

## Chapter 3

### Planning Forestry Operations and BMPs

**Chapter 3 Layout:**  
**Part 1 - Page 32**  
**Forest Management Plans**

**Part 2 - Page 33**  
**Preharvest Planning**

**Part 3 - Page 36**  
**Logging Systems**

**Part 4 - Page 36**  
**Planning Resource Aids**

-- -- -- --

#### **For Forest Owners:**

*A forest management plan commonly includes information about:*

- Property area (map).
- Tree size, age, type and quality.
- Soil conditions.
- Proximity to streams.
- Forest health, such as insects or disease.
- Overall forest growth and vigor.
- Options for forest regeneration.

*Forest management plans are most commonly available from:*

- Private consulting foresters.
- N.C. Forest Service.
- Forest industry programs.
- Other natural resources agencies or professionals.

#### **Water Quality Link**

There are two beneficial reasons for planning before starting your operation:

1. Understanding how to protect water quality on the job site.
2. Recognizing site-specific conditions that can determine what BMPs are needed in order to protect water quality.

Loggers, landowners, timber buyers, foresters and anyone else who has a financial stake in the forestry operation, should take an interest in making sure BMPs are properly implemented, maintained, and functioning. Planning affords you time to know where special attention may be needed on a site, and is a cornerstone of sustainable forestry stewardship.

### **Part 1 -- Forest Management Plans**

The most important goal of a forest management plan is to make prescriptions or offer options on how the forested area should be managed in order to achieve the landowner's objectives.

Forest management plans should include a description of how water quality will be protected when management activities are undertaken, and plans should denote areas on the property that may require special attention.

Examples of special areas include locations of streams or ditches, stream or ditch crossings, springheads or wetlands. A plan usually includes a brief summary of environmental rules that may apply on the property.

Specific recommendations for BMPs may be more appropriate for the preharvest plan, or other operational plan, once a more detailed site examination is conducted.

#### **When Forest Management Plans Are Required**

##### **DWR riverbasin and watershed 'Riparian Buffer Rules'**

- The buffer rules for specific riverbasins or watersheds require a forest management plan to be in place before any timber harvesting can occur within the defined buffer area.
- Refer to each applicable buffer rule in Appendix 1 for more information.

##### **Forestry Present-Use Tax Valuation of Property**

- For a landowner to receive a forestry-use valuation on his or her property, a forest management plan must be in place. Each county tax assessor's office has different interpretations. Refer to your local tax office.

## Part 2 -- Preharvest Planning

### For Forest Owners:

*Similar operational plans can be done for other forestry activities besides harvesting.*

*A few examples include:*  
- Site preparation  
- Pesticide / Fertilizer Use  
- Prescribed Burning  
- Road Construction  
- Drainage Maintenance

*Whenever forestry activities are done on your property, it is highly recommended that you use a written contract that includes an operational plan.*

### Also Refer To...

*Chapter 5 for roads, skid trails, decks;*

*Chapter 1 to learn about soil factors;*

*Appendix 8 for logging system descriptions;*

*Chapter 4 for SMZs and riparian buffers;*

*Chapter 6 for wetlands and hydrology information*



A preharvest plan provides greater detail than a forest management plan and should include descriptions of BMPs or other measures that will be implemented to protect water quality.

An 11-step preharvest planning list is outlined below for your reference. This list is only generic and should be modified to fit your specific needs.

### **Step 1 - Rules that apply for water quality (and/or other rules)**

- N.C. Forest Practices Guidelines Related to Water Quality
- NCDWR riverbasin and watershed 'Riparian Buffer Rules'
- Wetland rules and requirements (state and federal)
- Local zoning requirements
- Endangered species considerations
- Other forestry-related rules: waste disposal, burning, fluid spills

### **Step 2 - Layout and access**

- Examine the site to see the 'lay of the land'; study maps or photos.
- Determine access to the property by rights-of-way or easements and establish access onto public roads.
- Make sure the boundaries of the harvest and/or ownership area are well marked and visible.
- Begin marking important features on the tract map and taking notes.

