Part 2: Planning

BMP planning helps to:

- ✓ Evaluate the soil's potential for erosion risk.
- ✓ Locate streams and waterbodies to protect.
- ✓ Establish and mark SMZs (stream buffers).
- ✓ Determine road access needs.
- ✓ Assess stream crossing options (including avoidance).
- ✓ Lay out skid trail and deck locations.
- ✓ Anticipate site rehab needs.

Planning can help minimize water quality impacts and promote efficiency of all forestry operations, not just logging.

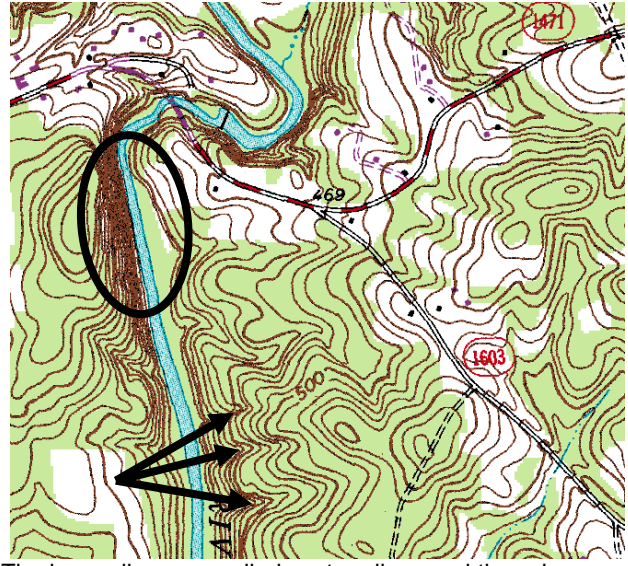
Use these planning tools:

1. On-site visit with maps
2. Topographic maps ("topo" maps)
3. Soil survey maps
4. Aerial photos or satellite images

The NCFS provides a free online Forest Preharvest Planning Tool (QR code) that summarizes multiple data sources to help plan a timber harvest and create custom tract maps. Icons can be placed on the map to show where BMPs should be installed.

Here are five map examples showing the same location.

Example 2A: Topographic (topo) Map



The brown lines are called contour lines and they show similar elevation on the landscape.

-- As contour lines get closer together, this indicates steeper slopes (circled area).

-- Contour lines shaped like a "V" indicate the likely location of a stream, gully or other drainage (three arrows).

-- Dashed or solid blue lines estimate rivers and larger streams. Topo maps do not show all streams.

Visit the site to verify stream location!

Example 2B: Soil Survey Manuscript Map

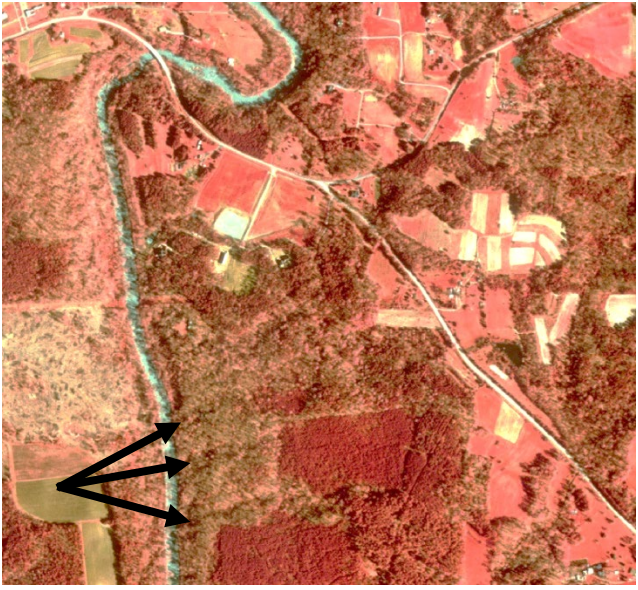
The solid black lines separate different soil types.
The alphabetic codes refer to the estimated soil series.

-- Streams are estimated with dashed lines (three arrows).

-- Soil maps often show more streams than on topo maps, but you should still visit the site to verify stream location.

-- The soil survey has tables of information describing the ability of each soil type to handle heavy equipment and support tree growth.

Example 2C: Aerial Photo



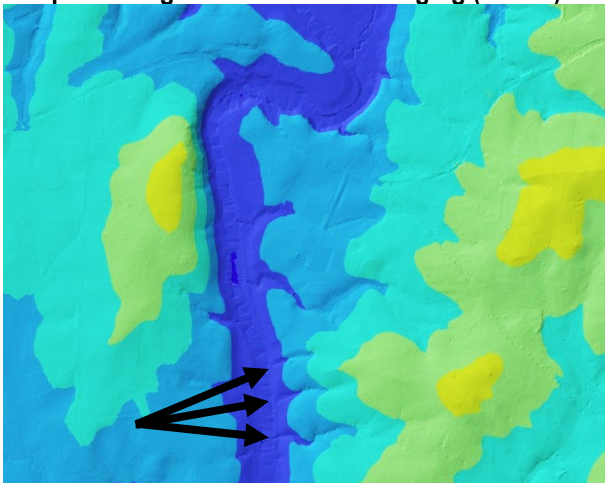
Satellite images and aerial photos may come in black and white, true color or infrared color.

-- Small streams can be hard to see on photos.

-- Compare this with the streams shown on the soils map (three arrows).

