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Survey of Invasive Species Surrounding Brookhaven National Laboratory

Non-native plants were first introduced to North America around 1850. Appearing in nursery catalogs, early non-native plants began as simple ornamental plants. While some of these plants have turned out to be harmless and non-invasive many others have turned out to be harmful to the surrounding flora. Invasive plants compete with native plants for space and often displace the native plants they are competing with. As the invasive species dislodge the native plants, the environment loses the wide diversity of plants it once had. In addition, the invasive plants ruin the environment's biodiversity by decreasing the amount of food the animals have to eat. Many of the invasive species cannot be consumed by animals and because the native plants have been supplanted, the animals have nothing else to eat.

Invasive plants can cause extreme damage to native plants, however, luckily there are only a few invasive plants that are able to cause this kind of damage. Furthermore Only a small sub-set of the 1,100 non-native species known are invasive. Taking this into consideration, Brookhaven is now trying to estimate the extent of the damage done by these invasive species and is also attempting to figure out the area these invasive species take up.

Japanese Barberry is among the most common shrubbery found in Brookhaven. Barberry tends to excessively grow, taking up all of the surrounding land. This plant was introduced to the U.S. in 1875 from Russia to Boston.

Brookhaven National Laboratory covers 5,265 acres within the Pine Barrens. The Laboratory is trying to estimate the amount of land taken up by invasive species. By doing this, Brookhaven will be able to help maintain Long Island's biodiversity as well as protect Long Island's native plants from these invasive species. Due to the behavior of invasive species, it is important to try to eradicate these plants before they do too much harm to the native plants. If left unchecked many of these invasive species will out-compete the native plants. The invasive plants out-shade these plants as well as take up essential nutrients and thus prevent native plants from growing

Finding how much land the invasive plants take up is essential in helping managers make decisions about keeping a healthy environment. In collecting this base-line data, it will be easier for employees at Brookhaven to come up with a plan to control these invasive species. Once Brookhaven has come up with a plan to control these plants, it will be easier to assist the preservation of our biodiversity and keep our environment free from the threat of invasive species.

Scotch Thistle was not commonly found during my search however, there are multiple types of thistle – this is simply one of them..

It is often hard to estimate the size or density of an invasive species when looking at a picture. Instead, we use a global positioning system in order to plot the coordinates of the location of the plants. In addition to the coordinates, the GPS is able to store information about the species such as the specific species found, the size of the area it occupies, and the shape of its area upon taking the coordinates of the locations of these plants.

The GPS unit, called a MobileMapper, works in coordination with a program called ArcGIS. ArcGIS is a program used for computerized mapping. After I record the information with the GPS system, the results are exported as a layer. This layer can be combined with existing layers in the ArcGIS program to form a map. The resulting map can be used for visualization and analysis such as the map in figure 1.

There are multiple problems affecting this process. Weather may affect the consistency and reliability of the GPS. For example, fog can greatly affect the number of satellites the GPS can read and it increases the error value. The error value is read by the PDOP which stands for positional dilution of precision. PDOP is able to accurately perceive the accuracy of the GPS unit by reading the interferences affecting the GPS. In addition to GPS errors, there are also human errors. Many of the areas I encountered were extremely dense, hindering my ability to plot every plant I could see or find.

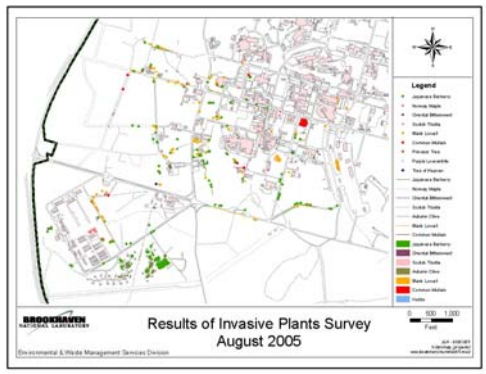

Figure 1

Both the map (fig. 1) and the graph (fig. 2) represent the different invasive species I found as well as the number of times they appeared. The map shows where the invasive species were found in reference to the buildings and roads around Brookhaven National Laboratory. In total, I covered 272 acres around Brookhaven in search of invasive plants. Fortunately, I did not find invasive plants in all 272 acres of land I went through. This shows that there are actually invasive free areas and that there are no invasive species around those areas

The most common invasive plants I found were Japanese Barberry and Black Locust. Japanese Barberry was the most common of all of the invasive species I found. However, there were also invasive plants that were rarely found, but when they were found, they appeared to have taken over the area they surrounded. Kudzu, for example, was only found in a little area by the Upton Gas Station. But within this area, Kudzu was the dominant plant.

After going through the locations I encountered, I noticed that the plants I found seemed to have been planted ornamentally. After these species were planted, many of them spread and they eventually may become like the clusters of invasive plants I found such as Japanese Barberry.

The Black Locust is a common invasive species in Brookhaven. It is among the two most common invasive species I found during my search. Black Locust is normally found along the edges of roads forming a straight line.

After surveying the main campus area of Brookhaven, I have found that invasive species do not merely exist in these areas but are extremely widespread. The Black Locust and Japanese Barberry fill the areas around the streets and are also found within the forests. These invasive plants take the place of our native alternatives thus out-competing many of the native plants.

It is essential that all of us try to help stop the spread of invasive plants to help save our environment's biodiversity. These plants will continue to grow unless we do something to stop that. From the mapping already done around Brookhaven, it is clear we already have an abundance of invasive plants. Now we need to focus on controlling these plants. Your role in all of this would be to try to prevent any further planting of invasive species as ornamental plants.

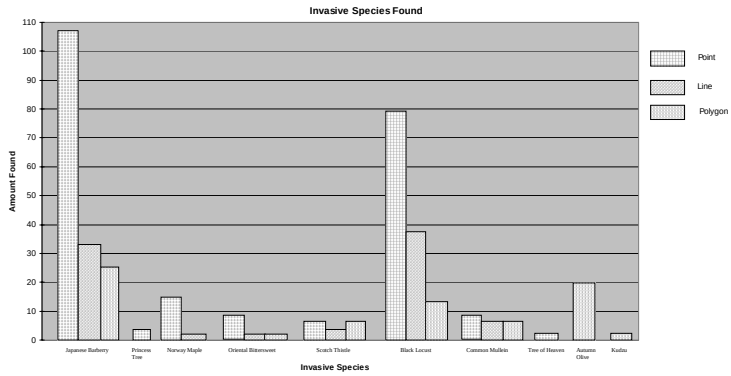

Figure 2

References:

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The Norway Maple Tree grows in 13 states in the eastern United States and displaces many native trees, shrubs, and herbs. It is not a very common invasive species. One way to differentiate it from native maple trees is the sap that forms in the veins of the leaves and in the stems. This species is normally planted as an ornamental plant not just around Brookhaven, but around the rest of Long Island.

Oriental Bittersweet was originally introduced to the United States in 1860 from Asia as an ornamental plant and is still sold despite its affects on the environment. This versatile plant is able to grow in many types of areas and overwhelms both native and non-native trees by growing all over them.

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