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Editorial

The purpose of the *Science and Technology Undergraduate Research Notes (SATURN) Journal* is to provide a venue for publication of undergraduate research. This research may include any novel findings of note while providing an opportunity for undergraduates to experience dissemination of their findings to the scientific community. Our goal is for the *SATURN Journal* to serve as both an educational and research tool. Each publication in this issue of the *SATURN Journal* has been reviewed by the professor for the course and by an outside scientist. Worthwhile data from embedded research in laboratory course curricula can be disseminated to the world community. By contributing their own novel findings for the greater good, students can be engaged in science through embedded research pedagogy more than through conventional pedagogy, and a source of large scale cataloging information can be developed by many students contributing novel data.

The *SATURN J.* Tree Survey pedagogy is an ongoing, cost competitive method of including embedded research in a non-majors science course, and has been successfully implemented at SCCC since the Spring Semester of 2012. It easily fits into the curriculum of contemporary Principles of Biology non-major science courses. Also, it has evolved into an instructed, crowd sourcing method for research that can readily be adopted by other institutions. This pedagogy has the capacity to provide valuable and long term undergraduate research experience nationwide. The *SATURN J.* began its‟ first issue with students from a Principles of Biology class at Suffolk County Community College (SCCC) in New York contributing their findings from a research project embedded in the laboratory curriculum. Specimens of each tree found on residential properties were brought to class. The species of each tree was identified by using a traditional dichotomous key. Students collaborated in groups to develop hypotheses based on the locations of the properties where the trees were found, the distribution of species, circumferences of trunks and population densities. The students followed the instructions for authors at the web site for the *SATURN Journal* (www.saturnjournal.org), and submitted their manuscripts to their instructor who acted as a peer reviewer. Those students whose manuscripts were accepted upon revision received a grade of ‟A‟ and were given extra credit for the revision and publication. This has been a cost effective exercise that has resulted in enthusiastic student engagement, and is building a catalogue of the distribution of tree species on residential properties in Suffolk County, New York. There was also a publication in this issue by a group of students who were enrolled in a statistics course. They compared the growth rates of different cultivars of the American Elm (*Ulmus americana*) planted on campus at SCCC.

In the second issue of the *SATURN Journal* there was a continuation of student publications pertaining to the embedded research project analyzing tree species distribution. Students found it helpful to compare their findings to the findings of student investigators who have published previously in the *SATURN Journal*, which resulted in citations of previously published students. The second issue also contained publications from a research project embedded in a microbiology course from which students reported their findings from tests of the antimicrobial properties of spices.

In the third issue of *SATURN J*. there was continuation of research projects that produced publications in the previous journals. New publications compared findings to a larger battery of previously identified trees. Students used the web site from the United Stated Geological Survey (www.usgs.gov) to report the latitude and longitude of properties included in the studies. Additional web based tools used by students included online dichotomous keys such as vTree at Virginia Tech located in Blacksburg, Virginia (http://dendro.cnre.vt.edu/dendrology/idit.htm).

The fourth issue of *SATURN J.* included an article published by students at Molloy College regarding sweeteners and inflammation in macrophages, three additional articles from the microbiology course at SCCC, and a continuation of the *SATURN J.* tree survey. In addition, the abstracts from the 5 2014 Northeast Regional Sigma Xi Conference held at SUNY Old Westbury were presented.
In the fifth issue of the *SATURN Journal* we presented an additional article from the microbiology course at SCCC that compares soil bacterial communities on Long Island, and multiple articles that continue the *SATURN J.* Tree Survey.

In the sixth issue of the *SATURN Journal* we presented additional articles from the microbiology course at SCCC that compares soil bacterial communities on Long Island. We also presented multiple articles that compare soil composition, and multiple articles that continue the *SATURN J.* Tree Survey. Both are from a Principles of Biology course at SCCC. In addition, we presented two articles from students at Molloy College that test the effects of teratogens on *Planeria*.

In the seventh issue of the *SATURN Journal* we present an additional article from a microbiology course at SCCC that compares soil bacterial communities on Long Island. We also present multiple articles that continue the *SATURN J.* Tree Survey from a Principles of Biology course at SCCC, and an article that compares soil composition from a Chemistry course.

In the eighth issue of the *SATURN Journal* we presented multiple articles that continue the *SATURN J.* Tree Survey from a Principles of Biology course at SCCC. We also present an article on the effect of carboplatin on tadpole and planarian regeneration, and an article on the effects of dopamine and serotonin on bacterial growth.

In the ninth issue of the *SATURN Journal* we presented multiple articles that continue the *SATURN J.* Tree Survey from a Principles of Biology course at SCCC. We also present an article on the identification of a housekeeping gene for use in inflammatory studies, and an article pertaining to the water quality of a lake in in a developing watershed in Minnesota.

In this tenth issue of the *SATURN Journal*, we present multiple additional articles that continue the *SATURN J.* Tree Survey from a Principles of Biology course at SCCC. We also present two articles authored by students in Ramsey Community College in Minnesota. One of these articles is a study on wildlife restoration, and the other is a water quality study.

We encourage instructors to have their students participate in the *SATURN Journal.* The publications in the journal are a source of embedded research project designs that instructors may include in their curricula. The journal serves as a venue for dissemination of student research and a source for students to compare their work to the work of others. Instructors are welcome to design additional projects from which their students can submit manuscripts.

Louis Roccanova, Ph.D.
Editor in Chief *SATURN Journal*

Deciduous Trees and Shrubs are Dominant over Evergreens, and there are Several Invasive Species in Suffolk County, New York

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Keywords: Taxonomy, Trees, Shrubs, Cultivar, Invasive, Maple, Suffolk County

Abstract:

There was a total of 370 trees and shrubs identified in this survey. 250 of the trees and shrubs were from East Northport, 29 were from Kings Park, and 91 were from Bay Shore. All the species observed were identified by using their bark, buds, and aroma. The students measured the circumferences of the trees and shrubs when accessible. The trees and shrubs were identified with the use of several different dichotomous keys, such as the mobile application, "*vTree*" (Peterson 2018), the Missouri Botanical Garden website (Henry 2018), the Woody Plants Database website (Bassuk 2013), and several reference books. The deciduous trees and shrubs were dominant, and there were seven different types invasive species found.

Introduction:

Taxonomy is the study of the classification of living organisms (SCCC Biology Department 2011). The botanical name comes from the Linnaean system of classification; the first being the part of the name is the genus, which is capitalized, and the second part is the species name, which is lowercased, and the whole name is written in italics or underlined. The name under the botanical name is called a cultivar, which means "cultivated variety," which was selected and cultivated by humans (Haynes 2018). According to the USDA (2018), with unnamed hybrids, a cultivar plant label might only include the genus and the cultivar name (as in *Ilex* "Sparkleberry"). "From this form of name, buyers can tell only that it is a cultivar of a hybrid and will not be able to determine the parents unless they happen to have a reference book containing the cultivar's history" (USDA 2018).

Dichotomous keys were created by scientists to help identify organisms, which for this particular study, were used for identifying trees and shrubs. The type of specimens that were collected from the three properties were either deciduous or evergreen. Evergreen plants have foliage that lasts year-round, while deciduous plants completely lose their foliage for part of the year (New World Encyclopedia contributors 2008). Evergreens, according to New World Encyclopedia contributors (2008), have different types which include: trees, shrubs, flowering plants, and species of the cone-bearing conifers with needle-like leaves. There are several types of deciduous trees and shrubs, and this includes certain genera of conifers; such as the European Larch (*Larix decidua*), the Dawn Redwood (*Metasequoia glyptostroboides*), and the Baldcypress (*Taxodium distchum*) (UNL Gardens 2018).

Islip, New York's annual high temperature is 16.2□, the annual low is 6.4□, and the average temperature is 11.3□ (U.S. Climate Data 2018). The height above sea level in town one (Northport) was 53.78m, town two (Kings Park) was 53.66m, and town three (Bay Shore) was 11.63m. Each town is located in the USDA Plant Hardiness Zone of 7a (-17.8□ to -15□) (Agricultural Research Service 2012) (Table 1). The soils pH levels, that were found by using Web Soil Survey, indicated that town one's pH levels were strongly acidic (pH 5.1 to 5.5), and that town two and three's pH levels were very strongly acidic (pH 4.5 to 5.0) (Soil Survey Staff 2017) (Table 1).

The students' hypothesis was that there would be more deciduous trees than evergreen and that there would more deciduous shrubs than evergreen.

Method:

To complete this survey, the circumference of each tree and shrub on the properties were measured when accessible. These three properties were in East Northport, Kings Park, and Bay Shore. After measuring circumferences, the students began to identify their trees and shrubs. To help with the identification process, the bark, the aroma, and at least three buds on the branches (when present) of each tree and shrub were closely examined. To identify the species that the students had, they used at least two dichotomous keys to confirm their findings. The students determined whether the trees and shrubs were deciduous or evergreen. Once all the trees and shrubs were identified they were placed according to their type, common name, and botanical name within each of the students' towns. The New York Invasive Species website (NYIS 2018), was used to find what specimens were invasive to New York State. The students also noted their latitude and longitude, and the height above sea level by using the U.S. Geological Survey website (USGS 2018). The amount of land on the three students' properties were found by using the Zillow website (Zillow 2006).

Results:

Based on the data collected from the three properties in each town, we concluded that the most dominant types of trees were deciduous, comprising 56 out of the 93 trees collected (Table 9). The most dominant type of shrubs was deciduous, comprising 142 out of the 277 shrubs collected (Table 9).

On the three properties there were seven different invasive species, the Norway Maple (*Acer platanoides*), the Black Locust (*Robinia pseudoacacia*), the Japanese Maple (*Acer palmatum*), the Multiflora Rose (*Rosa multiflora*), the Border Privot (*Ligustrum obtusifolium*), the Japanese Barberry (*Berberis thunbergii*), (Table 8). The total amount of invasive species out of the 370 specimens collected was 28 (Table 9). 53% of the trees and shrubs were deciduous, 39% of the trees and shrubs were evergreen, and 8% of the trees and shrubs were invasive between all three properties (Table 9).

Table 1: Location of towns, longitude and latitude, closest shore, planting zone, soil pH level, height above sea level, property size, and the total tree and shrub count.

	Town 1	Town 2	Town 3
Towns	East Northport, NY	Kings Park, NY	Bayshore, NY
Longitude	-73.3221	-73.2681	-73.2374
Latitude	40.8306	40.8823	40.7486
Town	East Northport	Kings Park	Bayshore
Closest Shore	North Shore	North Shore	South Shore
Planting Zone	7a (-17.8□ to -15□)	7a (-17.8□ to -15□)	7a (-17.8□ to -15□)
Soil pH Levels	5.1-5.5	4.5-5.0	4.5-5.0
Height Above Sea Level	53.78 m	53.66 m	11.63 m
Lot Size	5058.57 m^2	1011.71 m^2	1011.71 m^2
Tree Count	69	8	16
Shrub Count	181	21	75

Table 2: Town One's trees, type (deciduous or evergreen), common name, botanical name, quantity, and the range between circumferences.

Specimen Type	Name	Botanical Name	Quantity	Circumference Range
Deciduous	Sweet Birch	*Betula lenta*	16	18.4–204.4 cm
Deciduous	Black Oak	*Quercus velutina*	5	208.6–270.4 cm
Deciduous	Flowering Dogwood	*Cornus florida*	3	16.7–82.4 cm
Deciduous	Kousa Dogwood	*Cornus kousa*	4	11.4–58.1 cm
Deciduous	Fern-leaved Full-moon Maple	*Acer japonicum 'Aconitifolium'*	1	17.8 cm
Deciduous	Blood Leaf Japanese Maple	*Acer palmatum 'Atropurpureum'*	1	125.7 cm
Deciduous	Tamukeyama Japanese Maple	*Acer palmatum 'Tamukeyama'*	1	16.9 cm
Deciduous	Yoshino Cherry	*Prunus x yedoensis*	1	6 cm
Deciduous	Weeping Higan Cherry	*Prunus subhirtella 'Pendula Plena Rosea'*	3	9 cm–20.9 cm
Deciduous	Apricot	*Prunus armeniaca*	1	34.5 cm
Deciduous	Pear	*Pyrus communis*	1	8.5 cm
Deciduous	Peach	*Prunus persica*	1	19.6 cm
Deciduous	Sassafras	*Sassafras albidum*	5	5.4–24.3 cm
Deciduous	White Mulberry	*Morus alba*	1	6 cm
Evergreen	Sawara False-Cypress	*Chamaecyparis pisifera 'Squarrosa'*	3	35.2–96.3 cm
Evergreen	Emerald Green Arborvitae	*Thuja occidentalis 'Emerald'*	20	42.9–68.3 cm
Evergreen	Serbian Spruce	*Picea omorika*	1	85 cm
Evergreen	Eastern Hemlock	*Tsuga canadensis*	1	26.8 cm

Table 3: Town One's shrubs, type (deciduous or evergreen), common name, botanical name, and the range between circumferences.

