebeds
Medium Energy
N
Source: Shoreline, macrophyte beds and sparse growth digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.
0 250 500 1,000 1,500 2,000 Meters
Onondaga County Department Water Environment Protection
2013 Onondaga Lake Aquatic Macrophyte Survey
EcoLogic


Map 5
Stratum 3
Macrophyte Distribution
Onondaga Lake, August 2013
Legend
Silt Curtains
Strata borders
6-meter depth
Sparse macrophyte growth
Dense macrophyte growth
Dredging area 2012
Dredging area 2013
Stratum 3
Fine Sediment
High Energy
N
Source: Shoreline, macrophyte beds and sparse growth digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.
0 250 500 1,000 1,500 2,000 Meters
Onondaga County Department Water Environment Protection
2013 Onondaga Lake Aquatic Macrophyte Survey
EcoLogic


Map 6
Stratum 4
Macrophyte Distribution
Onondaga Lake, August 2013
Stratum 4
Oncolite
High Energy
Legend
Silt Curtains
Strata borders
6-meter depth
Sparse macrophyte growth
Dense macrophyte growth
Dredging area 2012
Source: Shoreline, macrophyte beds and sparse growth digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.
N
Meters
0 250 500 1,000 1,500 2,000
Onondaga County Department Water Environment Protection
2013 Onondaga Lake Aquatic Macrophyte Survey
EcoLogic

