How to use soil surveys and aerials photos in logging operations

This article explains how loggers, landowners, and foresters can use soil surveys and aerials photos to plan a timber harvest.

**Soil surveys**

A soil survey is a map and booklet that describes the location and expanse of different soil types in New York. "Know your soil" is an important term to keep in mind because the soil type controls many aspects of forest health. They indicate different soil types and names, wet spots, drainage patterns, steep slopes, and other good information. Remember, forests do not exist without soil.

The quality of the soil affects what kinds of trees will grow and how well they can tolerate windstorms, wetness, and regeneration. For forest management, a soil survey provides a description of the suitability of the site for logging roads, reforestation, and typical forest types.

To obtain a county soil survey, stop by the local Soil and Water Conservation District or Cornell Cooperative Extension office. You can get a copy of the information or purchase the entire survey. Some offices will provide you with a soil survey at no charge. If you are not familiar with soil surveys or how to use the information they have, talk to a Soil and Water Conservation District technician or county Cornell Cooperative Extension educator.

In a soil survey, locate the timber harvest site using the locator map and map numbers. Use your knowledge of roadways and streams to pinpoint the exact location of the timber harvest site. Read and make a note of which soil survey symbols correspond to all areas of the site (VoB, Ar, CaB, etc.). At the beginning of the map section, there will be a chart that matches the soil symbol to the name of the soil. Write down the names and locations of these soils on your baseline map, outlining their general location.

In the text portion of the soil survey, you will find a complete description of the soil and its quality. The description will explain whether it is well-drained, whether it is especially wet during the spring, and its limitations for reforestation, farming, and other activities. Other charts in the soil survey summarize the soil properties for
forest roads, erosion potential, and tendency for compaction. All this information leads to a much better understanding of the erosion potential of the harvest site.

**Aerial photos**
Aerial photographs will help you get a bird's eye view of your forest. With it, you will see features you've not seen before. Many county Soil and Water Conservation District offices keep good aerial photographs on hand and will copy one or two for you for a small fee. It is worth every penny. Get a lot of copies so you can mark them up with all your forest plans! Satellite imagery is available on-line, but the low resolution is frustrating to work with, unless you have a massive forest. Instead, get the aerial photographs. If you go online, look at the NYS Geographic Information Systems Clearinghouse at www.nysgis.state.ny.us.

**How to use aerial photos and soil surveys to plan a timber harvest**

Identify and understand the soil types and slopes in the proposed timber harvest site. Choose logging areas based on soil drainage, so work can be done on firm ground to extend the work season and ensure a timely harvest schedule. You can estimate slopes with the following conversion table:

<table>
<thead>
<tr>
<th>Slope</th>
<th>Grade</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0-3%</td>
<td>ErA = Erie silt loam, 0 - 3% slopes (gentle slope)</td>
</tr>
<tr>
<td>B</td>
<td>3 -8%</td>
<td>EuB = Burdett silt loam, 3 - 8% slopes (moderate slope)</td>
</tr>
<tr>
<td>C</td>
<td>8-15%</td>
<td>LnC = Lansing gravelly silt loam, 8 - 15% slopes</td>
</tr>
<tr>
<td>D</td>
<td>15-25%</td>
<td>HnD = Hornell channery silt loam, 15 - 25% slopes (steep)</td>
</tr>
<tr>
<td>E</td>
<td>25-35%</td>
<td>SyE = Schuyler silt loam, 25 - 35% slopes (very steep)</td>
</tr>
</tbody>
</table>

These slopes and soil types can identify soils that are well-drained, suitable for skidding even during wet seasons.

**Identify seeps and wet spots in vicinity of logging.**
These areas are marked with a special symbol or dashed line. Forested wetlands should be avoided as much as possible when harvesting starts. Soil surveys note where seeps, springs, and wet spots may interfere with good logging conditions. There are critical areas and should be avoided. Normally the soil in these spots will never dry or freeze. Logging equipment is likely to cause significant erosion in wet areas.

**Identify intermittent streams.**
Small-scale or intermittent streams may be dry through most of the year, but have flowing water after storms, heavy rain, or during spring runoff. Timber harvesting operations should work around or clean up over these streams, protecting the banks from erosion.
**Outline changes in woodland types.**
Aerial photographs often help clarify where forests change composition. For example, a pine-dominated forest will appear darker than a hardwood forest. Subtle changes, such as from a young aspen stand to an older maple stand can be identified with aerial photographs.

**Locate existing forest roads.**
Obscure forest roads, pipelines, and jeep trails may be visible on soil survey maps. If these are properly constructed, they can be used for logging equipment movement without harming forest soils. These existing roads can also provide options for entering the property.

**See property features on adjacent land.**
Proper timber harvest planning takes into account water features on adjacent property, such as small wetlands, streams, and farm ponds. Use aerial photographs to avoid the mistake of polluting water bodies within a short distance of the timber harvest. Aerial photos will also show current woodland edges, streams, sapling stands, softwood plantations, and adjacent property features.

Forest owners, loggers, and foresters are all responsible for ensuring logging activities do not cause environmental harm to streams and lake waters.