Shrub Type	Common Name	Botanical Name	Quantity	Circumference Range
Deciduous	Sweet Summer Hydrangea	*Hydrangea paniculata 'Bokrathirteen'*	1	6.2 cm
Deciduous	Early Rosa® Hydrangea	*Hydrangea macrophylla 'Early Rosa'*	8	N/A
Deciduous	Early Blue® Hydrangea	*Hydrangea macrophylla 'Early Blue'*	9	N/A

Deciduous	Magical™ Ruby Red Hydrangea	*Hydrangea macrophylla ‘Kolmaru’*	1	N/A
Deciduous	The Knock Out® Shrub Rose	*Rosa x ‘Radrazz’* (Hybrid)	13	6–10.2 cm
Deciduous	Drop Dead Red™ Floribunda Rose	*Rosa ‘Wekcharlie’* (Hybrid)	23	N/A
Deciduous	Dee-Lish® Hybrid Tea Rose	*Rosa ‘Meiclusif’* (Hybrid)	17	N/A
Deciduous	Multiflora Rose	*Rosa multiflora*	1	N/A
Deciduous	Dapple Willow	*Salix integra ‘Hakuro Nishiki’*	2	16.2–19.2 cm
Deciduous	Corkscrew Willow	*Salix matsudana ‘Tortuosa’*	3	N/A
Deciduous	Common Lilac	*Syringa vulgaris*	3	5.8–12.5 cm
Evergreen	Catawba Rhododendron	*Rhododendron catawbiense*	5	4.9–55.8 cm
Evergreen	Blaauw’s Pink Azalea	*Rhododendron ‘Blaauw’s Pink’* (Hybrid)	24	N/A
Evergreen	Hino-Crimson Azalea	*Rhododendron ‘Hino-Crimson’* (Hybrid)	21	N/A
Evergreen	Everest Azalea	*Rhododendron ‘Everest’* (Hybrid)	13	N/A
Evergreen	Japanese Pieris	*Pieris japonica*	3	29.2–38.6 cm
Evergreen	Mountain Laurel	*Kalmia latifolia*	9	N/A
Evergreen	Drooping Laurel	*Leucothoe fontanesiana*	10	N/A
Evergreen	Blue Princess Holly	*Ilex x meserveae ‘Blue Princess’*	1	N/A
Evergreen	Japanese Yew	*Taxus cuspidata*	14	N/A

Table 4: Town Two’s trees, type (deciduous or evergreen), common name, botanical name, quantity, and the range between circumferences.

Tree Type	Common Name	Botanical Name	Quantity	Circumference Range
Deciduous	Japanese Maple	*Acer palmatum ‘Katsura’*	1	12 cm
Deciduous	Oshio-beni Japanese Maple	*Acer palmatum ‘Oshio-beni’*	1	16.8 cm

Deciduous	Bloodgood Japanese Maple	*Acer palmatum 'Bloodgood'*	1	15.3 cm
Deciduous	Crimson King Norway Maple	*Acer platanoides 'Crimson King'*	2	187.3 cm, 222.1 cm
Deciduous	Yellow Poplar	*Liriodendron tulipifera*	1	72.5 cm
Deciduous	Eastern Redbud Forest Pansy	*Cercis canadensis 'Forest Pansy'*	1	73.9 cm
Evergreen	Dwarf Alberta Spruce	*Picea glauca 'Conica'*	1	39.4 cm

Table 5: Town Two's shrubs, type (deciduous or evergreen), common name, botanical name, quantity, and the range between circumferences.

Shrub Type	Common Name	Botanical Name	Quantity	Circumference Range
Deciduous	Common Lilac	*Syringa vulgaris*	3	14.8–21.3 cm
Deciduous	Black Knight Butterfly Bush	*Buddleja davidii 'Black Knight'*	1	55.2 cm
Deciduous	Heaven Butterfliy Bush	*Buddleja davidii 'Butterfly Heaven'*	1	43.2 cm
Deciduous	White Profusion Butterfly Bush	*Buddleja davidii 'White Profusion'*	1	46.6 cm
Deciduous	Pink Delight Butterfly Bush	*Buddleja davidii 'Pink Delight'*	1	49.5 cm
Deciduous	Heritage Red Raspberry	*Rubus idaeus 'Heritage'*	2	18.7 cm, 15.3 cm
Deciduous	Blackcap Raspberry	*Rubus occidentalis*	2	37.8 cm, 22.3 cm
Deciduous	Aphrodite Rose of Sharon	*Hibiscus syriacus 'Aphrodite'*	1	61.3 cm
Deciduous	Rose of Sharon	*Hibiscus syriacus*	1	73.8 cm
Deciduous	Climbing American Beauty	*Rosa 'Climbing American Beauty'* (Hybrid)	1	N/A
Evergreen	Japanese Pieris	*Pieris japonica*	1	27.5 cm
Evergreen	Shojo Japanese Pieris	*Pieris japonica 'Shojo'*	2	48.3 cm, 42.3 cm
Evergreen	Red Mill Japanese Pieris	*Pieris japonica 'Red Mill'*	1	53.8 cm
Evergreen	Temple Bells Japanese Pieris	*Pieris japonica 'Temple Bells'*	1	33.5 cm
Evergreen	Japanese Barberry	*Berberis thunbergii*	1	12.7 cm
Evergreen	Wintercreeper Euonymus	*Euonymus fortunei 'Emerald Gaiety'*	1	17.3 cm

Table 6: Town Three's trees, type (deciduous or evergreen), common name, botanical name, quantity, and the range between circumferences.

Tree Type	Common Name	Botanical Name	Quantity	Circumference Range
Deciduous	Black Locust	*Robinia pseudoacacia*	2	132.1 cm, 182.9 cm
Deciduous	Red Maple	*Acer rubrum*	9	33.5–179 cm
Deciduous	Norway Maple	*Acer platanoides*	4	131.1–189 cm
Deciduous	Cherry Plum	*Prunus cerasifera*	1	27.9 cm

Table 7: Town Three's shrubs, type (deciduous or evergreen), common name, botanical name, quantity, and the range between circumferences.

Shrub Type	Common Name	Botanical Name	Quantity	Circumference Range
Deciduous	Silver Dollar Hydrangea	*Hydrangea paniculata 'Silver Dollar'*	25	N/A
Deciduous	Border Privot	*Ligustrum obtusifolium*	15	N/A
Deciduous	Rose of Sharon	*Hibiscus syriacus*	23	N/A
Evergreen	Glamour Azalea	*Rhododendron 'Glamour'* (Hybrid)	3	N/A
Evergreen	Red Red Azalea	*Rhododendron 'Red Red'* (Hybrid)	4	N/A
Evergreen	Karens Azalea	*Rhododendron 'Karens'* (Hybrid)	1	N/A
Evergreen	Japanese Yew	*Taxus cuspidate*	4	N/A

Table 8: Invasive Species to New York State, Specimen Type, Common Name, Botanical Name, Overall Quantity, NY Invasiveness Rank, Date Approved.

Specimen Type	Common Name	Botanical Name	Quantity	NY Invasiveness Rank	N.Y. Invasive Ranking Form Date Approved
Tree *(Deciduous)*	Norway Maple	*Acer platanoides*	4	Very High (Relative Maximum Score >80.00)	9/10/2008
Tree *(Deciduous)*	Black Locust	*Robinia pseudoacacia*	2	Very High (Relative Maximum Score >80.00)	1/21/2009
Tree *(Deciduous)*	Japanese Maple	*Acer palmatum*	5	Moderate (Relative Maximum Score 50.00-69.99)	10/14/2009

Shrub (*Evergreen*)	Multiflora Rose	*Rosa multiflora*	1	Very High (Relative Maximum Score >80.00)	1/28/2009
Shrub (*Evergreen*)	Border Privot	*Ligustrum obtusifolium*	15	High (Relative Maximum Score 70.00-80.00)	2/25/2009
Shrub (*Evergreen*)	Japanese Barberry	*Berberis thunbergii*	1	Very High (Relative Maximum Score >80.00)	9/24/2008

Table 9: The total amount of Deciduous, Evergreen, and Invasive trees and shrubs that were found on the three properties.

Specimen Type	Trees	Shrubs	Total	Percentage
Deciduous	56	142	198	53%
Evergreen	26	118	144	39%
Invasive	11	17	28	8%
Overall Total	93	277	370	100%

The dominant deciduous tree on the North Shore was the Sweet Birch (*Betula lenta*), and the evergreen was the Emerald Green Arborvitae (*Thuja occidentalis 'Emerald'*). The dominant deciduous shrub was the Drop Dead Red™ Floribunda Rose (*Rosa 'Wekcharlie'*), and the evergreen was the Blaauw's Pink Azalea (*Rhododendron 'Blaauw's Pink'*). The dominant deciduous tree on the South Shore was the Red Maple (*Acer rubrum*) and did not have an evergreen. The dominant deciduous shrub was the Silver Dollar Hydrangea (*Hydrangea paniculata 'Silver Dollar'*), and the evergreen was the Red Red Azalea (*Rhododendron 'Red Red'*).

It was found that between the three properties of East Northport, Kings Park, and Bay Shore, there were 28 invasive species; seven Norway Maples (*Acer platanoides*), four Black Locusts (*Robinia pseudoacacia*), five Japanese Maples (*Acer palmatum*), one Multiflora Rose (*Rosa Multiflora*), fifteen Border Privot (*Ligustrum obtusifolium)*, and one Japanese Barberry (*Berberis thunbergii*) (Table 8 and 9).

Discussion:

In order for a species to receive a NY Invasiveness Rank to determine if a species is invasive or not, the New York State Invasive Species Council studies the following: ecological impact, biological characteristic and dispersal ability, ecological amplitude and distribution, and difficulty of control (NYIS 2008) (Table 8). On property one, there was also 125 Yellow Groove Bamboo (*Phyllostachys aureosulcata*) that is invasive to Suffolk County, New York, but could not be included in this study because it is considered a type of ornamental grass.

Shannon et al. (2017) also discovered that Norway Maple (*Acer platanoides*) and the Black Locust (*Robinia pseudoacacia*) was considered invasive in their study.

One important note is that due to it being Winter/Spring when this study was conducted, some of the trees and shrubs that were identified could be incorrect. The students identified them to the best of their abilities. In addition, some of the stumps were multi stumps, or impossible to reach causing some circumferences to not be obtainable.

Conclusion:

Through this study we can determine that out of 370 trees and shrubs that were collected, 198 were deciduous, 144 were evergreen, making deciduous the overall dominant type on the three properties. The total amount of the seven invasive species found on the three properties was 28 out of the 370 trees and shrubs that were collected. Our hypothesis was supported with 58% of the trees being deciduous, and 39% of the shrubs being deciduous.

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Pitch Pines are Dominant in the Edgewood Nature Preserve

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Keywords: Branches, Pitch Pine, Scrub Oaks, Trees

Abstract:
Forty one trees were surveyed in the Edgewood Nature Preserve in Deer Park, NY. The trees were identified using a dichotomous key (Watts & Watts 1998). Pitch Pines were dominant in the part of the preserve that was surveyed.

Introduction:
The Edgewood Nature Preserve in Deer Park, NY is situated between 25 and 30 meters elevation and is flatland (Cuthbertson 2013). The preserve is located on land that used to be developed that was since demolished, and that land was kept undeveloped for its rare Pitch Pine-Scrub Oak barrens environment (Cuthbertson 2013).
The Pitch Pine (*Pinus rigida*) grows to an average of 25 meters tall and 1 meter in diameter (Gucker 2007). They are conifers and have needles that grow in bunches of 7.6 and to nearly 15.2 centimeters long and will retain those needles for 2 to 3 years at time (Gucker 2007). They are the most common tree in pine barrens because of their capabilities to grow in harsh, sandy environments. The average temperature for the year of 2017 was 12.3 degrees Celsius, the total rainfall was 110.34 centimeters (NOAA 2018).

Methods:
Forty one trees were surveyed in the Edgewood Nature Preserve in Deer Park, NY during the winter of 2018 using a dichotomous key (Watts, 1998). All tree samples were taken within the perimeter created by these coordinates: Point 1 latitude 40.7805848, longitude -73.3044401, Point 2 latitude 40.7804094, longitude -73.3045035, Point 3 latitude 40.7802873, longitude -73.3041176, Point 4 latitude 40.7802335, longitude -73.3043553. All coordinates were found using Google Maps. (Google Maps 2018).

Results:
Out of the forty one trees, twenty seven (66%) of them were Pitch Pines, eight (20%) were Scrub Oaks, and only one specimen belonged to each of the remaining six tree species (Table 1).

Table 1: Quantity and Percentage of Identified Trees

Tree Type (Scientific Name)	Quantity	Percentage
Pitch Pine (*Pinus rigida*)	27	66%
Scrub Oak (*Quercus ilicifolia*)	8	20%
Chestnut Oak (*Quercus prinus*)	1	2%
Chinquapin Oak (*Quercus muehlenbergii*)	1	2%

Red Cedar (*Juniperus virginiana*)	1	2%
American Mountain Ash (*Sorbus americana*)	1	2%
White Ash (*Fraxinus americana*)	1	2%
Sycamore (*Platanus occidentalis*)	1	2%

Discussion:
The results of the survey are consistent with the trees commonly found in Pitch Pine-Scrub Oak barrens with the most common trees being Pitch Pines and Scrub Oaks (Gucker 2007). One tree the American Mountain Ash is not native to Long Island (Glenn 2013) but is native to other parts of New York State and could have possibly been introduced from the previous development on the land. The other trees are found throughout New York State.
In a study by Cardinale (2017) of the Makamah Nature Preserve in Fort Salonga, NY, located latitude 40.9156, longitude -73.3163, which is not a Pitch Pine-Scrub Oak barren, the most common trees were all deciduous, Maples or Holly's. The White Ash was the only tree found in both Preserves and this is likely due to the differences in environments.

Conclusion:
Of the 41 trees surveyed from the Edgewood Nature Preserve in Deer Park, NY 27 or 66% were Pitch Pines, and Scrub Oaks consisted of 8 or 20% of surveyed trees. The trees are different from trees commonly found in nearby Makamah Nature Preserve in Fort Salonga, NY, with the exception of the White Ash which was found in both.

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Deciduous Trees Are Dominant over Coniferous Trees in Suffolk County

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Keywords: Suffolk County, West Islip, Islip, West Babylon, Belmont Lake State Park, Trees, Species, Deciduous, Coniferous

Abstract:

Fifty samples of different trees in separate, opposite topographic environments were collected in order to determine which tree type is most abundant in Suffolk County. Using our dichotomous keys *Tree Finder: A Manual for the Identification of Trees by Their Leaves* by May Theilhaard Watts (1998), we determined that of the fifty samples, thirty-eight were deciduous and twelve had been coniferous. In Belmont Lake State Park, fifteen had been deciduous and ten had been coniferous, and in the backyard of a student's home, twenty had been deciduous and five were coniferous.

Introduction:

In the year 1778, a scientist by the name of Jean Baptiste Lamarck created a step-by-step written form that enabled the average person to identify trees one may come across (Gridding 2011). This helpful tool, which consisted of tables that directed interested individuals to various pages based tree characteristics viewed, was titled "The Dichotomous Key." Within such, one option to identify a plant was based on if it was deciduous or coniferous. While deciduous trees are identified by having broad, flat leaves, the coniferous trees are the opposite, containing small, needle-like leaves.

In this report, the dichotomous key was used to identify numerous amounts of trees located in the northeastern area, more specifically, in Long Island, New York. The samples for the experiment were collected in March during an overcast, chilly day, in which twenty-five samples had been obtained in Belmont Lake State Park, a relatively natural environment, while the other half of the sample was acquired in a student's backyard which consisted of flat, grassy land and other trees.

Using the dichotomous key to identify our trees, it is hypothesized there are more deciduous trees in Suffolk County than there are coniferous trees.

Method:

A total of 50 samples of trees from 2 different residents from West Babylon (Belmont State Park) and Bay Shore, New York were collected. Utilizing the two different dichotomous keys (Watts 1998) we identified the common and scientific names for the trees surveyed.The longitude and latitude of each property was found using *EarthExplorer* (USGS 2016). The first property we studied was in west Bay Shore (40.7501°N, 73.2922°S) and 25 trees were surveyed. The last property we studied was in Belmont Lake State Park, West Babylon, NY (40.7362° N, 73.3404° W) and 25 trees were surveyed.

Results:

More deciduous trees were found than coniferous in both locations sampled.

Table 1: Location of Tree Samples Collected

	Location 1	Location 2
Town	West Babylon, NY	Bay Shore, NY
Coordinates	40.7362°N, 73.3404°W	40.7501°N, 73.2922°S
Count	25	25

Example A: The location of where the samples were collected, their latitude and longitude coordinates, and the number of trees counted.

Table 2: Name, Scientific Name, Location, and Total Count of Deciduous Tree Samples Collected

Name of Deciduous Tree	Deciduous Trees Scientific Name	Location	Amount Counted
Sugar Maple	*Acer saccharum*	West Babylon, NY	3
Allegheny Serviceberry	*Amelanchier laevis*	West Babylon, NY	3
Kousa Dogwood	*Cornus kousa*	West Babylon, NY	2
River Birch	*Betula nigra*	West Babylon, NY	5
Shingle Oak	*Quercus imbricaria*	West Islip, NY	2
Willow Oak	*Quercus phellos*	West Islip, NY	3
Live Oak	*Quercus virginiana*	West Islip, NY	3
Scrub Oak	*Quercus berberidifolia*	West Islip, NY	2
English Holly	*Ilex aquifolium*	West Islip, NY	1
Black Cherry Tree	*Prunus serotina*	West Islip, NY	1
Pear Tree	*Pyrus calleryana*	West Islip, NY	1
Dwarf Pear Tree	*Pyrus communis*	West Islip, NY	1
Horse Chestnut Tree	*Aesculus hippocastanum*	West Islip, NY	1
Apple Tree	*Malus pumila*	West Islip, NY	1
Southern Crabapple	*Malus angustifolia*	West Islip, NY	1

Tree			
Red Alder	*Alnus rubra*	West Babylon, NY	3
Weeping Willow	*Salix babylonica*	West Babylon, NY	2
Bigtooth Aspen	*Populus grandidentata*	West Babylon, NY	3

Example B: The name of the deciduous tree, its scientific name, location, and the number of corresponding trees found within the sample collected.

Table 3: Name, Scientific Name, Location, and Total Count of Coniferous Tree Samples Collected

Name of Deciduous Tree	Deciduous Trees Scientific Name	Location	Amount Counted
Eastern Red Cedar	*Juniperus virginiana*	West Babylon, NY	4
Pitch Pine	*Pinus rigida*	West Babylon, NY	6
Singleleaf Pinyon	*Pinus monophylla*	West Islip, NY	1
Northern White-Cedar	*Thuja occidentalis*	West Islip, NY	1

Example C: The name of the coniferous tree, its scientific name, location, and the number of corresponding trees found within the sample collected.

Discussion:

Deciduous trees were found to be dominant to coniferous in Suffolk County (Long Island). In another study entitled, “Deciduous Trees are Dominant to Coniferous and the Norway Maple is Invasive in Suffolk County, New York” written by Chiuchiolo et al. (2018), it was also found that deciduous trees were found to be dominant to coniferous in Suffolk County (Long Island).

Conclusions:

After using the dichotomous key to identify our trees based on their branches and comparing and contrasting our samples, we determined that there are more deciduous trees than coniferous in both locations sampled.

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Pitch Pine and White Pine Were Found to be Dominant Species on a Residential Property in North Massapequa, New York

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Key words: Pitch Pine, White Pine, Massapequa

Abstract:

This study was conducted to identify the species of trees on a residential property in North Massapequa using a dichotomous key. Forty trees were surveyed for the study. They were identified as Pitch Pine (*Pinus rigida*) , Red Cedar (*Juniperus virginiana),* Bur Oak *(Quercus macrocarpa)* and White Pine (*Pinus strobus).* Pitch Pine and White Pine trees were found to be the most dominant species in the area.

Introduction:

Taxonomy is defined as the study of the classification of living organisms. It is applied to the identification of unknown species of organisms. The practice of taxonomy was applied throughout the study to aid in the identification process of the obtained tree specimen. Along with the analysis of a dichotomous key, the tree specimens were identified based on their biological name. A dichotomous key is a tool specific to the practice of taxonomy and is responsible for guiding the identification process through a series of organized statements.

This study was conducted in North Massapequa, New York to see which tree species inhabited that area. The soil type for this region is coarse-loamy, mixed, mesic Typic Dystrochrepts (USDA 2018). The first frost usually falls on November 2nd and the last frost ends on April 14th. The temperature usually ranges from 14 □ to 26□. This information can be found in the *Old Farmer's Almanac* (Judson ed. 2018)

Excluding invasive species, the trees that are native to New York include, but are not limited to: Pine Trees (*Pinus* or *Pincaceae*), Spruce (*Picea),* Larches/Tameracks (*Larix),* Hemlocks (*Tsuga*), Douglas-Firs and True Firs (*Pseudotsuga and Abies*) , Red Cedar (*Juniperus virginiana),* Bur Oak *(Quercus macrocarpa)* (USDA 2018).

Method:

Tree Finder, was the dichotomous key used to identify the tree species on a residential property located in North Massapequa, New York (Watts 1991). The latitude and longitude was found using *EarthExplorer*, a website used to find latitude and longitude (USGS 2018).

Results:

After the samples were collected, analyzed, and categorized, it was determined that out of the forty tree samples there were four different species. They were *Pinus rigida, Juniperus virginiana, Quercus macrocarpa, and Pinus strobus*. It was determined that out of the all samples collected, eighteen were *Pinus rigida*, which are commonly found across the landscape of Long Island. Another tree that was abundant was *Pinus strobus* with a total of fifteen trees in the sample. In addition to those findings, there were five *Juniperus virginiana* and two *Quercus macrocarpa*.

Table 1- Trees found in North Massapequa

Common Name	**Species Name**	**Number of Tress Identified**	**Percentage of Sample**
Pitch Pine	*Pinus rigida*	Eighteen	45%
White Pine	*Pinus strobus*	Fifteen	37.5%
Bur Oak	*Quercus macrocarpa*	Two	5%
Red Cedar	*Juniperus virginiana*	Five	12.5%

It was found that out of the trees that were surveyed, *Pinus Rigida* and *Pinus Strobus* were the more dominant species. However, the Pitch Pine (*Pinus Rigida)* seemed to be more dominant than the White Pine (*Pinus Strobus*).

Conclusion:

Of forty Trees that were surveyed, eighteen (45%) were Pitch Pine (*Pinus rigida)* is the more dominant species found on the North Masapequa Property.

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Trends in Water Quality of a Suburban Lake in a Developing Watershed (Lochness Lake, Blaine, MN); 2007-2016

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Keywords: biology, environmental science, water quality, limnology, environmental monitoring, aquatic ecology

Abstract:

In the face of growing population and urban development, managing natural resources is becoming a more important challenge. Aquatic ecosystems, especially, require proper management because of the important role they play in ecosystem services. The goal of this project is to provide a trend analysis of a lake in a suburban area over a decade. The watershed of Lochness Lake has experienced several development and construction projects during this time frame. This presented a good opportunity to examine how water quality is affected by urban growth. With development comes impermeable surfaces and increased runoff; this runoff carries with it larger amounts of nutrients and other suspended materials. These changes may contribute to decreased water clarity, increased algal growth and cause overall decreases to water quality. Results from water samples taken every other week during the summer months of 2007-2016 revealed increases of chlorophyll a, phosphorus and lake surface level. Decreases of water clarity and nitrogen were found as well. Further research is needed to better understand these changes but it does appear that development within the watershed of Lochness Lake is correlated with changes in water quality over time.

Introduction:

The effects of urban growth on water quality is important to study because growing communities depend on clean water for health and economic purposes. Understanding how aquatic ecosystems respond to development and land disturbances will allow cities to responsibly protect water quality and prevent degradation. The topic of study, Lochness Lake, is located approximately 20 miles north of Minnepolis/St. Paul, Minnesota within the city limits of the suburb of Blaine. This lake has been monitored by the Metropolitan Council of Environmental Services (MCES) since 2007. A long-term water quality monitoring project was established to examine how physical and chemical parameters of the lake change over time, specifically in the presence of urban development. Data collected by MCES as well as data from this study can be used to monitor, manage, and understand how development affects water quality in Lochness Lake. Proper understanding of water quality trends help experts effectively manage this precious resource. It is especially important to protect water quality when there are physical changes to a watershed. This has been the case in Blaine, Minnesota where development has altered Lochness Lake's watershed. Newly constructed buildings such as a Super Wal-Mart, Aldi grocery store and a large new office building are among the many new development projects occurring in the Lochness Lake watershed. These changes present an opportunity to collect long term water quality data from a lake in a setting experiencing urban growth.

The largest area of drainage in Lochness Lake's watershed lies to the south of the lake. This area has also experienced the greatest amount of development. This is increasing the amount of impermeable surfaces in the watershed. Large areas of impermeable surfaces prevent soil infiltration and are associated with increased runoff and sedimentation (Hogan and Walbridge, 2007). It seems reasonable to predict similar results for Lochness Lake. The increased volume of water flowing over the newly paved surfaces will pick up sediments, pollutants and other small particles that may have negative effects on water quality. Greater amounts of sedimentation have been observed in lakes located in urban areas compared to forested areas (Lenat and Crawford). It is predicted that the decreased soil infiltration will cause the lakes surface level to rise and increase the water content of both phosphorus and nitrogen. This could create larger and more frequent algal blooms as has happened in other lakes (e.g. Anderson et al, 2002). The increased algae as well as sediments and other suspended solids entering the lake from the increased runoff is likely to decrease water clarity. Other researchers have collected related data that revealed increases of phosphorus and chlorophyll-a, coupled with decreases in transparency associated with landscape alterations (Atasoy, et. al. 2006). Increased nutrients could also lead to increased aerobic decomposition and thus lower dissolved oxygen levels (Penn and Mihelcic, 2009). It is important to monitor Lochness Lake considering the recent land use changes that could negatively affect water quality. If construction and development influence water quality, continued monitoring will allow experts to address any water issues in the most environmentally responsible and economic ways possible. Proper investment into responsible monitoring and management assures that water quality will be maintained now and for future generations.

Materials and Methods:

From April through October in the years 2007-2014, volunteers in the Citizen-Assisted Monitoring Program (CAMP) collected water quality data for Lochness Lake (MN). Every other week, from the deepest part of the lake, water samples were collected. Clarity (Secchi depth) was recorded and a water sample was collected and sent to be analyzed for phosphorus, nitrogen and chlorophyll a content. Beginning in 2015, volunteers began collecting surface measurements of total dissolved solids (TDS), pH and salt content. Measurements of dissolved oxygen (DO), temperature and conductivity were also collected at 0.5 meter intervals to obtain a depth profile in the deepest part of the lake. A water sample was collected and filtered (0.45 μm) for chlorophyll a, phosphorus and total Kjeldahl nitrogen (TKN). Surface water elevation was also recorded. Changes in water quality parameters (e.g. nutrients, algae, water level, transparency) were evaluated over time using simple linear regression, and significance of relationships was established at $p<0.05$. Depth profiles of DO, temperature, and conductivity were evaluated graphically for the two years that data were available (2015-2016).

Results:

Data revealed a statistically significant increase of chlorophyll a from 2007 to 2015 (Figure 1). This relationship was strongest in the months of June, July and September (Table 1). Chlorophyll a increased by about 3.31 ug/L per year (Table 2). Phosphorus also increases over time, but was more variable (Figure 2). Phosphorus showed a small but statistically significant increase of 0.003 mg per year ($p=0.01$, Table 2). Total Kjeldahl Nitrogen (TKN) did not increase as chlorophyll a or phosphorus, but instead showed a slight decrease (Figure 3). TKN decreased by -0.037 mg/L per year ($p=0.001$, Table 2).

Water clarity also experienced changes (Figure 4). Over time, transparency decreased by -0.136 meters per year ($p<0.001$, Table 2). The months of May and June showed the greatest change in clarity with -0.176 meters and -0.183 meters respectively (Table 1). From 2009 to 2016 the surface level of Lochness Lake increased (Figure 5); this relationship was very strong throughout all months sampled (Table 1).

Two years of data show dissolved oxygen (DO) decreased from the surface to bottom in both 2015 and 2016 (Figure 6). In 2015, DO was higher from the surface to a depth of 2 m, whereas the DO was higher 2.5-3 m below the surface in 2016. Temperature also decreased from the surface to the bottom, but there was little to no difference between 2015 and 2016 (Figure 7).

Figure 1: Water samples taken twice monthly from Apr-Oct 2007-2015 revealed a trend of increasing chlorophyll a.

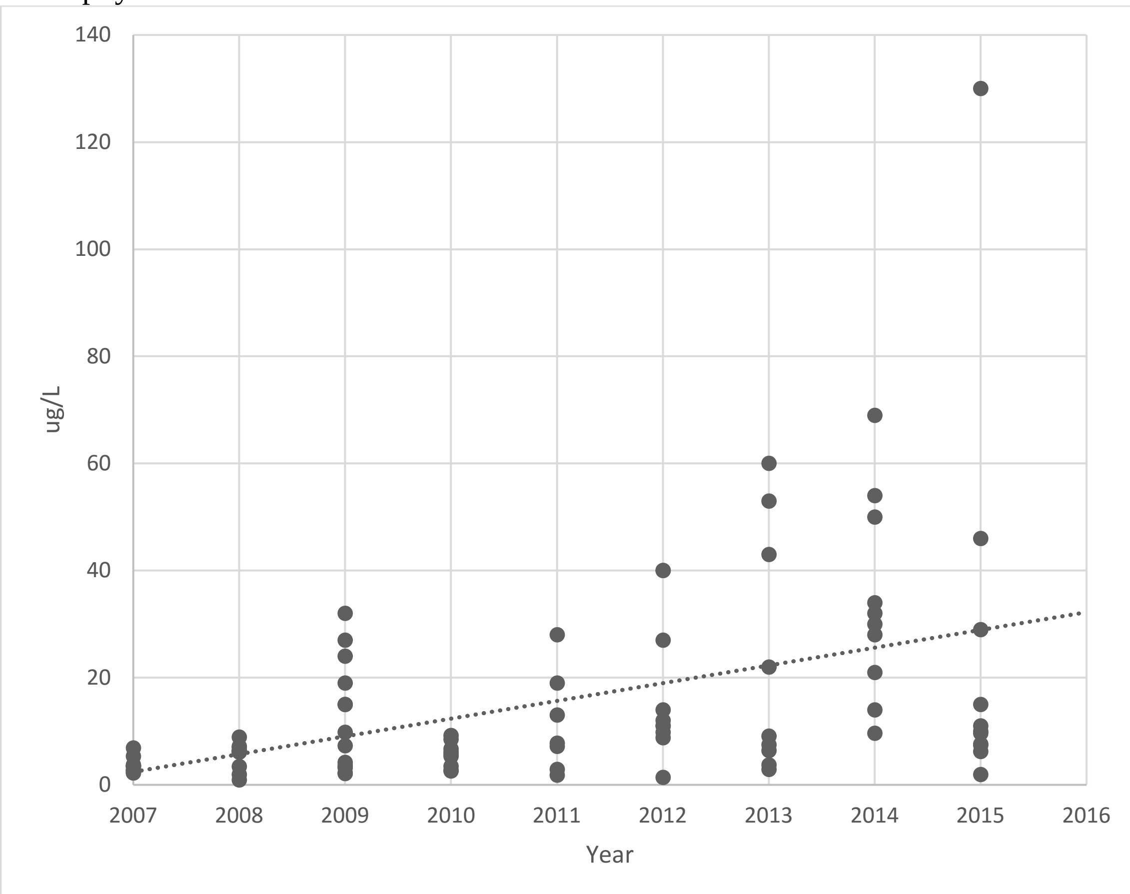


Figure 2: Water samples taken twice monthly from Apr-Oct 2007-2015 revealed a trend of increasing Phosphorus.

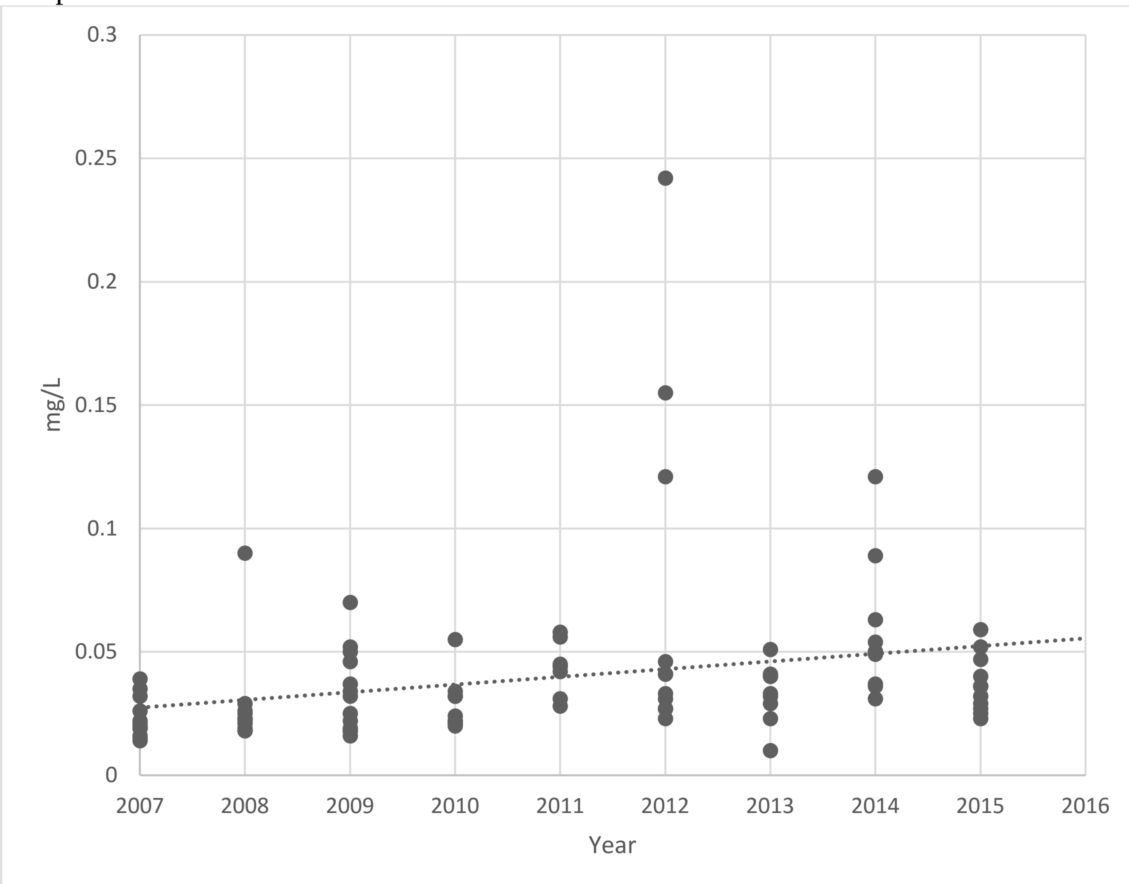


Figure 3: Water samples taken twice monthly from Apr-Oct 2007-2015 revealed a trend of decreasing nitrogen (TKN).

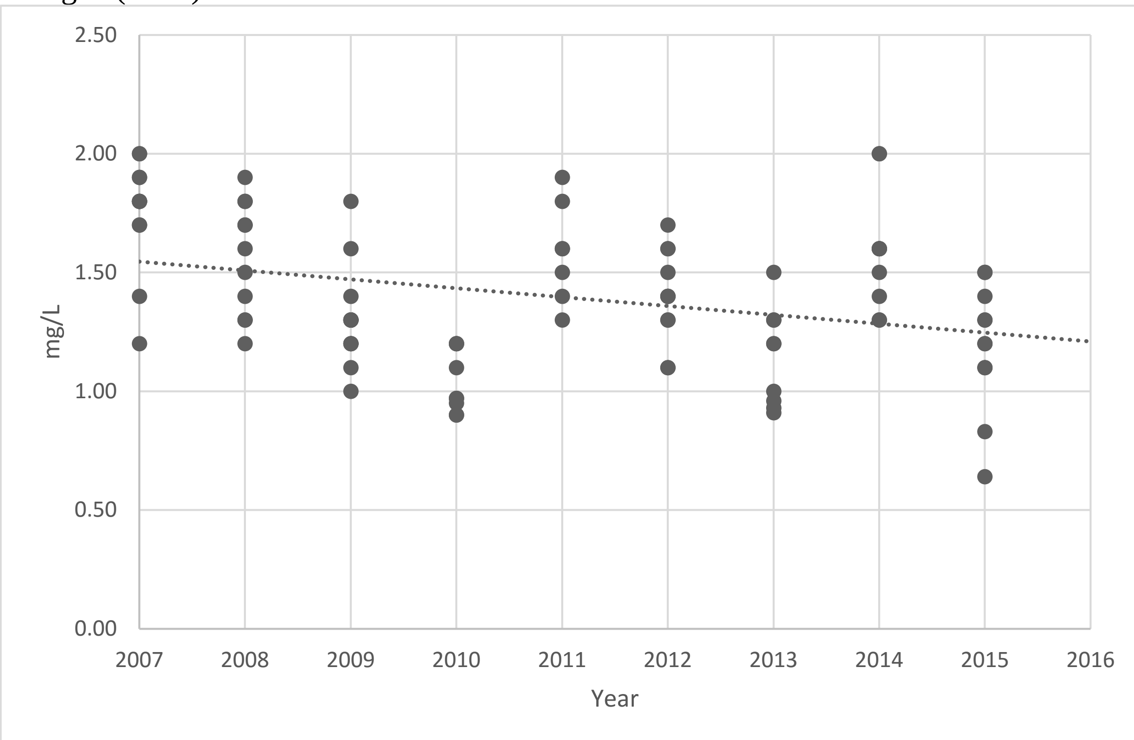


Table 1: Monthly trends in water quality (2007-2015) showing annual rates of change by month during the sampling season. Data shown are slope (R^2) for months across all years samples were collected.