Map 7
Ground Truth Buoy Site 1
August 2013, Onondaga Lake





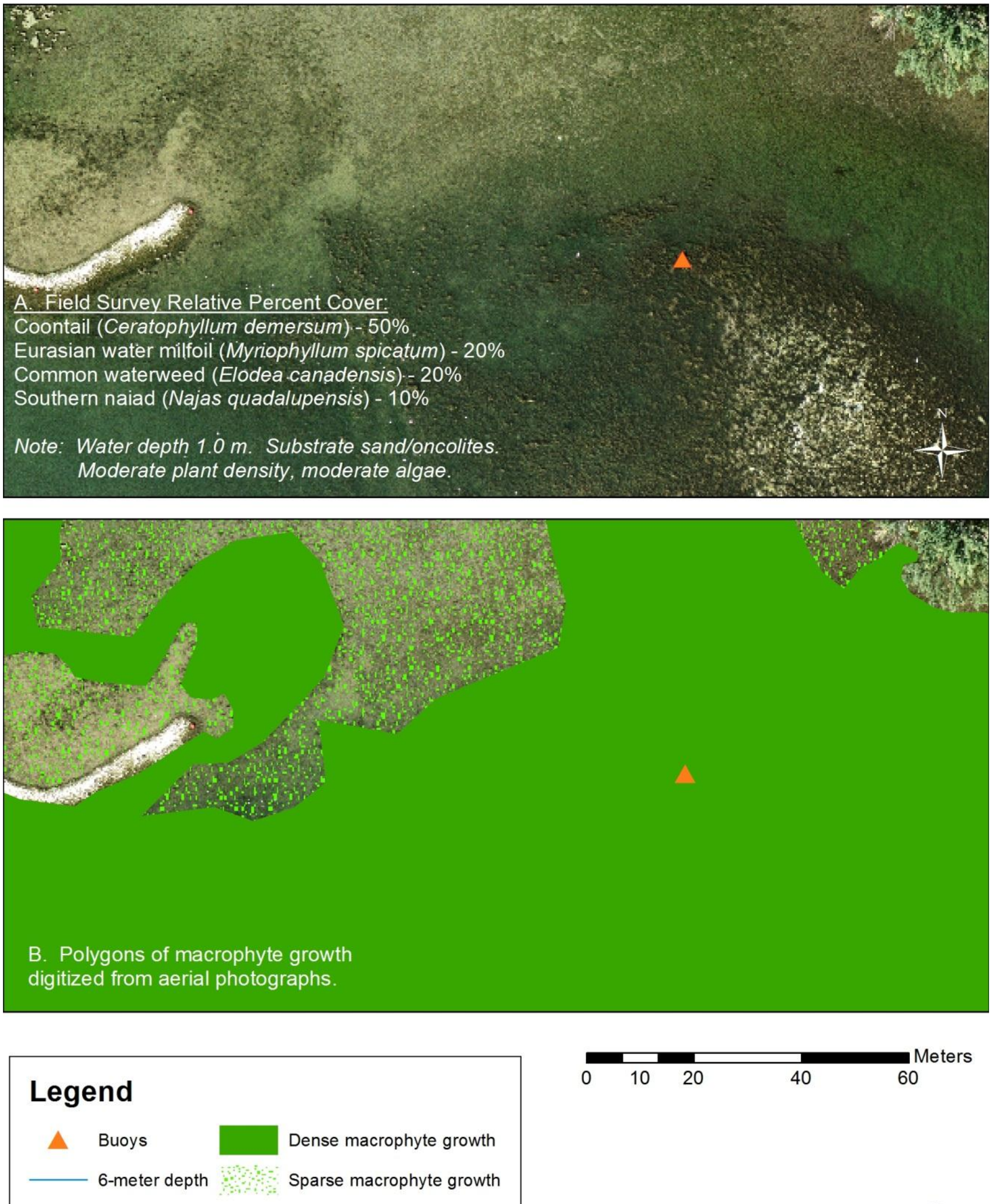
Legend

- Buoys
- 6-meter depth
- Dense macrophyte growth
- Sparse macrophyte growth

Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

EcoLogic

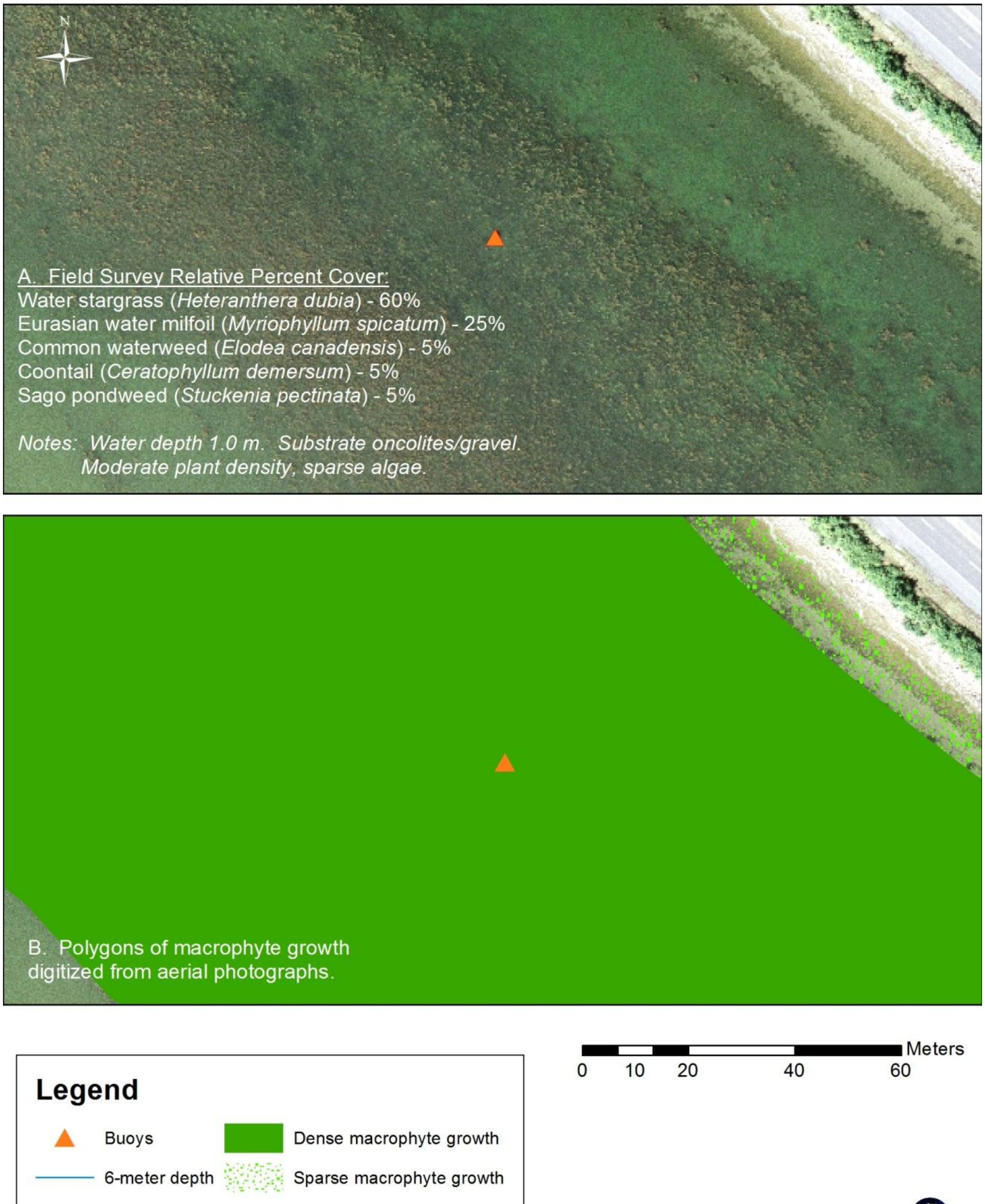
Map 8
Ground Truth Buoy Site 2
August 2013, Onondaga Lake



Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

EcoLogic

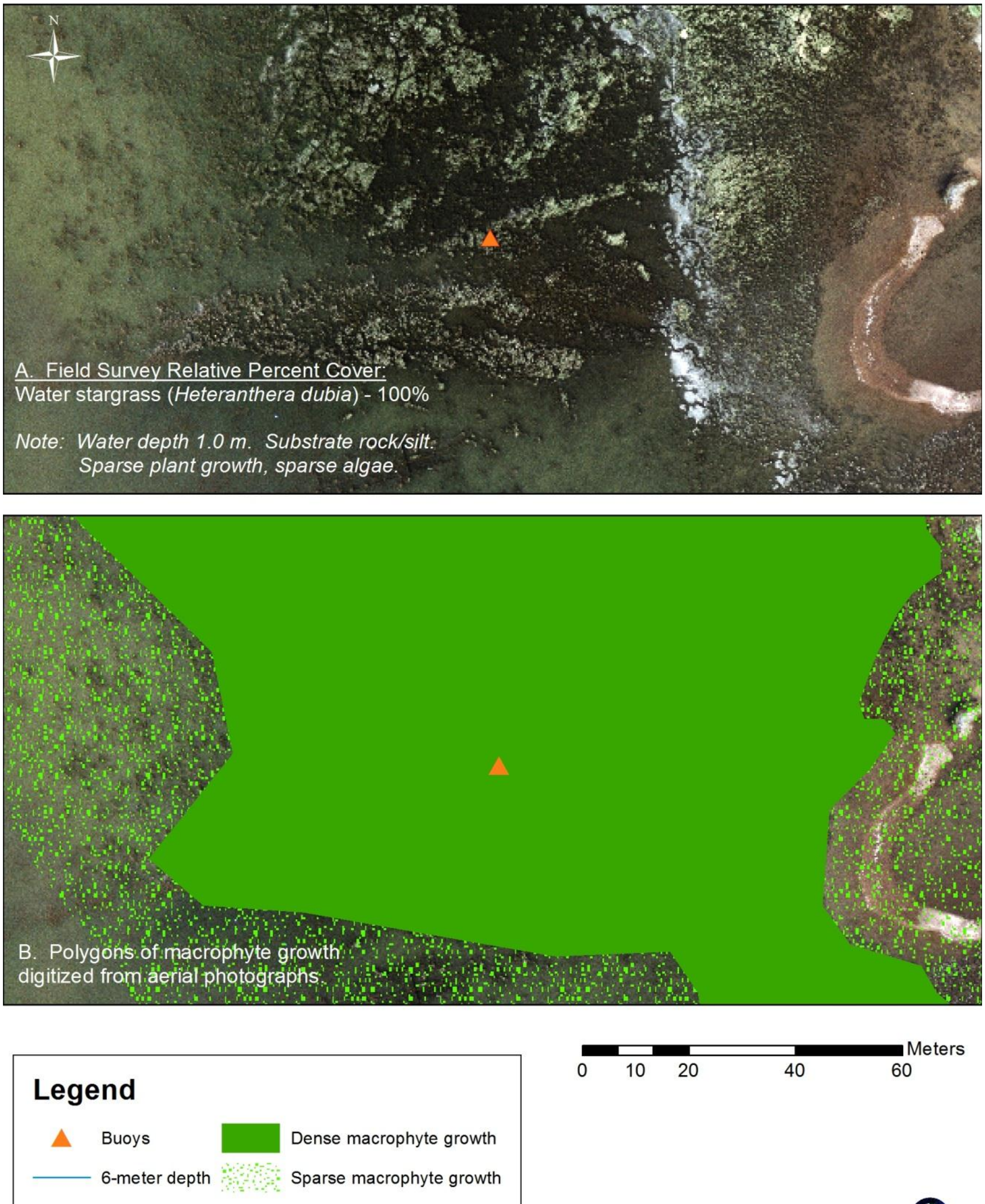
Map 9
Ground Truth Buoy Site 3
August 2013, Onondaga Lake



Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

EcoLogic

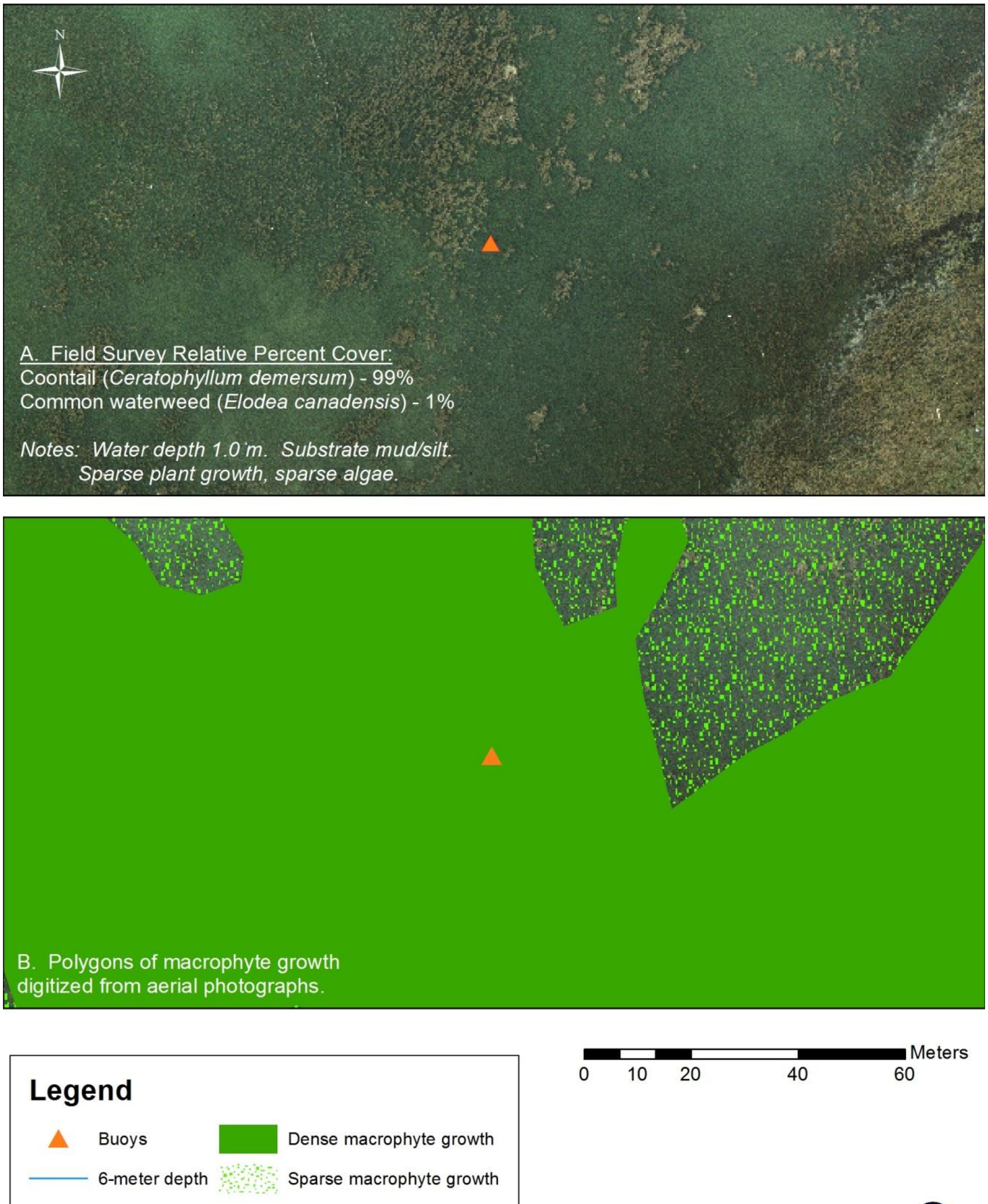
Map 10
Ground Truth Buoy Site 4
August 2013, Onondaga Lake



Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

EcoLogic

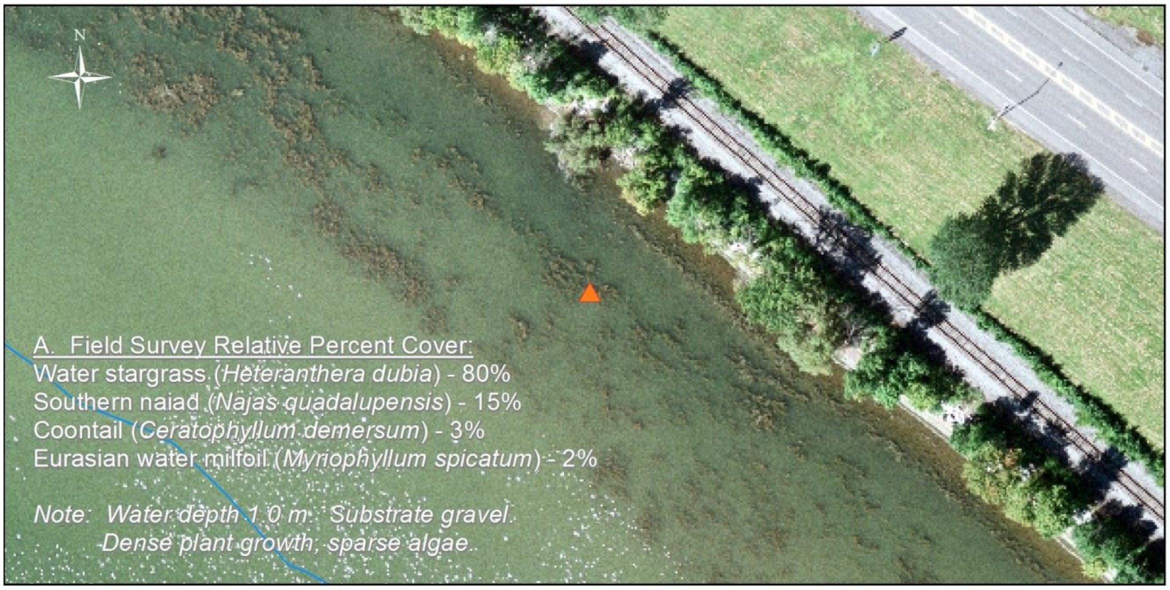
Map 11
Ground Truth Buoy Site 5
August 2013, Onondaga Lake

