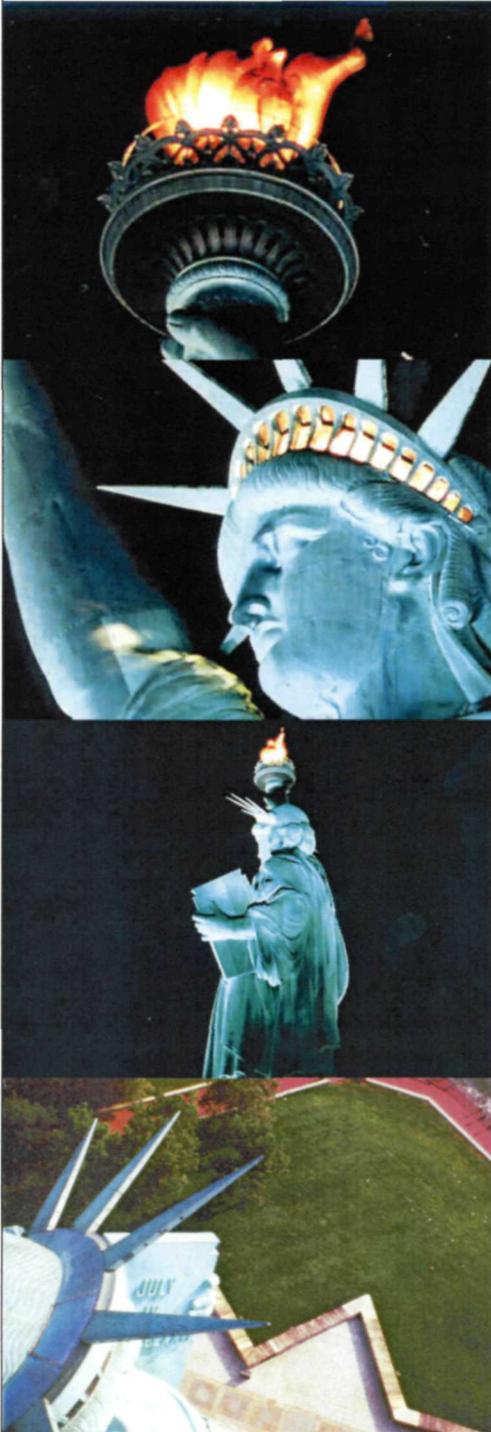




Statue of Liberty  
National Monument  
& Ellis Island

The newsletter of  
sustainability efforts  
and environmentally  
preferable alternatives

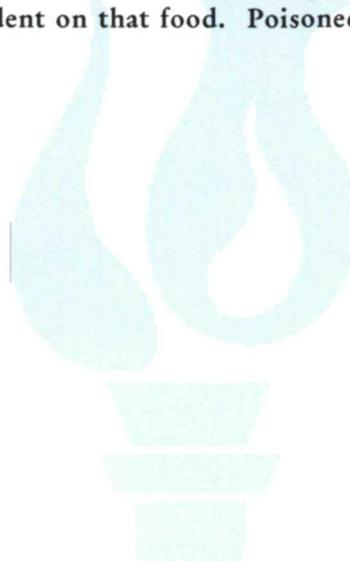
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# Patina

## The Soil Issue

In this issue of Patina we celebrate the soil in honor of Earth Day which is April 22nd. Soil is the medium that provides us with nearly all our food, clothing, building materials and naturally purifies our water. Soil is very often referred to as "earth" as it is considered the material that our planet is made of. Indeed it sustains life as we know it on Earth. Never call it dirt! Clearly the quality of life for all the Earth's creatures is determined by how healthy the soil is. Perhaps you've never given it much thought but healthy soil will produce healthy food that in turn will produce healthy creatures that are dependent on that food. Poisoned soil will produce unhealthy results.