### **Step 3 - Site and timber conditions**

- Topography and terrain of the land can determine the placement of roads, skid trails, firelines and decks.
- Slope is a factor that influences the amount and speed of runoff that will need to be controlled and/or captured.
- Soil conditions can influence where roads and decks are placed, as well as the operating window of time suitable for heavy equipment.
- The volume and spacing of timber to be harvested will determine the location of roads, skid trails and decks. These factors also play a role in selecting what type of logging system to use.

### **Step 4 - Streams, waterbodies and hydrology**

- Locate streams and waterbodies that will need protection.
- Establish appropriate Streamside Management Zone (SMZ) and/or riparian buffer, as needed. See Step 5 below.
- Recognize the hydrology of the site, because this can influence how a harvest is conducted and be an indicator of possible wetland areas.
- Determine if stream crossings are needed. See Step 6 below.

### **Step 5 - SMZs and riparian buffers**

- Establish any needed SMZs according to **FPG .0201**. You are encouraged to visibly mark the SMZ so everyone on the job site knows its location, especially the heavy equipment operators.

**FPG**

- Establish any needed ‘riparian buffers’ that are specific to certain river basins and watersheds of North Carolina. You should mark these riparian buffers so everyone on the job site knows their location.
- Refer to Chapter 4 of this Manual for explanations of what riparian buffer rules may apply to your location and for SMZ width suggestions.

#### **Step 6 - Locate stream crossings and determine the best method**

- Avoid stream crossings if possible. Know the rules related to crossings.
- Refer to Part 5 of Chapter 5 for details on choosing a good stream crossing location and method.
- Determine if a crossing will be temporary or permanent. This decision can influence the type of crossing that is used.
- Invest in appropriate BMP tools to control runoff and capture sediment.

**FPG**

#### **Step 7 - Access roads and entrances**

- Know the rules related to access road placement and construction.
- The type and amount of roads needed are determined by many factors, including safety needs, size of area, timber conditions, soil conditions, slope, landowner’s objectives, and the type of logging system or harvest.
- Establish access from the site onto public roads. This may require obtaining N.C. Department of Transportation driveway permits.
- 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. Warning signs should be considered along public roads to warn oncoming traffic.
- If a new road must be built, establish the control points and road right-of-way through the tract to lay out the road before construction occurs.
- Refer to Part 3 of Chapter 5 for BMPs related to forest roads.
- Refer to Chapter 6 for required practices for roads in forested wetlands.

#### **For Forest Owners:**

*A helpful resource for mountain roads is the Layman’s Guide to Private Access Road Construction in the Southern Appalachian Mountains. Contact your nearest NCFS District Office or USDA-NRCS office for a free copy.*

#### **Step 8 - Skid trails and decks**

- Plan to minimize the number and size of skid trails and decks.
- Take note of any critical locations on the skid trail and deck locations that may need additional precautions and/or BMPs to protect water quality.
- Locate the skid trails and decks as far from waterbodies as practical given the site layout and conditions.
- Different types of logging systems may require different types and/or sizes of skid trails and decks. Recognize this need and plan accordingly.
- Refer to Part 6 of Chapter 5 for BMPs for skid trails and decks.

#### **Step 9 - Site map and harvest scheduling**

- Create a site map that includes expected BMPs and notes important features, such as those already mentioned in Steps 1 through 8. Refer to the following Figure 3A for an example of a hand-drawn preharvest map.
- Make sure workers on the job site 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.
- Determine which portion of a site will be harvested first and have a contingency, or backup, plan if site or soil conditions deteriorate.

#### **For Forest Owners:**

*Some timber harvest contracts may need allowances for time extensions due to wet site conditions. This allows a logger to perform the work in a way that best protects water quality.*

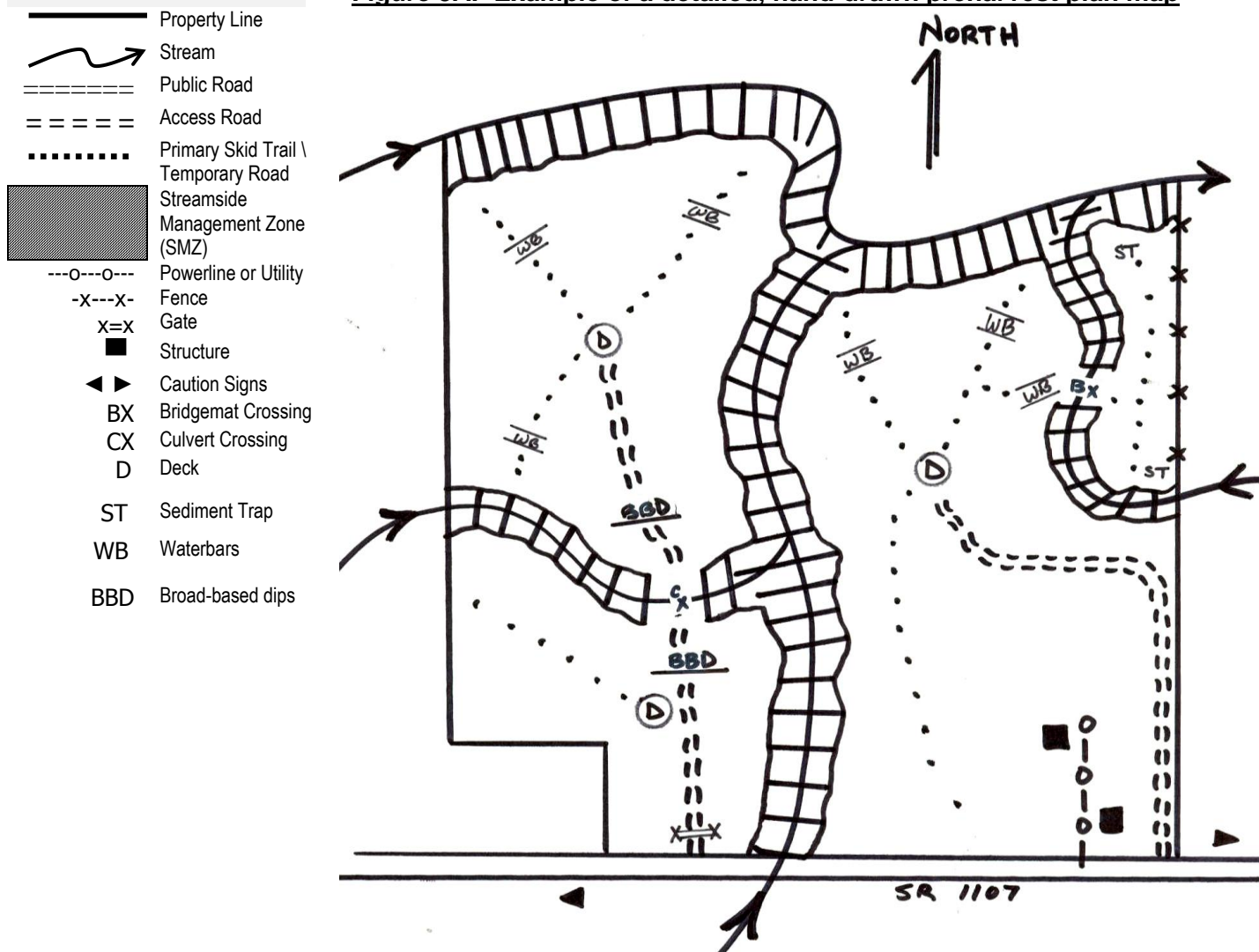
### **Step 10 - Site stabilization and tract close-out**

- Know the rules related to site stabilization.
- Specify who is responsible for stabilizing the different areas of the site.
- Understand how roads, skid trails, stream crossings and decks will be stabilized or closed-out. This may involve mulching, culvert removals, re-grading of roads and installation of fences or gates.

### **Step 11 - Monitor and Maintain BMPs**

- Specify how BMPs will be monitored and maintained so they continue to function effectively.
- Evaluate BMPs and site conditions after heavy precipitation to determine if water quality is still protected and that BMPs are not failing. Make necessary corrections as soon as possible.