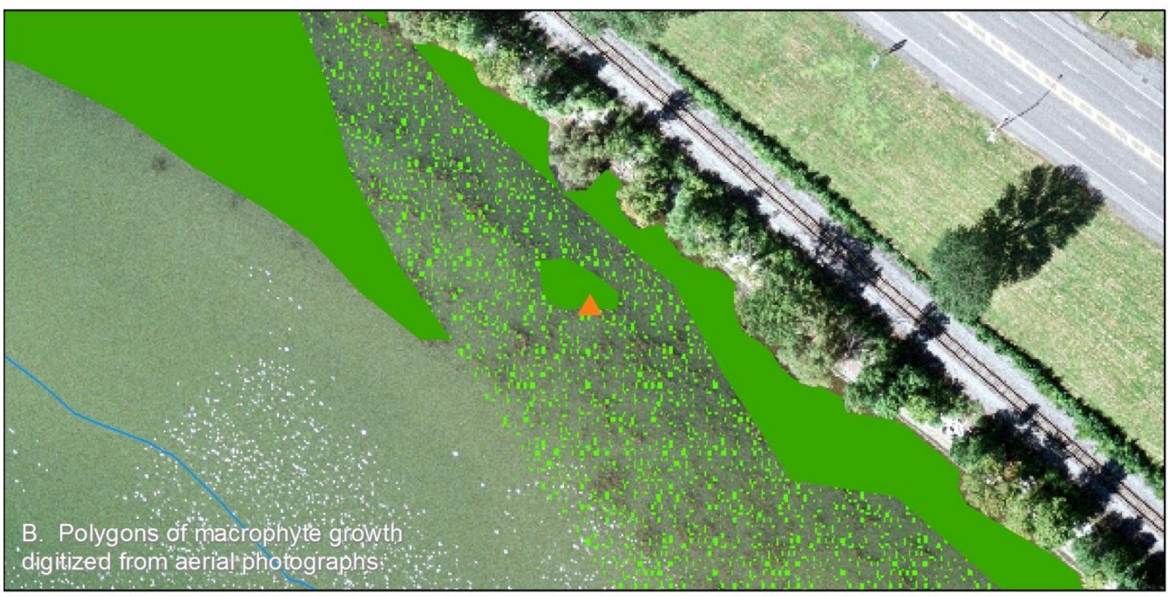


Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

EcoLogic

Map 12
Ground Truth Buoy Site 6
August 2013, Onondaga Lake





Meters
0 10 20 40 60

Legend

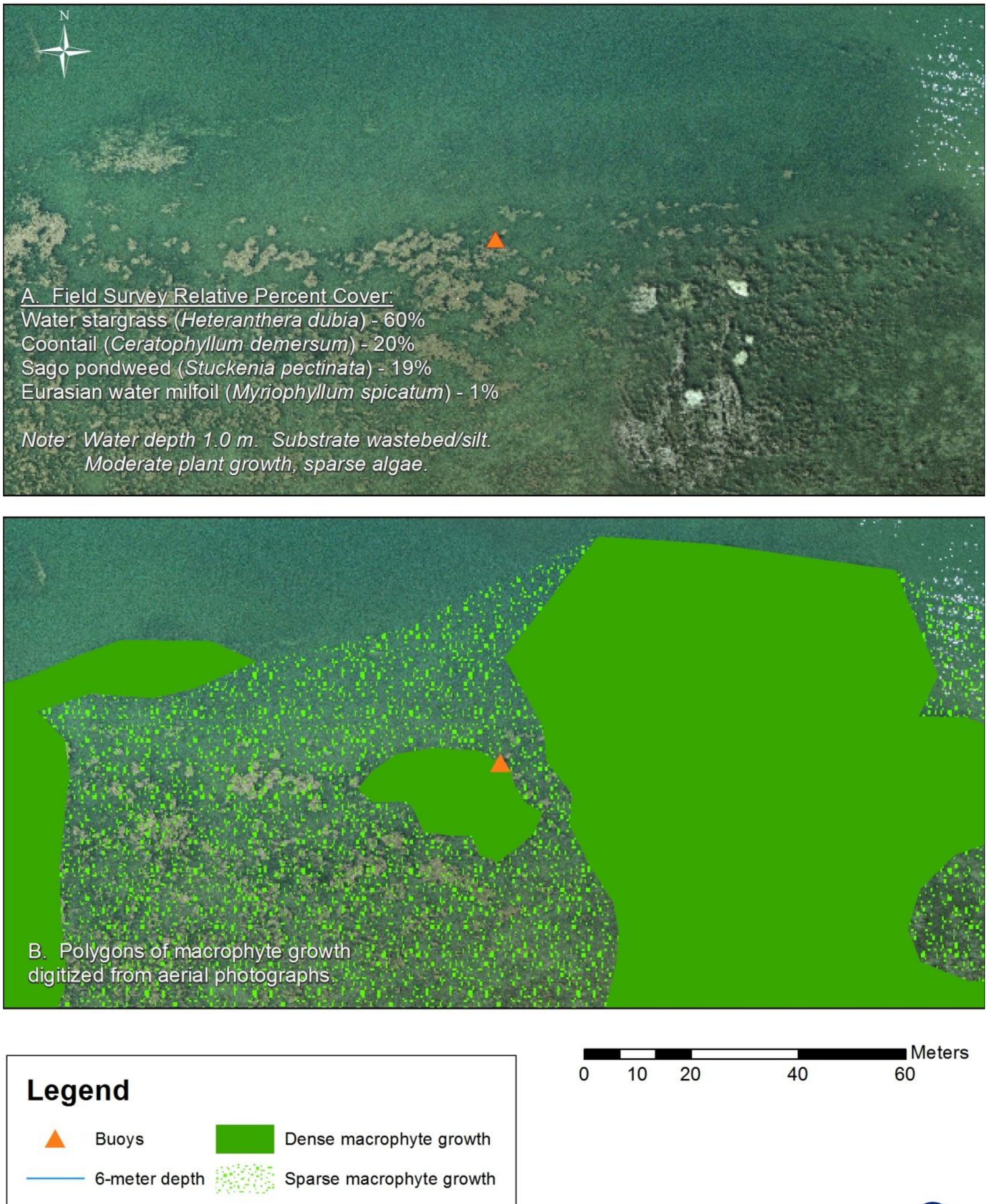
- Buoys
- 6-meter depth
- Dense macrophyte growth