**To highlight the Statue's simple yet highly effective mechanism for sustaining itself this newsletter takes on the name: Patina.**

At the Statue of Liberty National Monument & Ellis Island we are moving forward on environmental responsibility by improving the quality of our soil. This means using fewer chemicals like synthetic fertilizers and pesticides. This spring we have implemented the switch over to a sustainable lawn. The procedure began on the lawn directly surrounding the Statue. The process consists of feeding the soil with compost and letting the soil provide the necessary nutrients for the grass to grow. With this procedure we make the Statue of Liberty National Monument a safer, less toxic environment as we improve our soils to maintain our cultural landscape. Read on about this procedure in this issue of Patina, which is highlighted in "A Special Shade of Green: Managing Miss Liberty's Lawn for Sustainability".



# A Special Shade of Green: Managing Miss Liberty's Lawn for Sustainability

# Green :



## I. Context

The Statue of Liberty has looked out on New York Harbor for over 100 years. She has welcomed and witnessed the tired huddled masses arriving to our shores. These days she welcomes and looks down upon up to 20,000 visitors per day. She also looks down upon a massive green lawn that gently spreads out on the ground below her.

The 1939 Master Plan for the development of Liberty Island attempted to create an appropriate setting for the Statue of Liberty. The design goal was to have the Statue of Liberty stand out on the southern end of the Island as the dominant feature. The green lawn that surrounds the statue helps to achieve this design goal. What is unusual these days is how the lawn is being maintained. Rather than a lawn that is dependent on synthetic chemicals to keep it green and to manage pests and diseases a "greener" or more environmentally friendly approach is underway to allow the grass to grow in a more natural way. This approach has as its basis "feeding" the soil or more appropriately feeding and managing the microbial populations living in the soil. The environmental benefits of this approach are: no toxic chemicals stored on site, safer conditions for visitors and staff, no chemical runoff into New York Harbor and a return to the concept of relying on & supporting the soil to grow healthy plants. Sometimes this approach is called sustainable soil management. In this particular case a sustainable lawn. Miss Liberty's sustainable lawn! Indeed that is a Special Shade of Green.

For more information please contact Al Farrugio at the Statue of Liberty National Monument and Ellis Island. Telephone (212) 363-3206 ext. 141 or Email [Al\\_Farrugio@nps.gov](mailto:Al_Farrugio@nps.gov).

## The Soil Environment

The soil environment contains as its principal components: Air, Water, Minerals, Organic Matter and populations of: Bacteria, Fungi, Actinomycetes, Algae, Protozoa, Nematodes, Arthropods, and Earthworms.

**In poor soil these organisms are few.**

A healthy soil contains these organisms in profusion where they form a complex yet balanced food web.

Properly Balanced Soil Contains:	Typical Soil Contains:
5,000,000,000 Bacteria/gram	100,000 Bacteria/gram
500,000,000 Actinomycetes/gram	2,000 Actinomycetes/gram
50,000,000 Fungi/gram	5-10,000 Fungi/gram

The sustainable lawn encourages the populations of soil organisms to thrive by:

- Sustaining or feeding the soil microbes with several applications of compost or other forms of organic matter during the growing season. Adding organic matter provides more food for microbes.
- Aerating the soil using mechanical aeration equipment. Soil microbes need oxygen to prosper and they give off carbon dioxide. Aeration allows better gaseous exchange between the atmosphere and the soil. When soil is aerated more oxygen enters the soil to benefit microbes and plant roots. Likewise, excess carbon dioxide is released to the atmosphere preventing microbes from asphyxiation.
- Avoiding soil compaction. Soil compaction prevents gaseous exchange between the soil and the atmosphere and consequently has a deleterious effect on soil microbes and the grass. Visitors are kindly requested to show they care and stay on the paved surfaces to prevent soil compaction.

- Providing adequate moisture levels through irrigation which supports prolific microbial populations.
- Avoiding the use of chemicals that kill soil organisms and upset the soil food web (e.g., insecticides, high nitrogen synthetic fertilizer, herbicides and fungicides).