**Figure 3A: Example of a detailed, hand-drawn preharvest plan map**



## Part 3 -- Logging Systems

### For Forest Owners:

*A brief explanation of the most common logging systems found in the southeastern U.S. is provided in Appendix 8.*

*Knowing this information allows you to recognize what BMPs may be appropriate for the site, given the type of equipment that is used.*

The logging system and type of harvest can affect the design and layout of access roads, skid trails and decks. Roads and skid trails used during logging are the most common source for sediment in nonpoint source pollution contributed by forestry activities.

As a result, it is worthwhile to consider the relationship between the type of logging system that is used and implementation of appropriate forestry BMPs, so water quality is protected. Two example situations:

1. Long tractor-trailers may require wider access roads and larger turning areas than straight-body trucks. Likewise, chipping operations usually require wider, flatter roads so the high-dimension chip trailers remain stable during transport. These wider road surface areas will need additional BMP attention to insure erosion and sedimentation is minimized.
2. A harvest with many different log products can require larger deck areas for the sorting and handling of multiple log stacks. As with the roads, these larger exposed soil decks may require additional attention for BMPs.

### **BMPs for Logging Systems**

- Planning should be done to find out what kind of site conditions exist. These conditions and the type of operation you intend to conduct will determine the type and amount of BMPs that should be used.
- Understand the limitations of the equipment and how it can be best operated to protect water quality during harvesting.
- If a single pass with the equipment produces a significant rut, evaluate your options for working on the site. Choose an alternative that will protect water quality.
- Harvest timber in a manner to minimize significant changes to soil structure or organic matter, both of which contribute to changes in surface runoff that may negatively impact water quality.
- Have a backup plan when inclement weather and/or wet site conditions do not allow operations to continue on a specific site.

### In Other Words...

***Use the correct equipment, and use the equipment correctly!***

### For Forest Owners:

*A backup plan may be as simple as moving off site or stopping operations while waiting for conditions to improve.*

### Helpful Hints:

*You may find it helpful to talk with neighbors, hunters, or other local individuals when examining the tract.*

Many resources are available to aid in the planning process. Appendix 7 provides a list of sources where some of these aids may be available for review or purchase. In some cases, you may be able to look over or obtain photocopies of these resources at local NCFS county ranger offices.

## Part 4 -- Planning Resource Aids

### Did You Know?

The topo maps referred to here are those prepared by the U.S. Geological Survey (USGS).

Topo maps at 1:24000 scale are also called the '7.5 Minute Series', and usually provide the best resolution of detail for field use, when compared to 1:100000 scale maps.

### On Site Examination

The best resource for planning is an on-the-ground examination of the site. This allows you a chance to see first-hand what the site is like and where water quality or BMP issues need to be addressed.

### Topographic Maps ('topo' maps)

These are detailed maps that indicate slope, land contours and estimated stream features. While topo maps provide good planning information, they are not always sufficiently accurate for forestry purposes, especially related to stream location and identification.

Commercially available topo map atlas books are excellent references, but often do not have the fine level of detail you may need. You should make an on-site examination to verify the features shown on the map.