Month	Chl a (ug/L)	Transparency (m)	TKN (mg/L)	TP (mg/L)	Lake Level (ft)
May	1.241 (0.442)	-0.176 (0.598)	-0.061 (0.260)	0.004 (0.141)	0.446 (0.430)
June	2.815 (0.271)	-0.183 (0.514)	-0.010 (0.006)	0.007 (0.117)	0.606 (0.748)
July	3.026 (0.262)	-0.168 (0.348)	-0.005 (0.003)	0.004 (0.601)	0.705 (0.839)
Aug	2.351 (0.136)	-0.057 (0.046)	-0.070 (0.346)	-0.0003 (0.004)	0.618 (0.866)
Sept	3.662 (0.342)	-0.060 (0.114)	-0.075 (0.573)	0.0002 (<0.001)	0.750 (0.829)

Table 2:

Results of Simple Linear Regression for Water Quality Parameters, 2007-2016.

Parameter	**Coefficient (change/yr)**	R^2	**p value**	**n**
Chlorophyll a (ug/L)	3.312	0.217	< 0.001	92
Total Kjeldahl Nitrogen (mg/L)	-0.037	0.106	0.001	93
Total Phosphorus (mg/L)	0.003	0.071	0.01	93
Transparency (m)	-0.136	0.352	<0.001	102

Figure 4: Water samples taken twice monthly from Apr-Oct 2007-2016 revealed a trend of decreasing water clarity.

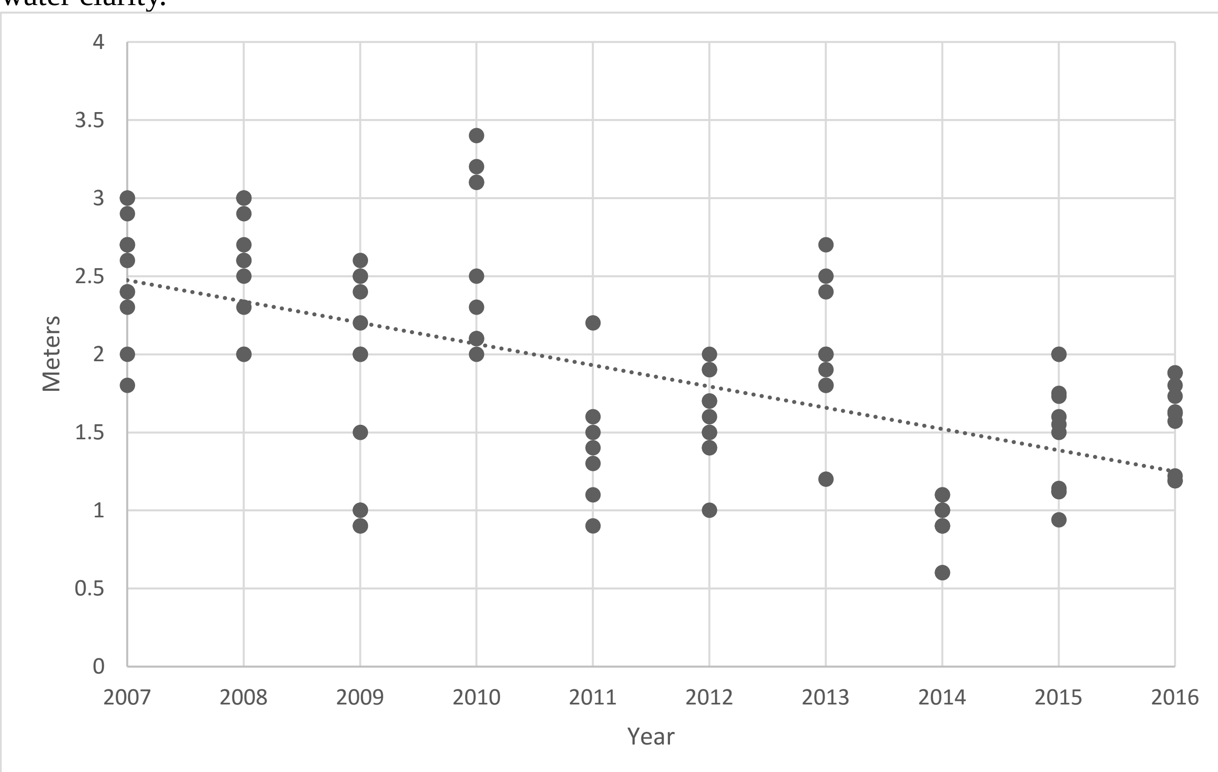


Figure 5: Water samples taken twice monthly from Apr-Oct 2007-2014 revealed a trend of increasing surface elevation.

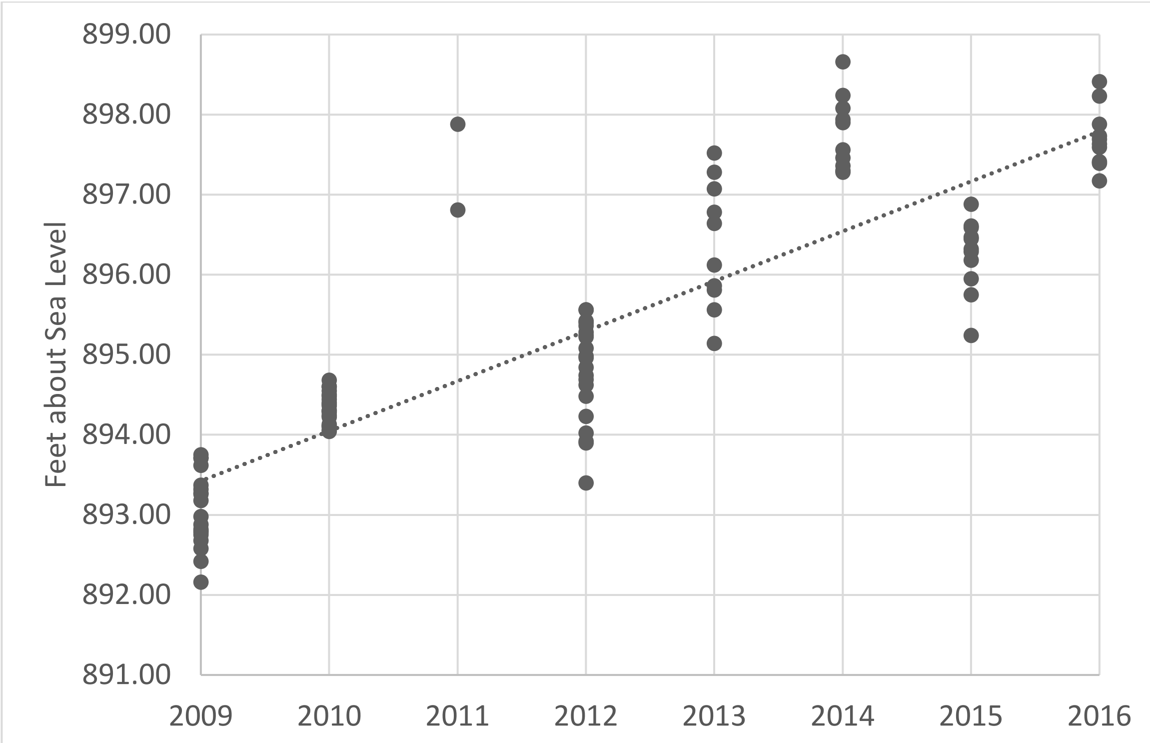


Figure 6: Depth profile showing monthly means of dissolved oxygen levels for 2015-2016.

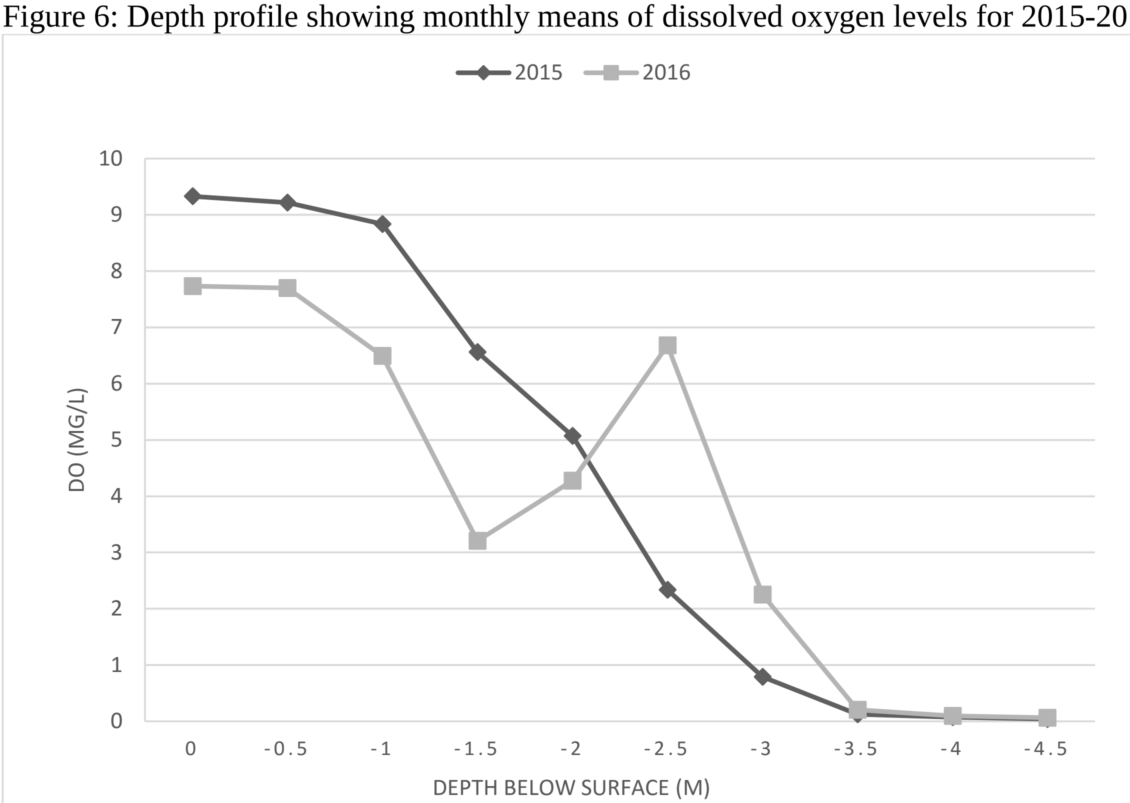
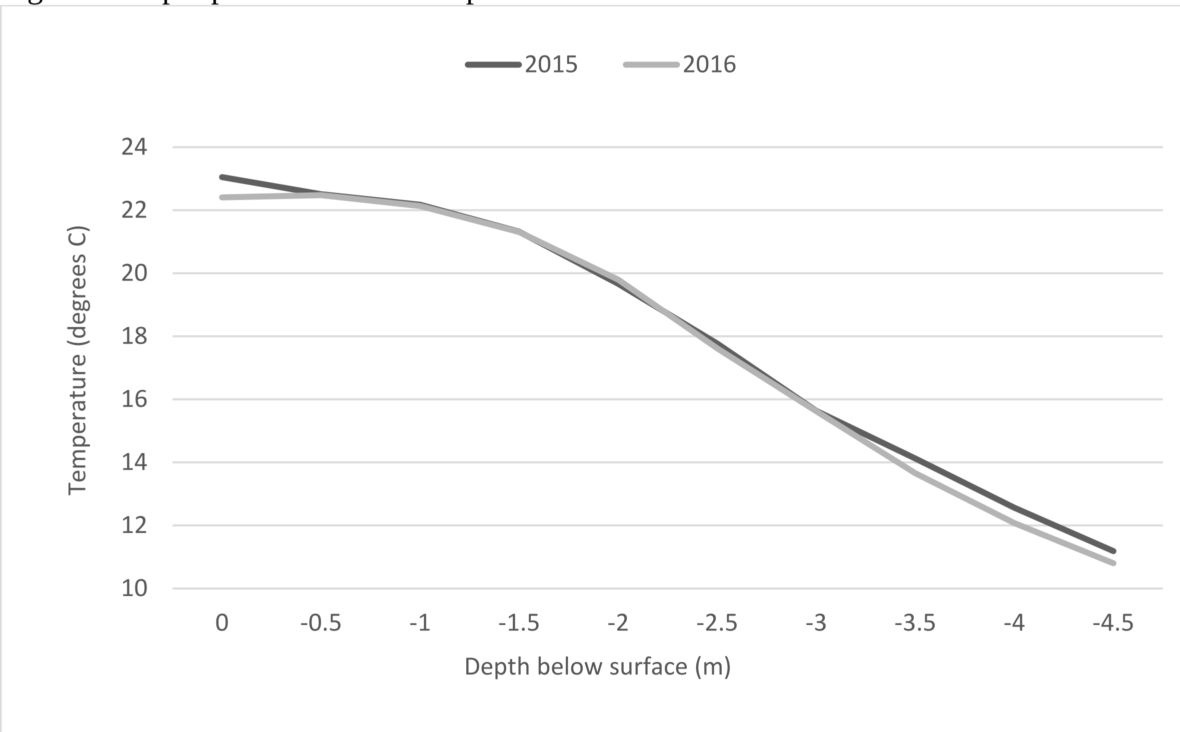


Figure 7: Depth profile of water temperature for 2015-2016.