## Why support soil microbes and other soil organisms?

The sustainable lawn supports soil microbes and other soil organisms because their biological functions provide numerous benefits for the soil and grass such as:

- decomposing organic matter thereby recycling nutrients and making them available to plants aiding plant roots in the uptake of water and nutrients
- improving soil structure and preventing compaction
- producing natural growth hormones which stimulate root growth
- producing antibiotics that fight root diseases
- detoxifying the soil

## II. Process

The operations that are being employed to build a sustainable lawn at the Statue of Liberty National Monument consist of soil aeration, applications of compost, overseeding, employment of cultural practices that support the lawn ecosystem, and use of non-polluting mowing equipment.

- Soil aeration: Mechanical aeration equipment pulls cores out of the soil allowing oxygen to penetrate below the soil surface. This initial step allows the existing microbial populations to proliferate.
- Applications of compost: The soil microbial populations must have a constant supply of organic matter or their numbers will be reduced. During the growing season several applications of compost are applied

to the existing lawn. Each application is made using a topdresser which carefully covers the existing lawn with 1/4" of compost. The compost feeds the microbes, increases their populations and allows them to make soil improvements that create conditions for a vigorous healthy lawn. Soil aeration and compost applications are repeated every 5 weeks through the growing season.

- Overseeding: This step incorporates into the existing lawn cultivars of turfgrass seed that have desirable characteristics. The addition of turfgrass cultivars that are better able to resist diseases, require less water, and are vigorous growers that can withstand traffic are selections that are used for overseeding.
- Employment of cultural practices that support the lawn ecosystem: Good cultural practices consist of: taking soil samples for nutrient analysis, mowing high to conserve moisture, recycling grass clippings during mowing, irrigating deep and infrequently to encourage deep root growth, using an Integrated Pest Management approach to deal with pests and diseases and avoiding the use of chemicals that can disturb the soil food web.

## III. Results

A natural lawn that is safe, looks good and doesn't threaten the environment. Knowing that the soil below the Statue of Liberty is alive with thriving populations of microorganisms will hopefully set a national example of how we can improve our environment as we preserve and protect our natural and cultural resources.

# ONE EXTRA SPECIAL VISITOR:

What better way to realize that the borders of our park extend beyond the seawalls of Liberty and Ellis Islands than to spot a special frequent visitor to Liberty Island. A peregrine falcon has been spotted several times by a number of Liberty Island rangers. However it was Chief of Maintenance, Pete O'Dougherty who documented its presence with the aid of his digital camera. While taking close up photographs to evaluate conditions of the copper skin of the Statue, Pete noticed the Peregrine Falcon resting on the folds of copper under the right arm of the Statue. He snapped this photo of it. Peregrine Falcons feed on a number of smaller birds like starlings and sometimes pigeons. If you would like to see a live Peregrine Falcon family go to the lobby of 55 Water Street which is just a few blocks east of MIO. There you will find a TV monitor that is transmitting live pictures from a 14th floor ledge of a Peregrine Falcon pair named Jack & Diane who are minding their nest waiting for their eggs to hatch. It is very possible that one or the other of the pair, our neighbors, make their way to Liberty Island to perch on Miss Liberty in search of food for the family. Their visits reinforce the need to keep our park operations free of toxic materials that might get into the environment where they can cause harm to wildlife.



## New Vocabulary Words:

**DECONSTRUCTION:** The process of dismantling a structure and salvaging the parts for reuse and/or sending them off to be recycled. This process is underway in the former American Museum of Immigration in the Monument on Liberty Island. Rather than demolishing the exhibit space and sending the parts to a landfill a deconstruction effort is underway. Reusable pieces like lumber are being salvaged and we have sent the old ceiling tiles back to Armstrong for recycling.



## Patina Volume 1, Issue 2

Diane H. Dayson  
*Superintendent  
Statue of Liberty National  
Monument & Ellis Island*

Cynthia Garrett  
*Deputy Superintendent  
Statue of Liberty National  
Monument & Ellis Island*

Al Farrugio  
*Editor in Chief  
Statue of Liberty National  
Monument & Ellis Island*

Bill Rivera  
*Graphics Production Manager  
Statue of Liberty National  
Monument & Ellis Island*

Contributors for this issue : Al Farrugio