**Figure 3B: Excerpt from the USGS 'Rougemont' 7.5-minute quad topo map**

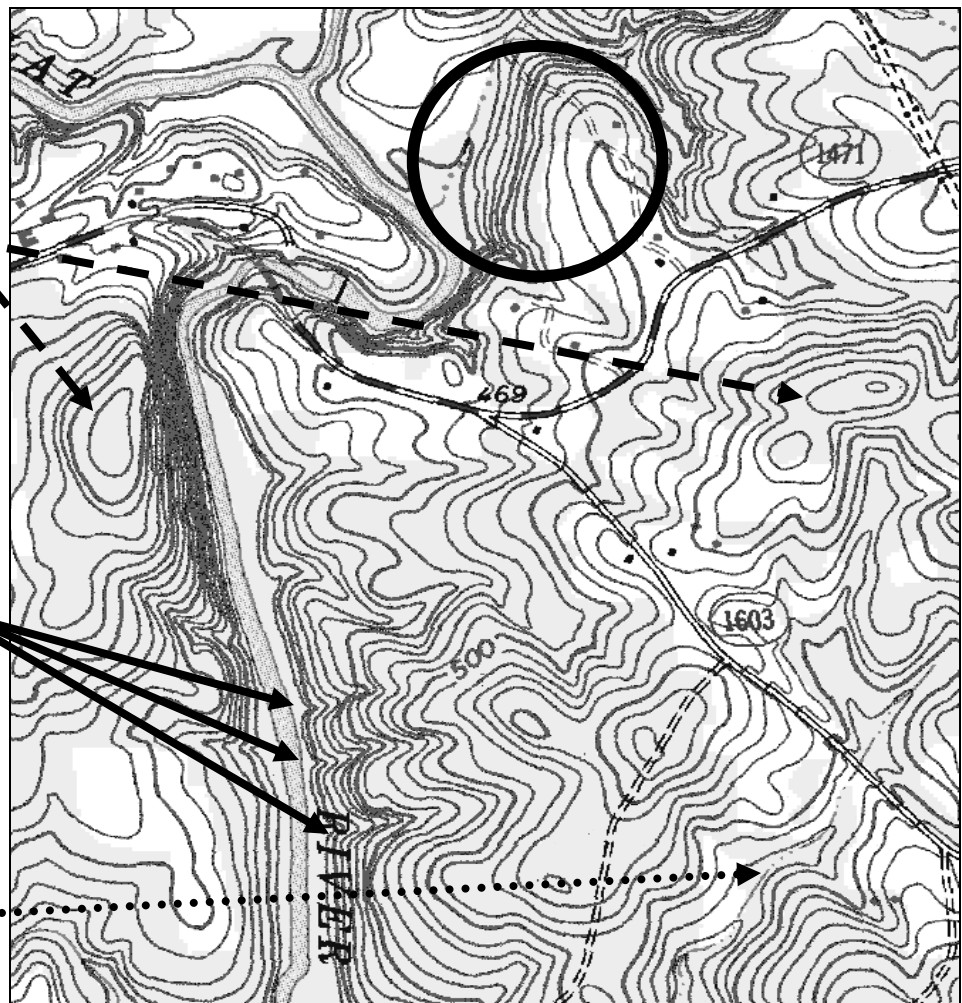
#### Caption:

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

Complete circles of contour lines indicate the peaks of hilltops (dashed arrows)

Where contour lines are shaped like a V, this indicates gullies, or some form of water drainage on the land. Note that no streams are indicated in the three V-notched locations shown by solid arrows. Compare this topo map with the soil survey map on the next page.

Streams are indicated by either a dashed / dotted line or a solid line. On color topo maps, these lines appear in blue color, which is why they are often called 'blueline' streams (shown here by dotted arrow).



### Did You Know?

Soil surveys are produced by the USDA-Natural Resources Conservation Service (NRCS).

This agency used to be known as the SCS or 'Soil Conservation Service'

Soil surveys may also be available from county Soil & Water Conservation District (SWCD) offices.

## Soil Surveys ('soil maps')

Soil survey maps are usually black and white, and provide details on the expected soil conditions of the site, along with estimated stream features.

Many of these surveys also provide generic recommendations on the operability of a soil type for heavy equipment use and forest growth.

While soil maps provide good planning information, they are not always sufficiently accurate for forestry purposes, especially related to stream location and identification. You should make an on-site examination to verify the features shown on the survey map.

Soil survey maps are a good way to determine whether any unique soil conditions exist on your site. Examples include organic, muck soils or shrink/swell clay soils, both of which are explained in Part 4 of Chapter 1.

**Figure 3C: Excerpt from NRCS soil survey map of the same location as shown in Figure 3B**

### Caption:

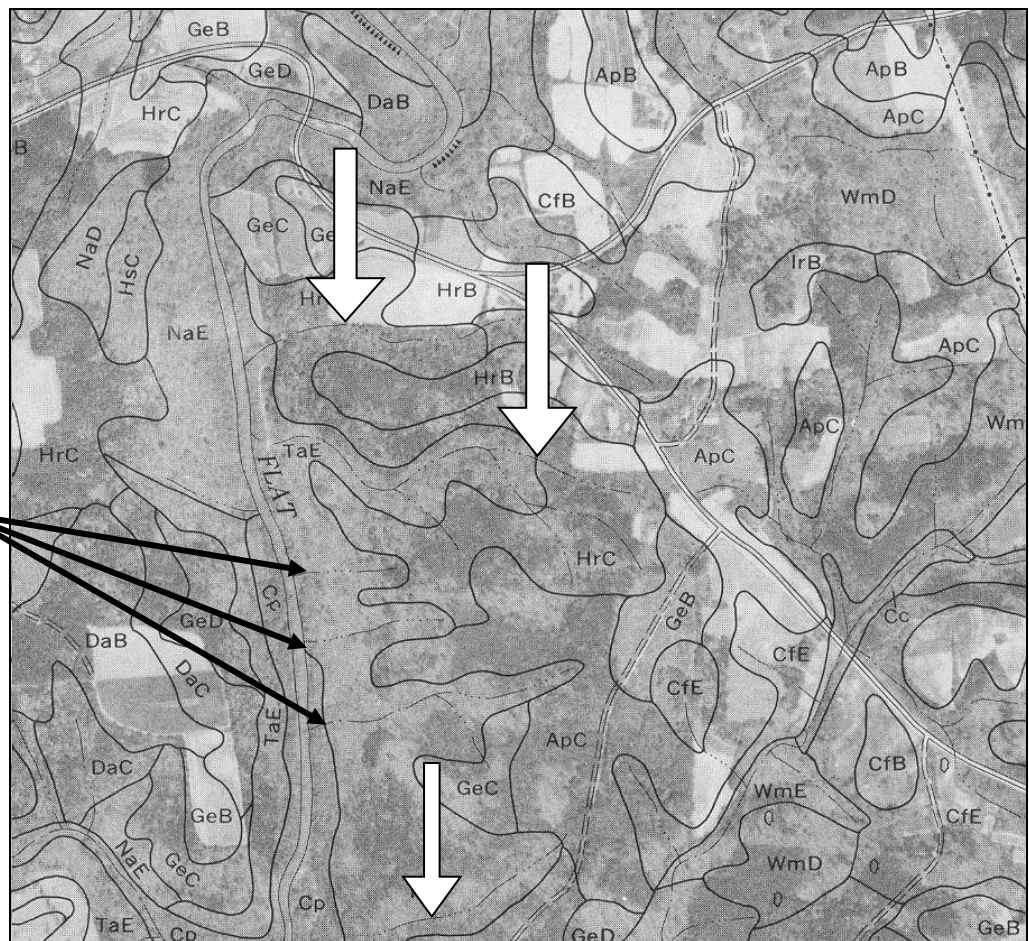
Soil maps show public roads, and some woods- or field-roads.

---  
The alphabetic codes refer to the different soil types estimated for that location. Each code is explained in the soil survey book.

---  
Streams are indicated with dashed/dotted lines.

On the topo map, the three V-notch areas along the Flat River did not indicate any streams. However, on the soil map, each V-notch is estimated to have a stream.

Also note the other streams estimated on the soil map, that are not indicated on the topo map (shown by white arrows).





### Did You Know?

Photos may come in black & white, true color, or color-infrared (CIR).

Aerial photos are a good way to verify the features shown on a topo map or soil survey map.

### Aerial Photographs / Satellite Images

Aerial photographs and satellite images provide a scaled, overhead view of the ground surface. Overlapping photos with stereographic coverage can be used to measure slope and land contours, which will help in laying out roads.

Subtle differences in timber type, coloration of the ground surface, and changes in stream channels can help give you an idea of places on the job site that may need extra precautions to protect water resources.

**Figure 3D: Aerial photo of same Durham County location as shown in Figures 3B and 3C**

#### Caption:

This aerial photo shows the same location as the above two maps.

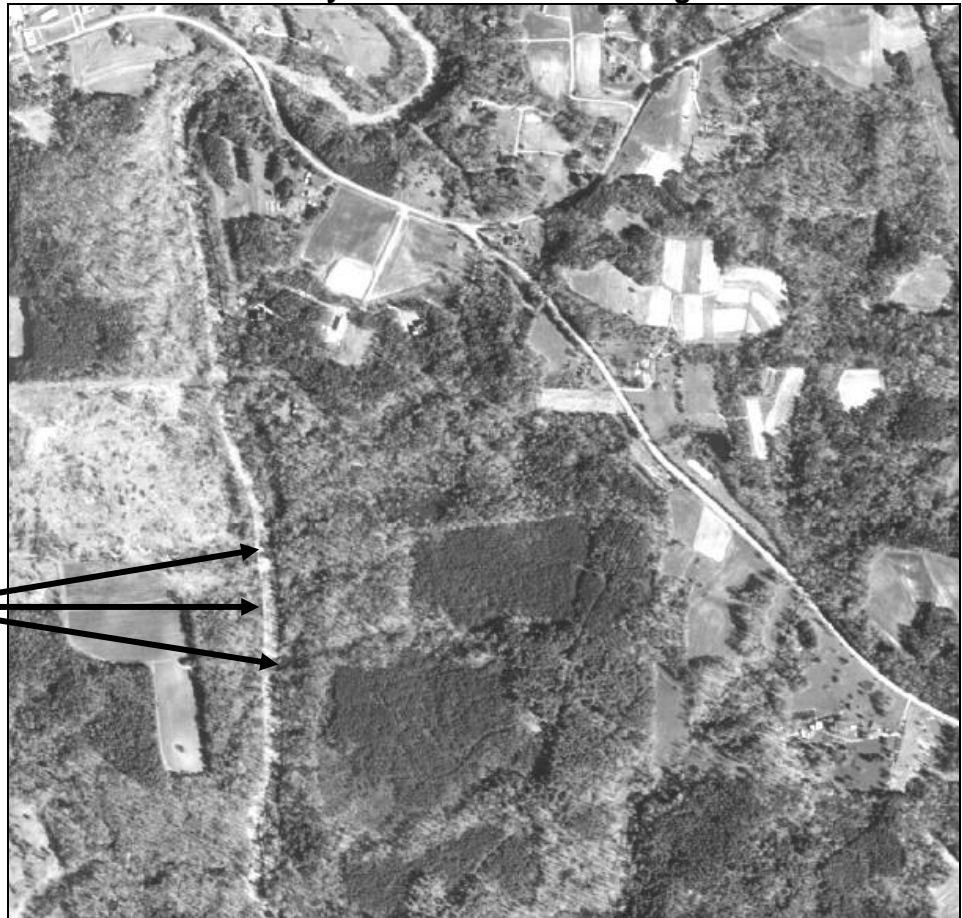
---

Roads, rivers, forest edges, and major corridors are easy to see on a photo, but small individual streams are not.

---

Looking carefully, you may notice differences of shadowing in the area of the three V-notches along the Flat River. Shadowing like this may be your only clue on a photo that a stream or gully exists.

A 'ground-truth' on-site examination will help verify exactly what stream and ground conditions exist.



### For Forest Owners:

It is **your** responsibility to verify and locate your property lines! Don't rely on the logger, forester, or timber buyer to do it for you.

Only a Registered Land Surveyor can **establish** property lines

### Tax Parcel Information (tax maps)

County tax offices may have tax parcel information that can help identify the general vicinity of a site's property boundary lines.

**NOTE:** It is important to remember that tax maps are only a general approximation and do not provide the same high level of detail or accuracy as a surveyor's property line survey drawing.

**>>> Remember the 6P's of Planning <<<**

**<sup>1</sup>Proper <sup>2</sup>Prior <sup>3</sup>Planning <sup>4</sup>Prevents <sup>5</sup>Poor <sup>6</sup>Performance!**