-- Changes in shadows or timber types (pine vs. hardwood) can be a clue that a stream corridor exists.

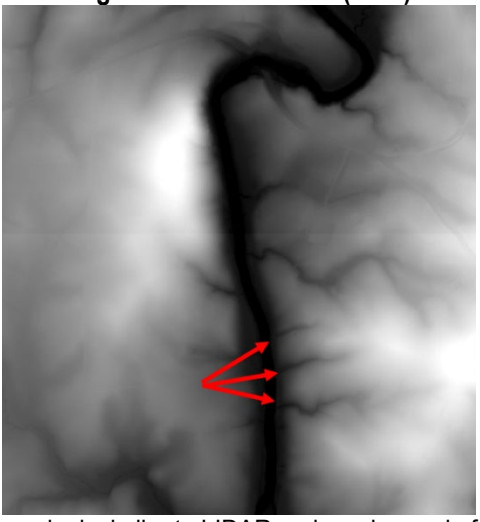
Example 2D: Light Detection and Ranging (LIDAR)



LIDAR is a remote sensing method that uses a pulsed laser to measure the distance from the aircraft sensors to the earth's surface.

-- Quick transitions between colors indicate a steep slope.
-- Darker or indented areas are often streams. It is best to compare with other maps if possible and ground truth.
-- Using LIDAR data ground points is typically best for the purposes of identifying streams as compared with using non-ground points, which are used to detect vegetation.

Example 2E: Digital Elevation Model (DEM)



DEM maps look similar to LIDAR and can be made from LIDAR point clouds. The DEM is a digital representation of ground topography, excluding vegetation and other surface features. The DEM is stored as an image (raster) and is continuous data rather than individual points like LIDAR.

-- DEMs can be viewed in black and white or in color, similar to the LIDAR map.
-- Like LIDAR, the DEM can help identify stream valleys and topography on steep ground (called shaded relief).
-- DEMs can be useful when performing more complex analyses in geospatial software.

Steps for Preharvest Planning

Step 1 - Know the Rules that Apply to Water Quality

- North Carolina FPGs
- State river basin and watershed riparian buffer rules.
- Federal and state wetland rules and requirements.
- Threatened & Endangered (T&E) species rules.
- Other: petroleum spills, pesticides, waste, etc.

Step 2 - Establish and Understand Forest Management and Landowner Objectives

- Understand what outcomes are needed in terms of property access. For example, will the roads/skid trails/stream crossings be temporary or permanent? More BMP work and maintenance will be needed if permanent access is desired afterwards.

Step 3 - Review Maps and Photos

- Examine the site using office tools. Download and/or print topo and soil maps, aerial photos, tax maps, etc.
- Identify parcel and harvest boundaries, along with any r/o/w or easements.
- Identify potential access to the property.
- Mark features on the maps; utility/gas lines, potential skid trail routes, soil prone to erosion or rutting, steep slopes, etc. More BMP work will be needed on steep ground and upon highly erodible soils.

Step 4 - Visit and Assess the Site

Tract Layout

- Take the maps and notes to the tract and walk the site.
- Verify access to the property.
- Ensure that timber sale boundaries and/or ownership boundaries are well marked and visible.

Streams, Waterbodies and Hydrology

- Recognize how water moves through the site. If water is coming onto the site from elsewhere, more runoff control measures may be needed.
- Locate streams and waterbodies that need to be protected.
- Establish and mark SMZs and/or buffer rule zones. Verify the operators recognize the markings.

Stream Crossings

- Avoid crossing streams whenever possible.
- Minimize the number of crossings.
- Evaluate the entire stream reach to determine the best practical crossing location and method.
- Deploy BMPs during installation, use and removal.

Access Roads and Entrances

- Minimize overall road length, width and footprint.
- If a new road must be built, establish the control points and right of way through the tract to lay out the road before construction occurs.
- Construct the road in advance so the soil can firm up.
- Establish access to the public road.
- Prepare to use measures that minimize mud and debris from being dragged onto public roads.
- Provide a suitable sight distance at the public road entrance point for safety. Place warning signs along public roads to warn oncoming traffic.

Skid Trails and Decks

- Minimize overall length, width and footprint on site.
- Locate skid trails and decks as far from waterbodies as practical given the site layout and conditions.
- Prepare to use measures that minimize soil disturbance and erosion along skid trails and decks.
- Different types of logging systems may require different types and/or sizes of skid trails and decks.

  For example, an in woods chipper needs a wide, flat area for the chip vans. More BMPs may be needed due to more exposed soil.

Step 5 - Finalize and Communicate the Preharvest Plan

- Develop a plan to install, evaluate and repair BMPs during and after the operation so that FPG standards are met. Specify a heavy precipitation event threshold to evaluate and repair BMPs.
- Update the site map based on observations during the tract visit. Be sure to include expected BMPs and notes for important features.
- Determine which portion of a site will be harvested first and have a backup plan if site, or soil conditions get too soft.
- Identify who is responsible for stabilizing the different areas of the site.
- Explain how BMPs will be monitored and maintained so they continue to function effectively.
- Communicate your plan! Make sure workers on the job understand what the site looks like and what to expect when it comes to BMPs, rules and water quality protection. This is especially valuable for heavy equipment operators.

The NCFS has BMP training videos on bridgemats, stream crossings, skid trails and installing erosion control devices. Scan this QR code to get links to each video: