Harvest Planning

- A harvest planning is necessary because:
  - Timber harvesting is an extremely complex operation.
  - Today's logging contractors also need to:
    - Consider the production and costs,
    - Comply with numerous laws and regulations, and
    - Incorporate BMP's into logging operations.

(Source: Shaffer, R. 1994. A logger's guide to harvest planning. Publication 420-088. Virginia Cooperative Extension.)

Harvest Planning

- There are two stages of harvest planning:
  - preliminary pre-harvest planning
  - comprehensive harvest planning

Preliminary Planning

- Is a fairly simple plan and prepared:
  - by a ‘service’ forester or forestry consultant
  - for a forest landowner prior to conducting a timber sale

Preliminary Planning

- It normally identifies:
  - recommended streamside management zones,
  - potential problem areas like fragile soils or steep slopes, and
  - other areas that may require special treatments during harvesting operations

Comprehensive Planning

- A comprehensive harvest plan is much more complex and detailed.
- It is usually prepared by the logger or logging manger just prior to beginning harvesting operations.

Comprehensive Planning

- The logging plan may include recommendations on:
  - logging roads,
  - log decks,
  - streamside management zones,
  - stream crossings,
  - skid trails, and
  - schedule of activities.

Information Needed for Harvest Planning

- **Type of cut**
- **Terms of timber sale contract**
- **Tract topography**
- **Tract soil conditions**
- **Tract hydrology**
- **Tract boundaries**
- **Timber volumes to be removed**
- **Logging system and equipment**
- **Applicable laws and regulations**

Type of Cut

- The type of cut can be:
  - clearcut,
  - thinning, or
  - partial cuts
- Will trees be removed from streamside management zones (SMZ's)? This could affect:
  - deck size and location,
  - equipment restrictions or
  - job layout

Terms of Timber Sale Contract

- The length of time on the contract may dictate the time of year that the tract will be logged.
- That may impact the haul road construction standards.

Tract Topography

- In the mountains, topography will often limit logger's options for road and deck locations.
- In addition to slope, aspect and exposure should also be considered.

Tract Soil Conditions

- Soils will affect road and deck location, especially in the fragile regions such as steep slopes and SMZ's.
- Soils also impact equipment decisions and scheduling of activities.

Tract Hydrology

- Knowing how much water to expect in a stream after a big rain will affect decisions on stream crossing structures.

Tract Boundaries

- The tract boundaries, easements, and rights-of-way are necessary to locate access points and haul roads.

Timber Volume

- The timber volumes to be removed by species and product, and
- The distribution of those volumes across the tract.
- They are vital for determining:
  - haul road standards,
  - deck size and location, and
  - scheduling

Logging System and Equipment

- The planner has to consider:
  - logging system and equipment in harvest planning
  - characteristics of the logging operational constraints

Logging System and Equipment

- For example,
  - Four wheeled feller-bunchers are suited to clearcutting.
  - Cable skidders are good for manually felled larger timber.
  - The type of log truck (tractor/trailer, or …) will also impact:
    - haul road layout,
    - acceptable curve radius, and
    - landing size.

Laws and Regulations

- Applicable laws and regulations affect logging, including BMPs.
- These will affect all aspects of the harvest plan.

Maps for Planning

There are several maps available to harvest planners:

- Topographic maps - from the U.S. Geological Survey
- Soil maps - from the Soil Conservation Service
- A detailed timberstand map - from the owner
- County ownership maps - are available commercially

Steps to Prepare a Harvest Plan

- The following twelve “steps” provide a possible framework for a comprehensive harvest plan.

Step 1

- Study the applicable maps and conduct an on-the-ground reconnaissance of the area to be logged.
  - Note the slope, aspect, soil, timber, stream, access, boundaries, old logging roads, etc.

Step 2

- Identify and mark streamside management zones (SMZ's).
  - is one of the most important and effective ways to reduce stream sedimentation in a logged area
  - should be implemented whenever possible
  - should note that SMZs are:
    - low cost (to the logger)
    - highly effective

Step 3

- Locate and flag log decks.
  - These are critical decisions that will directly affect production.
  - Log deck location is a tradeoff between skidding distance and haul road construction.
- Log decks:
  - should generally be kept as small as feasible, and
  - should be well “daylighted” to facilitate drying out after a shower.
  - an ideally located log deck will be on a slightly sloped area with stable soils that do not easily rut.

Step 4

- Locate and mark logging road stream crossings.
  - Choosing proper location is critical (if a stream crossing is necessary).
  - Look at stream width, water depth, stability of stream bottom and banks, and high water mark.
  - Choose location that will minimize the chance of stream sedimentation arising from logging as well as hauling.

Step 5

- Locate and mark logging road entrance points from public roads.
  - Generally, the law requires that a truck driver pulling onto the highway from a temporary logging road be able to see clearly in either direction for a minimum of 200 feet.
  - Entrance points should always be located on well-drained, stable soils.

Step 6

- Locate any other logging road “control” points.
  - These are points or locations that logging road must either connect or avoid.
  - Entrance points and stream crossing are “positive” control points, and
  - Rock outcrops or gumbo clay flats are “negative” control points.

Step 7

- Locate and flag the logging road gradeline (in the mountains) or centerline (in flat areas).
  - A good procedure is:
    - first attempting to plot the gradeline on a topo map,
    - connecting the positive control points, and
    - keeping the road at an acceptable grade.
  - Ideally, the grade should be kept at:
    - 10% or less for haul roads
    - 15% or less for skid roads
  - The gradeline (centerline) location must consider log truck (or skidder) characteristics.

Step 8

- Locate and flag designated skid roads/trails, if necessary.
  - In general, designated skid trials should be avoided if at all possible,
  - They greatly increase:
    - environmental impact
    - chance of erosion and stream sedimentation

Step 9

- Specify logging road construction standards.
  - There are generally three logging road standards:
    - “primary” logging or forest road
    - “secondary” logging road
    - “branch” logging road
  - The most common by far is a “branch” logging road.
  - It is designed as temporary road that will be “retired” immediately after logging is completed.

Step 10

- Specify stream crossing structures, if applicable.
  - The common choices from least to most expensive are :
    - A ford,
    - A culvert,
    - A “low water” bridge, and
    - An elevated timber bridge.
  - The best choice depends on
    - cost,
    - stream characteristics,
    - the amount of use,
    - load bearing requirements, etc..

Step 11

- Determine the schedule of operations and harvest patterns.
  - This step is especially critical on a large tract.
  - The most efficient schedule of operations depends on:
    - tract topography,
    - time of year,
    - road construction,
    - cash flow conditions,
    - mill needs,
    - equipment, etc.

Step 12

- Specify tract “close-down” requirements.
  - These primarily involve the implementation of BMP’s.
  - The requirements include:
    - Re-grading ruts
    - Installing water-bars
    - Reseeding certain landings and roads
    - Removing any temporary stream crossing structures
    - Cleaning-up the tract

Safety

- Safety must remain a constant consideration through the harvest planning process.
- Every decision made by harvest planners will have safety implications, from location of a log deck to scheduling of activities.

Planning Forest Access System

- Roads and landings are the source of most water quality problems on logged areas.
- Roads are the most permanent disturbance on logged areas.
- On skidder logged area, 84% of disturbance is caused by skidroads.
- The farther roads, landings and machines are kept from stream, wet areas, the better.
- The steeper the roads the more difficult it is to control water on them.

(WVDOF. 1992. A logger's guide to planning the forest access system. WVDOF-MP92-8)

Planning Forest Access System

- A typical 100-acre tract will require about 5 miles of road to skid logs.
- This includes:
  - about 0.5 mile of haul road and
  - 4.5 miles of skid roads.

Planning Forest Access System

Four basic aspects should be considered.

- Preliminary Considerations
- Hydrologic Considerations
- Logging Considerations
- Construction and Maintenance Considerations

Preliminary Considerations

- The location of the timber to be harvested
- How it will be logged: haul road or skidroad
- Planning the road system for the entire tract
- Discussing the road system with landowner
- Deciding where the truck road will start and end
- Future road needs

Hydrologic Considerations

- Maximizing distance from streams, wet areas
- Minimizing the amount of soil disturbance
- The road grade –
  - 10% maximum for haul roads,
  - 15% maximum for skidroads
- Stream crossing
- Landing location

Logging Considerations

- Turnouts and turnarounds
- Existing highway approaches
- Getting off truck road with skidroads, where and how
- Skidroad spacing
- Landing location
- Road location in relation to timber

Construction and Maintenance Considerations

- Desired road standard
- Rock outcrops
- Stream crossing
- Drainage
- Exposure (aspect)