Discussion:

Results from this study indicate a relationship between urban development and water quality. It was predicted that increased runoff would impact several variables associated with water quality. Phosphorus increased as predicted however the amount of change was less than expected. This was especially surprising considering the significant increases of chlorophyll a and decreased water clarity. Literary research revealed phosphorus to be a limiting nutrient, meaning that small amounts contribute to large algal growths (Correll 2014). Another study found more harmful algal blooms occurring in agriculture and urban areas than in undeveloped areas (Heisler et al. 2008). Examining other variables over a longer period of time will help better understand phosphorus and its role in Lochness Lake's water quality. Nitrogen content decreased for reasons unknown. The addition of paved surfaces and removal of plant matter may be affecting nitrogen fixation in the soil. Also, stormwater regulations for construction sites may be effectively preventing soils containing nitrogen from entering the lake. Studying how the nitrogen cycle interacts with the water cycle and is affected by construction may help clarify why Lochness Lake is experiencing decreased nitrogen content.

Lochness Lake also experienced an increase in surface level that was likely aided, in part, by the addition of impermeable surfaces that increased the volume of runoff. Similar observations have been documented in other studies (Bolstad and Swank, 1997). However, precipitation from the same time frame may have also contributed to surface level increase. Greater amounts of rainfall in the later years of the study may have created the appearance of construction influencing surface water elevation. Weather records do show some changes of annual precipitation levels (National Weather Service). Yearly precipitation was 25 inches in 2007 and 35 inches in 2015. Levels fluctuated from 20 inches to 30 inches for the years between 2007 and 2015. It was surprising to see relatively large increases of the lakes surface water level but small increases of nutrients. This may be explained by stormwater regulations that were not known when this study began. The City of Blaine is a holder of a MS4 (municipal and separate storm sewer) permit. This permit states that the City of Blaine must be compliant with regulations under the Clean Water Act and follow National Pollution Discharge Elimination Standards (NPDES) that establish conditions for discharging stormwater. Some of the regulations in the permit are aimed at minimizing stormwater runoff during and after construction projects. These are called best management practices (BMPs) and may include things like silt fences, bio-log filters, and stormwater holding ponds. Successful implementation of BMPs may explain the lower than expected increases of phosphorus and the decrease of TKN.

Conclusion:

The results of this study indicate that development within the watershed is correlated with changes in the water quality of Lochness Lake. From 2006-2016 data shows statistically significant annual increases of chlorophyll a, surface level and phosphorus but a decrease in water clarity and nitrogen content. This supports the hypothesis and shows that urban development is associated with negative effects on water quality. Limited data was available for water temperature and DO so more time is needed to understand if development is influencing these variables. It is important to understand the parameters that are effecting water quality to prevent degradation of important aquatic ecosystems. Lochness Lake is an example of how continued monitoring of natural resources is an important part of maintaining a clean, healthy and sustainable community.

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European Larch is a Dominant Tree Species at Belmont Lake State Park

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Keywords: Belmont Lake State Park, European Larch

Abstract:
Forty different tree samples were collected at Belmont Lake State Park. To identify the tree species we used a dichotomous key tree finder, "A Manual for the Identification of Trees by their Leaves" by Mary Theilgaard Watts,1991. Within the area of where the tree samples were collected, it was concluded that European Larch (*Larix decidua)* was the first most dominant tree and Eastern Hemlock (*Thug canadensis)* was second most dominate.

Introduction:
According to the New York State Tree Nursery (2018) the European Larch grows at a medium to fast rate. This tree grows from about 18.2 to 24.3 meters in height and has a width of 7.62 to 9.14 meters. The European Larch requires an area with sun and moist well drained soil. In the fall this type of tree turns yellow and drops needles. The needles vary in colors from bright to dark green, and the size of the needles are 25.4 to 38.1 millimeters long. The Eastern Hemlock has a growth rate of slow to medium and it grows best on cool sheltered sites. It is an Evergreen conifer tree that has a height of 15.24 to 22.86 millimeters long and a width of 7.62 to 10.66 millimeters. The needles and cones of this tree are 12.7 millimeters to 19.05 millimeters long.

Methods:
Forty different tree samples were collected from Belmont Lake State Park. Once the samples are collected it was necessary to take down the latitude and longitude of Belmont Lake State Park using Earth Explorer (USGS 2018). In order to identify the tree samples, we used a dichotomous key, "A Manual for the Identification of Trees by their Leaves" by Mary Theilgaard Watts,(1991). To keep track of all of the different tree species, we created a tally chart to record the number of trees belonging to each species.

Results:
Based on all the data that was collected at Belmont Lake State park, it was concluded that the most dominant tree species was European Larch (*Larix decidua).* Nine out of forty (22.5%) trees surveyed were European Larch. Also, Eastern Hemlock (*Tsuga canadensis)* were 6 out of 40 (15%), Red Cedar (*Juniperus virginiana)* and Tamarack (*Larix laricina)* both resulted in 3 out of 40 (7.5%). Other tree samples such as Atlantic White Cedar *(Chamaecyparis thyroids)*, White Pine *(Pinus strobus)*, American Holly *(Llex opaca)* and Pitch Pine (*Pinus rigida)* all resulted in 2 out of 40 (5%). Also Colorado Spurce *(Picea pungens)* was 4 out of 40 (10%) and Bald Cypress *(Taxodium distichum)* resulted in 5 out of 40 (12.5%). Lastly, the tree samples Scrub Pine *(Pinus virginiana)* and Sugar Maple *(Acer saccharum)* each had 1 out 40 (2.5%).

Table 1: Tree Samples from Belmont Lake State Park. Latitude 40.7362 Longitude -73.3404

Common Name	Scientific Name	Quantity	Percentage
European Larch	*Larix decidua*	9	22.5%
Atlantic White Cedar	*Chamaecyparis thyroids*	2	5%
Eastern Hemlock	*Tsuga canadensis*	6	15%
Red Cedar	*Juniperus virginiana*	3	7.5%
Scrub Pine	*Pinus virginiana*	1	2.5%
White Pine	*Pinus strobus*	2	5%
Sugar Maple	*Acer saccharum*	1	2.5%
American Holly	*Llex opaca*	2	5%
Bald Cypress	*Taxodium distichum*	5	12.5%
Colorado Spurce	*Picea pungens*	4	10%
Tamarack	*Larix laricina*	3	7.5%
Pitch Pine	*Pinus rigida*	2	5%

Discussion:
In Belmont Lake State Park forty trees were surveyed and the European Larch (22.5%) along with the Eastern Hemlock (15%) were found to be dominate. A study made by Valencia et al. (2017) identified 48 trees. Out of the forty-eight trees surveyed there was one European Larch (2.08%) in North Bayshore and one (2.08%) in North Brentwood. This data shows that European Larch is more dominate in a park area compared to residential locations.

Conclusion:
In Belmont Lake State Park from the forty samples that were collected the European Larch and the Eastern Hemlock were found to be most dominant in the area surveyed. Out of the forty samples the Scrub Pine and Sugar Maple were the rarest species.

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Wildlife Use of Restored Peatland Habitats in East Central Minnesota

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Keywords: Ecology, Wetlands, Restoration, Peatland, Camera Traps, Anoka Sand Plain

Abstract:
Wetlands are integral components of ecosystems. Recent studies show that nearly half of global wetlands have been lost; less than 9% of earth's land area remains as wetland. One of the resulting issues is a reduction in wildlife abundance and diversity. This is due to decreased native plant diversity that supports many terrestrial wildlife species. The overall objective of this study was to determine wildlife use in a protected and partially restored wetland in Blaine, MN. The hypothesis was that restoration of wetlands would increase the diversity of animal species present by providing more suitable habitat conditions. We used camera traps to capture animals in the restored and unrestored areas of the Blaine Wetland Sanctuary. The species richness at each location was recorded, and statistical analyses determined if there was a significant difference between the restored and unrestored areas. Although this is just the first phase of a long-term study, preliminary analyses suggest that wildlife species in the Blaine Wetland Sanctuary similarly uses both restored and unrestored wetlands, and camera placement is very important in documenting species presence. Of the animals captured, only three species were found in both the restored and unrestored areas whereas several species were found in only one area and not the other. Although there was no difference in species richness, more individuals were captured in the restored wetlands. These results will contribute to a database of wildlife use on a broader geographic scale to identify patterns of species diversity and habitat use in remnant and protected habitats of east central Minnesota.

Introduction:

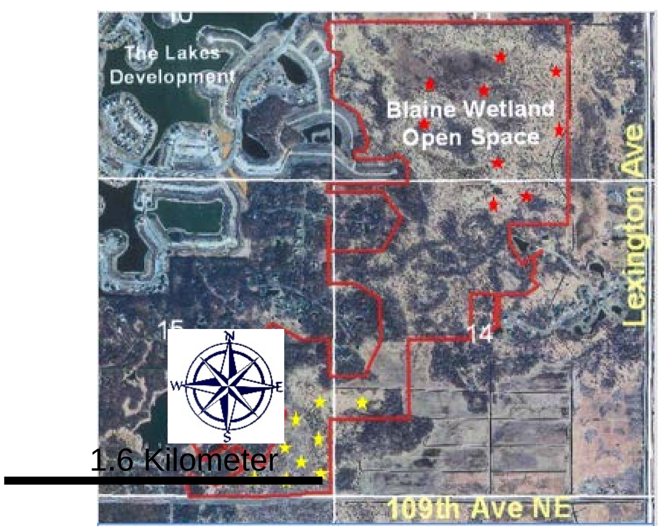
Wetlands are important components of ecosystems, contributing to biodiversity, water quality, flood prevention, and carbon sequestration (Zedler and Kercher 2005). Recent studies show that nearly half of the global wetlands have been lost; less than 9% of earth's land area remains as wetland (Zedler and Kercher 2005). In the United States, over 300,000 km of stream channels have been modified from 1820 to 1970 (Mensing et al. 1998). More specifically, in Minnesota over 35,000 km of streams were disturbed prior to 1971 (Mensing et al. 1998). Since streams are frequently modified to drain wetlands for agricultural purposes, the amount of stream disturbance is indicative of the level of wetland disturbance. The level of anthropogenic disturbance on wetlands in Minnesota is very significant and has lasting ramifications.

One of the issues caused by human disturbance is the negative impact on wildlife abundance and diversity. This is due to decreased plant diversity that supports life for many terrestrial animals (Zedler et al. 2001). Furthermore, in a review of eighty-five publications, researchers linked habitat variety with animal species diversity (Tews et al. 2004). They also suggested that certain keystone structures are necessary for animal species diversity to flourish (Tews et al. 2004). Other research has demonstrated a connection between the scale of habitat disturbance and the varying effects on different organismal groups (Mensing et al. 1998). The general trend in the findings suggested that the larger the habitat ranges of species, the more they were affected by broader scale disturbance (Mensing et al. 1998).

Advancements in technology (e.g., camera traps) have opened entirely new avenues for scientists and ecologists trying to determine population densities and species diversity of wildlife (Burton et al. 2015). However, there are some trade-offs that must be evaluated due to differences in camera performance and settings (Swann et al. 2011). Other issues involve determining the correct placement of the camera traps to capture the type and variety of species of interest (Kays et al. 2009). Researchers have proposed several models to combat these issues allowing for more accurate sampling (O'Connell et al. 2010). Camera traps provide an effective, round the clock means of surveying animal activities in specific areas (Burton et al. 2015). Studies have shown that data obtained via camera traps can be utilized to calculate the density of animal populations (Rowcliffe et al. 2008). For these reasons and others, in this study camera traps are employed to unobtrusively gather data regarding animal diversity in restored and unrestored wetlands.