- Sparse macrophyte growth

Note: New location for Site 6 in 2013 due to dredging activities at previous site.

Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

EcoLogic

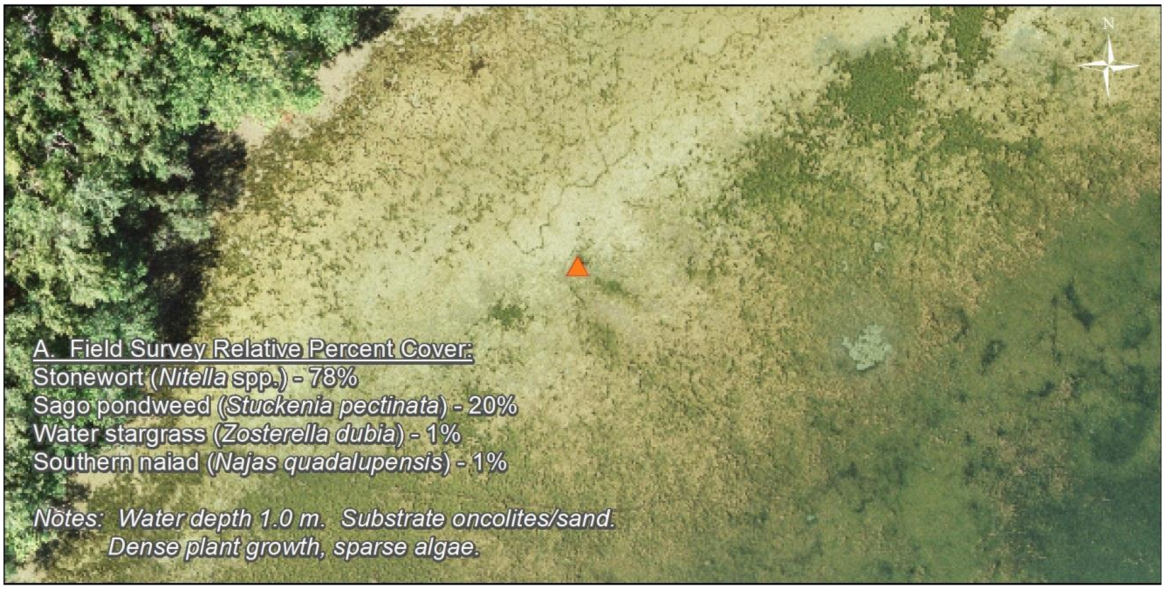
Map 13
Ground Truth Buoy Site 7
August 2013, Onondaga Lake



Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

EcoLogic

Map 14
Ground Truth Buoy Site 8
August 2013, Onondaga Lake



Meters
0 10 20 40 60

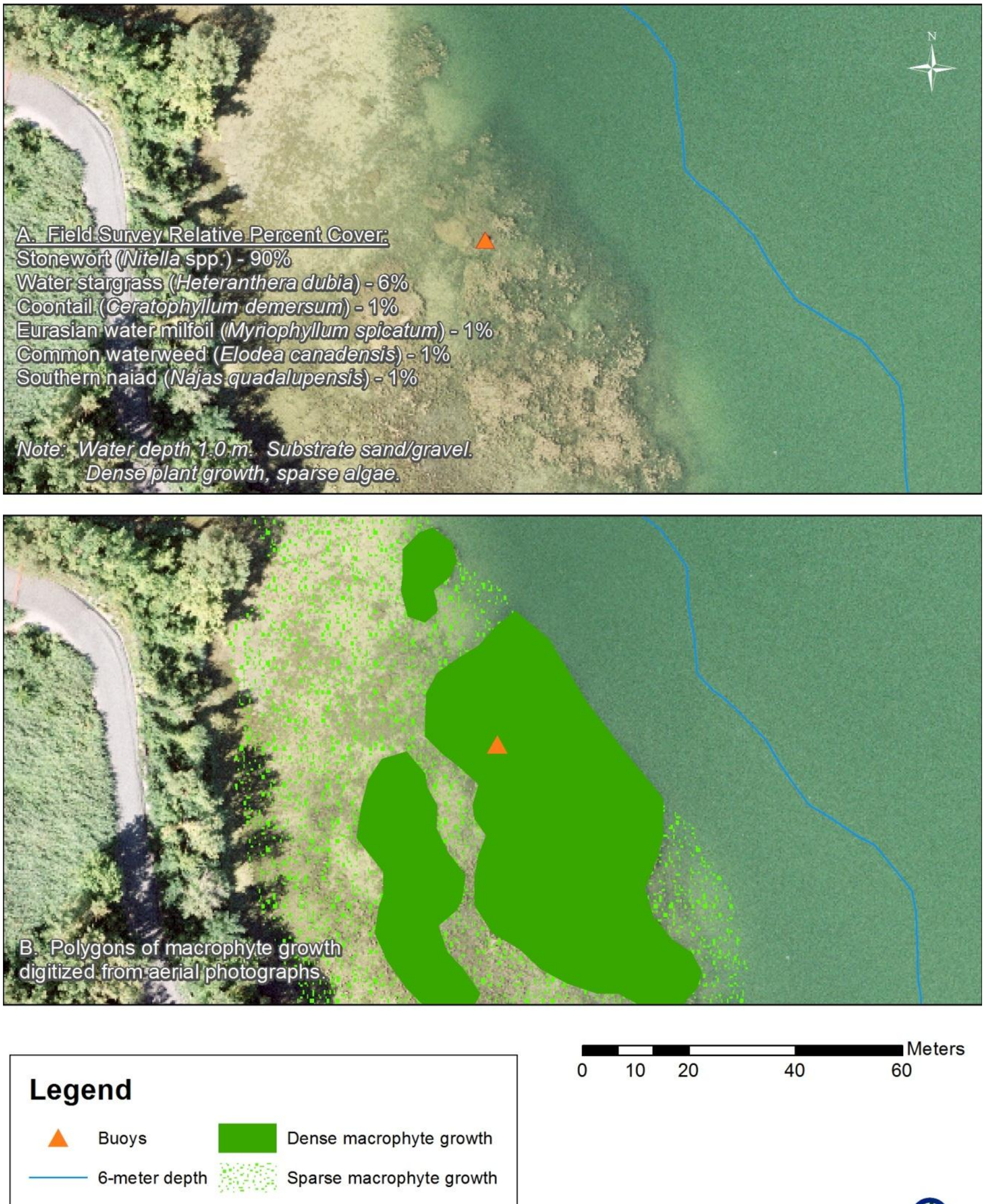
Legend

- Buoys
- 6-meter depth
- Dense macrophyte growth
- Sparse macrophyte growth

Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

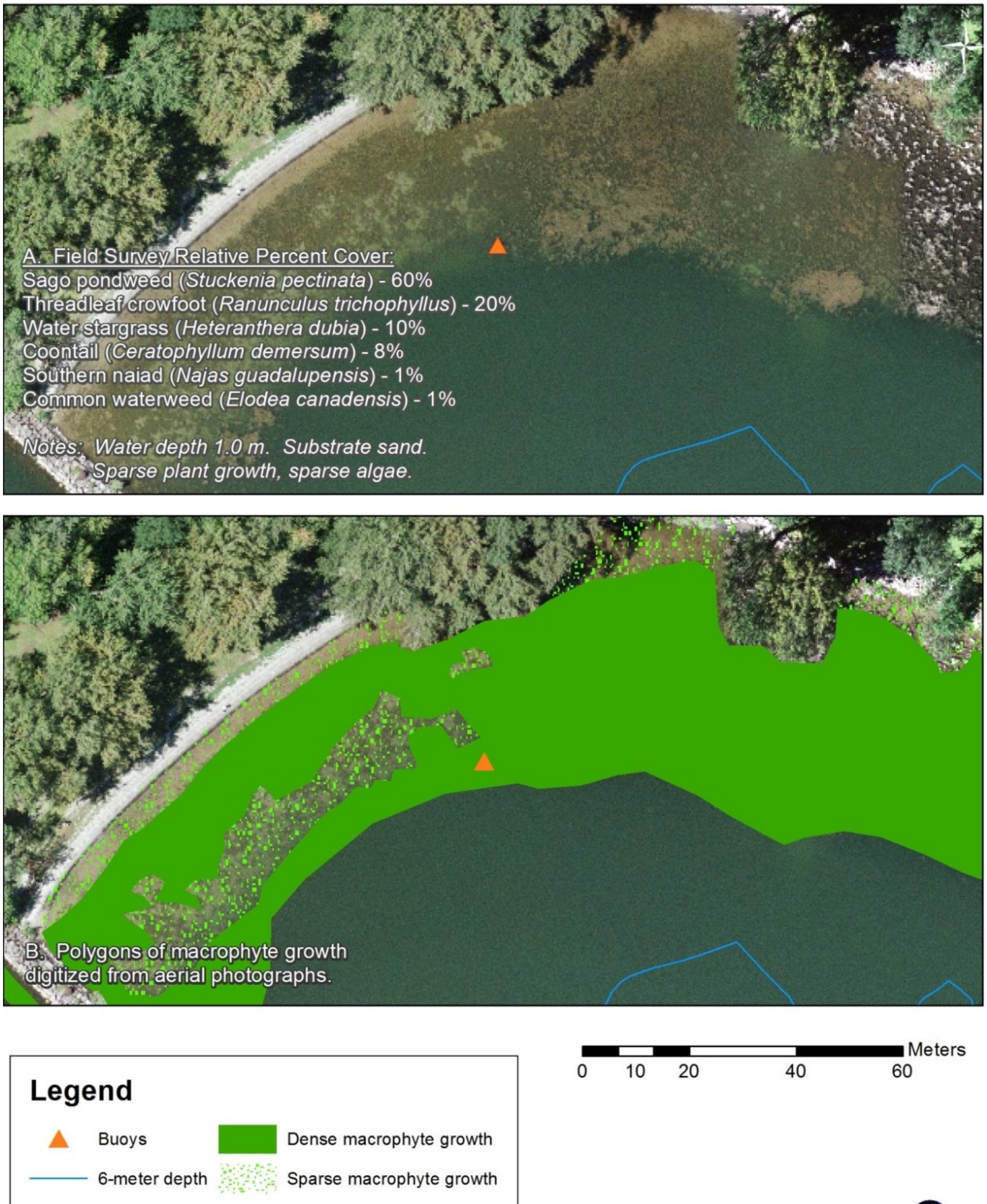
EcoLogic

Map 15
Ground Truth Buoy Site 9
August 2012, Onondaga Lake



Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

Map 16
Ground Truth Buoy Site 10
August 2013, Onondaga Lake



Source: Buoy locations and macrophyte polygons digitized from aerial photographs provided by Air Photographics, Inc. Bathymetry dated 2006.

Note: Species identified in the field notes as Threadleaf crowfoot was not verified; it is only certain that it was a species of water crowfoot (*Ranunculus* species).