The overall objective of this study was to determine wildlife use in a partially restored wetland at the Blaine Wetland Sanctuary (BWS) (Figure 1). This site was disturbed in the early 1800s when farmers drained the fertile peatland for farming. The northern 300 acres of the BWS are currently undergoing restoration, while the southern 200 acres remain unrestored. The restored areas are composed of lowland peat with small outcroppings of mesic forest intersected by two drainage ditches (Figure 2A and 2B). In contrast, the unrestored areas are predominantly forest habitat (Figure 2C). Restoration at the BWS is in the early stages. In the last two years, trees have been removed, the top layer of thatch has been mechanically raked, and invasive species have been managed with herbicides (Figure 2A). The plant community has responded very well to the restoration efforts and several species of rare and endangered plants have germinated from the native seed bank including Twisted Yellow-Eye Grass (*Xyris torta*) and Lance-Leaved Violet (*Viola lanceolata*). While the results of preliminary restoration are already evident for plants, it remains unclear if there is also a response in the animal community.

Figure 1: An overview map of the Blaine Wetland Sanctuary showing approximate camera locations (stars: red=restored, yellow=unrestored).



The objective of this study was to evaluate whether restoration of wetlands to pre-settlement conditions impacts wildlife use of these habitats. The central question for this study is: Does restoration of wetlands to pre-settlement landscape conditions influence the species diversity of animals? The hypothesis was that restoration of wetlands will influence the diversity of animals by providing more suitable habitat conditions. Also, if the restoration of wetlands results in higher plant species diversity, then the animal diversity will also increase.

Figure 2: (A, Left) The restored areas of the BWS are composed of lowland peat with islands of upland mesic forest. (B, Center) Open water areas of the BWS provide habitat diversity for many species like these Mallards. (C, Right) Looking down on the BWS shows the restored areas (cleared) and the unrestored areas (forested).

Methods:

Camera traps were haphazardly placed in 18 locations (9 each in restored and unrestored sections) for 2-3 week sampling periods (10-28 days) from 8/22/2017 through 11/26/2017 (Figures 1 and 3). Bushnell® cameras were used. Capture rate was set to one image/minute while all other settings were at default. Cameras were placed on trees one meter above ground. After each trap period, the images were downloaded, and the cameras were redeployed to new locations. The images were analyzed for evidence of animals. Individuals of the same species captured within 30 minutes of each other were not counted unless they were clearly a different individual. The date, species, sex, age, behavior, and identifying features of each individual at each location were recorded. The data were then statistically analyzed for trends and relationships. The total number of each species, the total number of individuals, and the percent community composition was calculated for both the restored and unrestored areas. A t-test was performed on the captures per trap day for the restored areas compared to the unrestored areas. Additionally, Shannon Diversity (H') and species richness were calculated for both areas.

Figure 3: Camera traps provided an effective means of surveying animals 24 hours/day.

Results:

Preliminary results indicated that both restored and unrestored sections of the Blaine Wetland Sanctuary are used by wildlife, although number of captures and species composition did differ. Of the individuals captured, 123 were in the restored area compared to 79 in the unrestored; while the species richness was approximately the same in both areas (Table 1). The proportion of bird species captured in the unrestored area was much higher than in the restored area (Figure 4). There were only three species found in both the restored and unrestored sites (deer, raccoons, and coyotes) however more individuals of each were in the restored site (Figure 4). Deer were also the most common species captured in both sites (Table 1). Shannon Diversity (H') was slightly higher in unrestored sites (0.591) compared to restored sites (0.485). Finally, there was no significant difference in captures/trap day between restored and unrestored sites ($t = 0.370$, $p=0.71$) (Figure 5).

Table 1: Species occurrence and species richness in the restored and unrestored sites of the BWS.

Species	Restored	Unrestored
White-tailed Deer	83	48
Raccoon	22	2
Mallard	5	0
Coyote	4	1
Opossum	3	0
Muskrat	2	0
Wood Duck	2	0
River Otter	1	0
Red Fox	1	0
Wild Turkey	0	14
Blue Jay	0	4
American Crow	0	3
Gray Squirrel	0	3
White-footed Deer Mouse	0	2
Red-bellied Woodpecker	0	1
Red-tailed Hawk	0	1
Total Number of Individuals	123	79
Species Richness	9	10

Figure 4: Animal community composition of restored and unrestored sections of the BWS.

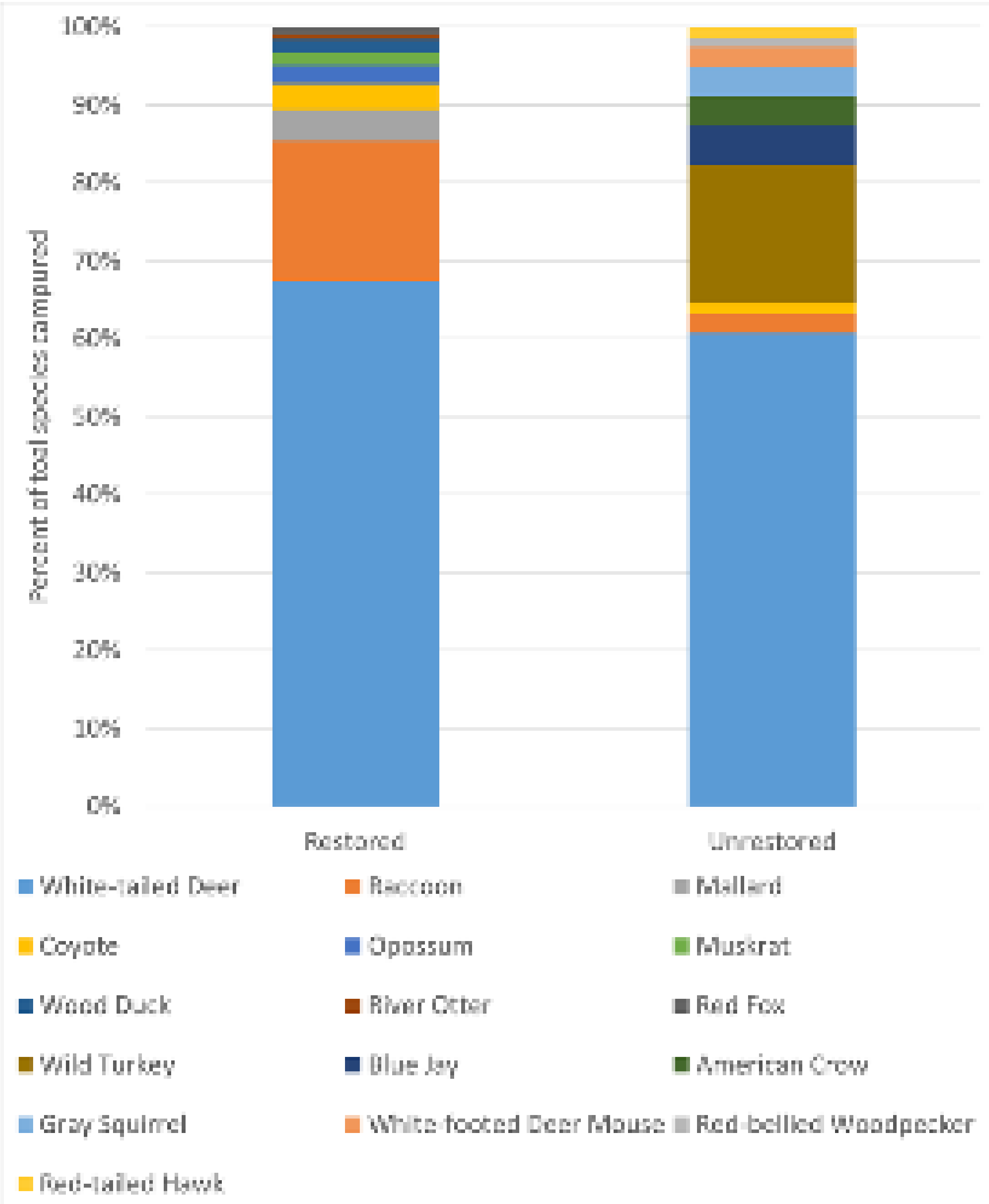
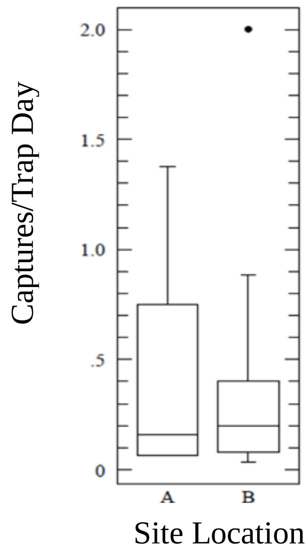


Figure 5: Results of an unpaired t-test of captures/trap day between the restored (A) and unrestored (B) sites (t = 0.370, st. dev = 0.464, df = 29, p = 0.71).



Discussion:

Although the results show no significant differences in diversity, species richness, or captures per trap day for species diversity in restored compared to unrestored sections of the BWS, there were more individuals captured in the restored area. This lack of significance was due to variability in the unrestored site data provided primarily by one outlier. Also, the data indicated a relationship between specific camera location and diversity. So, our hypothesis that restoration of wetlands would increase the diversity of animal species by providing more suitable habitat conditions was only partially supported by these preliminary data. Our findings differed from previous research that linked a decline in plant diversity with a decline in animal diversity (Zedler et al. 2001). However, in our case we were looking at the process of restoration. Thus, we were coming at the problem from the other side examining restoration rather than deterioration of wetlands.

Although our findings differed from predictions, they were still consistent with the classic, ecological definition of more niches resulting in more species. Our predictions were based on the expectation that the restored area would have more niches due to a greater diversity of plant species. Although this may have been the case, we failed to account for the further niches provided by the vertical portioning of trees in the forested, unrestored areas. This habitat provided more niches that were exploited by bird species. Our results reflected this fact with more avian species captured in the unrestored area. It is important to note that this study was limited to animal species that could be captured on the cameras. There are many other species such as insects and invertebrates that went undetected. This means that the increase in plant diversity may in fact be causing a yet undetected increase in animal diversity. Because of these capture limitations, this study provides only one piece of the whole ecosystem at the BWS.

Another important discovery was that the type of habitat at each camera location played a role in determining what species would be observed. Because the unrestored area of the BWS is primarily forested, many species of birds were observed there. In fact, five out of the seven species captured solely in the unrestored area were avian species. Similarly, in the restored section, the camera sites closest to open water areas captured all of the species that were found in the restored area, but not in the unrestored area. These results may indicate the presence of keystone structures in these wetland habitats (Tews et al. 2004). In the restored area, open water may be a keystone structure enhancing the entire wetland habitat making it suitable for many species of animals. As this study continues more data will clarify this possibility.

Because this wetland is in the early phases of restoration, it is critical to continue this study long term to monitor the progress as there may be a lag between plant community restoration and animal response. Previous studies have shown that full restoration of native vegetation diversity does not equate full restoration of native animal diversity. For example, some species of amphibians are unable to recolonize restored areas that are surrounded by urban development due to a lack of habitat bridges (Lehtinen and Galatowitsch 2001). Other species with larger home ranges may not recolonize a restored wetland if it is small and isolated. Research has shown that many bird species will not recolonize restored riparian corridors unless there is a forested buffer area (Mensing et al. 1998). Therefore, the results of this study are only a snapshot of the animal species present in the wetland at this early stage of restoration.

Moving forward, to compensate for the effect of specific camera location, this study should be continued for several years to allow for a larger sample size, and to account for seasonal changes in different species presence and behavior. For example, some species hibernate during the winter (e.g., squirrels) and other species (e.g., birds) migrate during the fall and spring. Also, cameras should be placed to capture animals in all the different habitats (peatlands, wet meadows, uplands, and water). Finally, the results of this ongoing study should be synthesized with the results for plant diversity. The comparison of the plant and animal diversity will provide ecologists and the city of Blaine with a clear and holistic picture of the overall results of restoration in the BWS.

Conclusion:

The results of this study did not completely answer our question nor support our hypothesis that restoration would increase animal diversity. However, they did suggest a relationship between restoration and higher abundance, as measured by numbers of individuals captured by the camera traps. Similarly, they showed a clear relationship between specific camera location and diversity of species captured. Since the BWS is in the early stages of restoration, the vegetation community is being actively managed and is in transition considering invasive species removal and establishment of native species. Thus, the findings in this study are useful as a baseline for future wildlife surveys in the BWS. Finally, these results are useful as they will contribute to a larger database of wildlife use on a broader geographic scale to identify patterns of species diversity and habitat use throughout east central Minnesota.

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Native Trees are Dominant over Non-Native Trees in West Babylon, Bay Shore and Islip, N.Y.

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Keywords: Native, Coniferous, Deciduous

Abstract:
A total of forty trees from four different residential properties were identified using the dichotomous keys (Watts & Watts 1970, Watts 1998, Petrides 1998). The species of trees identified were confirmed using the application Leafsnap (Belhumeur 2015). West Babylon, Bay Shore and Islip are located on the South Shore of Long Island. The most dominant trees found were Cedars, Oaks and Maples. 89% of the trees identified were Native to North America.

Introduction:
There are many elements that may affect the growth of a particular tree species. A big factor of the trees growth is climate. Other factors include the amount of sunlight and water the tree is getting, which can affect how fast or even how much the tree will grow, and if it'll ever grow to be to its full potential size. According to *MyForecast* (2018), in West Babylon the average precipitation is 0.102 meters; the average high temperature is 16.11 degrees Celsius, and the average low temperature is 6.67 degrees Celsius. In Bay Shore the average precipitation is 0.105 meters; the average high temperature is 16.11 degrees Celsius and the average low temperature is 8.33 degrees Celsius. In Islip the average precipitation is 0.105 meters, the average high temperature is 16.11 degrees Celsius, and the average low temperature is 6.67 degrees Celsius. Both properties in West Babylon and the properties from Bay Shore and Islip are close to each other, and their climates are almost the same.

Methods:
In West Babylon, Bay Shore and Islip, samples were taken from trees and examined to determine the scientific name of that tree, whether it was native or non-native, and coniferous or deciduous using the dichotomous keys (Watts & Watts 1970, Watts 1998, Petrides 1998). To help identify the trees, the applications vTree (Peterson 2012) and Leafsnap (Belhumeur 2015) were used. These applications also aided in finding the latitude, longitude, and elevation of the locations. The application vTree (Peterson 2015) was used to obtain the latitude, longitude and elevation of each property. When first opening this application, you can use choose which facts sheets you want. Then you type in the location and it tells you the information you need for that specific area (latitude, longitude, elevation). The Leafsnap application was used to find the scientific name of the tree, to see if the tree was native or non-native, and if it was coniferous or deciduous. To find this information, a leaf was picked off each tree and a picture was taken of it. The application then identified the leaf and gave a few options regarding its species the user of the application then chooses the picture of the leaf that most closely resembles their own.

Results:
Four properties, two in West Babylon, one in Bay Shore and one in Islip, all had different trees. On the West Babylon property, we found that 70% of the trees were White Cedar. In the town of Bay Shore,

30% of the trees identified were American Elm and Red Maple. In Islip, 20% of the trees identified were Oak.

Table 1 shows the four locations this study took place, West Babylon, Bay Shore and Islip. The latitude, longitude and elevation of each location was found, the four properties were used to compare what kind of trees were on each property.

Table 1: locations of the samples

Property 1: West Babylon	**Property 2: West Babylon**	**Property 3: Bay Shore**	**Property 4: Islip**
Latitude: 40.6435	Latitude:40.7217	Latitude:40.7404	Latitude:40.7417
Longitude: -73.3439	Longitude: -73.3694	Longitude: -73.2277	Longitude: -73.2202
Elevation: 5.18 m	Elevation: 14.1 m	Elevation:8.3 m	Elevation: 7.3152 m

Table 2 shows the types of trees on both of the West Babylon properties. The tree samples collected from these properties were used to find the scientific name, if its non-native or native, and if it's deciduous or coniferous. Twenty trees were identified on the West Babylon properties. Ten out of the twenty trees were identified as White Cedar Tree (*Chamaecyparis thyoides).* The last ten are Japanese Maple (*Acer palmatum),* Norway Maple (Acer *platanoides),* Cherry Plum (*Prunus cerasifera),* and Littleleaf Linden (*Tilia cordata).*

Table 2: Samples found on West Babylon properties

Common name	**Scientific name**	**Number of samples**	**%**	**Native or Non-native**	**Deciduous or Coniferous**
White Cedar Tree	*Chamaecyparis thyoides*	10	50%	Native	Coniferous
Japanese Maple	*Acer palmatum*	1	5%	Non-Native	Deciduous
Cherry Plum	*Prunus cerasifera*	2	10%	Non-Native	Deciduous
Norway Maple	*Acer platanoides*	3	15%	Non-Native	Deciduous

Littleleaf Linden	*Tilia cordata*	4	20%	Non-Native	Deciduous

Table 3 shows the species of trees in Bay Shore. 13 trees were identified and examined to find the scientific name, if its native or non-native, and if it's deciduous or coniferous. Three trees that were dominant in this study are the American Elm (*Ulmus Americana)*, Eastern Red Cedar (*Juniperus virginiana*), and Red Maple (*Acer rubrum)* with three American Elms, two Eastern red Cedars and two Red Maples. The other seven trees identified were Sugar Maple (*Acer saccharium*), White Cedar (*Chamaecyparis thyoides*), American Hornbeam (*Carpinus caroliniana*), Northern Red Oak *(Quercus rubra*), and Eastern White Pine *(Pinus strobus*).

Table 3; Samples found on Bay Shore property

Common name	Scientific name	Number of samples	%	Non-native or Native	Deciduous or Coniferous
Eastern White Pine	*Pinus strobus*	1	8.33%	Native	Coniferous
Sugar Maple	*Acer saccharium*	1	8.33%	Native	Deciduous
White Cedar	*Chamaecyparis thyoides*	1	8.33%	Native	Coniferous
American Elm	*Ulmus Americana*	3	25%	Native	Deciduous
Eastern Red Cedar	*Juniperus virginiana*	2	16.66%	Native	Coniferous
American Hornbeam	*Carpinus caroliniana*	1	8.33%	Native	Deciduous
Red Maple	*Acer rubrum*	2	16.66%	Native	Coniferous
Northern Red Oak	*Quercus rubra*	1	8.33%	Native	Deciduous

Table 4 shows the sample of trees found in Islip. A total of 7 trees samples were collected and evaluated to find the scientific name, if the tree was non-native or native and if they were either deciduous or coniferous. Of the 7 trees, none of them had more than one on the property. The 7 trees identified are Pitch Pine (*Pinus rigida*), American Beech (*Fagus grandifolia*), American Hornbeam (*Carpinus caroliniana*), Sugar Maple *(Acer saccarum*), White Ash (*Fraxinus Americana*), Swamp White Oak (*Quercus bicolor*), and Black Walnut (*Juglans nigra*).

Table 4: Samples found on Islip property

Common name	Scientific name	Number of samples	%	Non-native or Native	Deciduous or coniferous
Pitch Pine	*Pinus rigida*	1	14.286%	Native	Coniferous
American Beech	*Fagus*	1	14.286%	Native	Deciduous
American Hornbeam	*Carpinus caroliniana*	1	14.286%	Native	Deciduous
Sugar Maple	*Acer saccarum*	1	14.286%	Native	Deciduous
White Ash	*Fraxinus americana*	1	14.286%	Native	Deciduous
Swamp White Oak	*Quercus bicolor*	1	14.286%	Native	Deciduous
Black Walnut	*Juglans nigra*	1	14.286%	Native	Deciduous

Discussion:
At the West Babylon Properties, 70% of the trees were native to North America. A study conducted in 2016 showed that two out of two trees found were native which are the Black Cottonwood *(Populus balsamifera*) and the Hardy Catalapa (*Catalapa speciose*) (Alexander et al. 2016). In the Bay Shore property, 100% of the trees were native to North America as well. In a similar study, sixteen out of twenty trees identified in Brightwaters were native to North America (Castro et al. 2017). In the Islip area, 100% of the trees were native as well. In another study also in Islip, seven out of thirty trees found on that property were native (Perullo & Baptiste 2017). These studies show that even if tree identifications are taken place in the same town, there may be different types of trees growing in certain areas.

Conclusion:
Out of the forty trees found in this investigation, only 10% of the trees were found to be non-native. 90% of the trees found were native to North America. The results above support that native trees are dominant over non-native trees on residential properties in West Babylon, Bay Shore, and Islip.

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Dominance of Maple Trees Varies Between Brentwood and Babylon / Deer Park, N.Y.

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Abstract:

In this experiment we gathered forty tree samples and bushes from Suffolk County, Long Island. We picked them from residential properties in Brentwood, Babylon, and Deer Park. Using two different dichotomous keys and the app Leafsnap we were able to classify the different trees and bushes. We saw that Maple trees were dominant in Brentwood but not in Babylon and Deer Park.

Introduction:

There is a fairly broad selection of Maple Trees that can be found all over Long Island. Some are Sugar Maple, Red Maple and Norway Maple. Red Maple trees are most commonly found on Long Island (Welmore 2016). According to Allen (2017) the native range of the Maple Tree is in the Eastern and Central part of North America. They grow 12.192 meters to 21.336 meters tall and spread 9.144 meters to 15.24 meters. They bloom in March to April. They can also tolerate wet soil and air pollution.

Methods:

We took branch samples from trees and bushes that were on residential properties in Suffolk County. Each student found up to ten different branches. Samples were identified using dichotomous keys by Watts (2004), Watts (1991), and Symonds (2004). The students also used an app called “Leaf Snap” (Bellhuneurand 2016) that allows anyone to snap a picture of a branch and then identifies the exact tree or bush. With the information that they found, they were able to compare all the trees and bushes found from each town; Brentwood, Deer Park and Babylon.

Results:

The latitude and longitude of residential properties in Babylon, Deer Park, and in Brentwood (Table 1), and the different trees and bushes found on the different properties (Table 2) are reported below. We found that there were ten Eastern Red Cedar (*Juniperus virginiana*) trees found on one property in Brentwood.

Table 1: Different Property Locations Used for Trees and Bushes

Property 1: Babylon	**Property 2: Deer Park**	**Property 3: Brentwood**	**Property 4: Brentwood**
Latitude: 40.725577	Latitude: 40.748671	Latitude: 40.796137	Latitude: 40.756955
Longitude: -73.353839	Longitude: -73.344769	Longitude: -73.254674	Longitude: -73.250950

**Table 1 depicts the latitudes and longitudes properties in Babylon, Deer Park and Brentwood*

Table 2: Trees Found on Property #1 (Latitude: 40.725577/Longitude: -73.353839)

Type of Tree	**Scientific Name**	**Quantity**	**Percentage Found**
Pink Rose Bush	*Rosa* (Hybrid)	2	22% (.22)
White Rose Bush	*Rosa* (Hybrid)	1	11% (.11)
Yellow Rose Bush	*Rosa* (Hybrid)	1	11% (.11)
Red Rose Bush	*Rosa* (Hybrid)	1	11% (.11)
Shagbark Hickory	*Carya ovata*	2	22% (.22)
Arbor Vitae	*Thuja occidentalis*	1	11% (.11)
Red Maple	*Acer rubrum*	1	11% (.11)

**Table 2 shows trees found on property #1*

Table 3: Trees Found on Property #2_ (Latitude: 40.748671/Longitude: -73.344769)

Type of Tree	**Scientific Name**	**Quantity**	**Percentage**
White Cedar	*Thuja occidentalis*	1	11% (.11)
Dotted Hawthorn	*Crataegus punctata*	1	11% (.11)
Kentucky Coffeetree	*Gymnocladus diocus*	1	11% (.11)
Black Walnut	*Juglans nigra*	4	44% (.44)
Silver Maple	*Acer saccharinum*	1	11% (.11)
Red Maple	*Acer rubrum*	1	11% (.11)

**Table 3 shows trees found on property 2*

Table 4: Trees Found on Property #3 (Latitude: 40.796137/Longitude:-73.254674)

Type of Tree	**Scientific Name**	**Quantity**	**Percentage**
Chinese Hibuscus	*Rosa-sinensis*	1	6% (.06)
Red Maple	*Acer rubrum*	2	12.5% (.125)
Eastern Red Cedar	*Juniperus virginiana*	10	62.5% (.625)

Japanese Maple	*Acer palmatum*	1	6% (.06)
Silver Maple	*Acer saccharinum*	2	12.5% (.125)

**Table 4 shows trees found on property 3*

Table 5: Trees Found on Property #4 (Latitude: 40.756955/Longitude:-73.250950)

Type of Tree	**Scientific Name**	**Quantity**	**Percentage**
Silver Maple	*Acer saccharinum*	1	16% (.16)
Striped Maple	*Acer pensylvanicum*	1	16% (.16)
Buckthornbomella	*Rhamus*	1	16% (.16)
Gum Bumelia	*Sideroxylon languginosum*	1	16% (.16)
Red Maple	*Acer rubrum*	2	33% (.33)

**Table 5 shows trees found on property 4*

Discussion:

Orto et al. (2017) found three Silver Maples (*Acer saccharinum)* in one property in Deer Park and one property in Brentwood. In our study we found three Silver Maple (*Acer saccharinum)* trees in Brentwood on both properties. Brown and Banks (2017) found two Eastern Red Cedar (*Juniperus virginiana*) in Farmingdale. In our study we found ten Eastern Red Cedar (*Juniperus virginiana*) trees in one Brentwood property.

Conclusion:

Among the forty trees we surveyed in Babylon, Deer Park, and Brentwood, we found there was a dominance of Silver Maple Trees (*Acer saccharinum*), and Eastern Red Cedar (*Juniperus virginiana*) trees in Brentwood. Also, another common tree was the Red Maple Tree (*Acer rubrum*) found in Brentwood as well. Red Maple (*Acer rubrum)* shows a dominance in the region being the only tree present on all four residential properties.

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