



Timber
Harvesting
& Marketing

10

Forest Operations Manual
The Conservation Forestry Program

Timber Harvesting & Marketing

CHAPTER **10**

10.1 The Nature Conservancy Goals and Philosophy

When harvesting and marketing timber, all decisions will be based on a firm commitment to maintaining and improving the long-term ecological health of the forest and its important habitats and species. As a result, forest managers will strive to minimize the negative impacts of their harvests, particularly for streams, rivers, and the soil, and, where possible, use harvests to actively improve forest health. These principles apply to all harvest planning and timbering operations, enabling the Conservation Forestry Program to generate regular income by drawing from mature timber assets and regenerating stands that are poor investments in an environmentally sound manner.

Harvesting: Managers will select stands for harvest in order to:

- ☛ Receive the best prices for the products removed;
- ☛ Capitalize on market trends to seek premiums for certain products when available;
- ☛ Promote efficiencies with local logging operators;
- ☛ Harvest biologically or economically mature stands to optimize the benefits from highly productive sites;
- ☛ Maintain or enhance the functioning of the ecological processes present.

Marketing: To maximize income, forest managers will pursue premium markets for all forest products. In addition, the Conservation Forestry Program will pursue independent third-party forest management certification to reach an important market niche, that of certified wood products. Finally, forest managers will work to create new markets and/or to add value to low-value wood or low-grade materials, to keep as much of the value of the forest products in the local economy.

10.2 Goals and Guidelines for Selling Forest Products

When marketing timber, managers will seek to:

- ☛ Sell forest products at fair market prices;
- ☛ Develop new markets for the less desirable timber species and lower grade materials common on regional forest sites;





SELLING FOREST PRODUCTS

Managers will employ the following procedure for all timber sales (after Foresters Incorporated 1997b):

1. **Accurately inventory the sale timber.**

Typically, timber harvests will be “marked sales,” in which every tree harvested is selected and tallied individually. Consequently, only foresters experienced in evaluating and measuring forest products and marking timber will prepare sales and inventory stands. To insure accuracy for inventories current state-of-the-art sampling methods will be used to insure that the sample error of the volume estimate must be less than $\pm 10\%$ at the 95% confidence interval.

2. **Estimate the potential value of the sale by applying current prices to the inventory.**

To estimate current prices:

- Review stumpage price histories and trends from previous timber sales records;
- Use the results of land and timber appraisals developed for potential tracts;
- Study regional market reports and buyer price lists available to the procurement community.

Because prices fluctuate seasonally due to the effects of weather on logging, as well as annually due to changes in national and international markets, analyzing forest product prices will be an ongoing, long-term project for forest managers.

3. **Locate potential buyers, present them with a timber sale prospectus, show the timber, and negotiate or receive their bid.**

Initially, forest managers will negotiate sales individually with buyers who have excellent logging records and will cooperate to do the best job possible for the landowner and the forest. Forest managers may locate potential buyers by contacting Department of Forestry personnel, private mills, and companies, and by visiting procurement staff and loggers. A beginning point for locating excellent loggers will be the state list of loggers who have completed training as either Master Loggers or Sharp Loggers.

Once the timber sale process matures, forest managers may implement sealed bid sales, in which multiple buyers are invited to submit confidential bids for a given sale. However, the high performance standards for loggers on Nature Conservancy jobs may limit the potential to receive higher prices through competitive bidding.

Potential buyers will be presented with a timber sale prospectus that includes:

- Descriptions of the tract and harvest area (size, owner, access, and location);
- Contact information for the seller and sale administrator;
- Date and procedures for the sale;
- Dates when interested buyers may visit the harvest area and meet the sale administrator;
- Terms of the timber sale (refer to the Timber Sale Contract/Agreement);
- Description of the trees being harvested (marking method, quality);
- Volume estimates by products and species (included measurement and calculation methods);
- Best Management Practices (BMPs) and other environmental specifications that must be followed;
- Special site factors that may affect harvest operations and logging productivity, such as seasonal limitations, utility lines, etc.

Forest managers will then take potential buyers to the harvest area to view the sale trees and the site conditions. During this visit, interested buyers can talk with the forest manager about what is expected from buyers and loggers (*see Harvesting section*).

Finally, the manager will negotiate a mutually agreeable price with the buyer, keeping in mind the needs of the program and its landowners.





4. **Close the deal by signing a Timber Sale Agreement or Contract that defines the harvest criteria and the performance standards expected of the loggers.**

The Timber Sale Contract must provide a strong and clear agreement between The Nature Conservancy and the buyer to remove the forest products and manage all forest resources in an environmentally responsible manner. At a minimum, the Contract will include:

- Identification of the buyer and seller;
- Location and detailed description of the forest products being sold;
- Consideration or value being exchanged for the products and payment method;
- Term or duration of the contract;
- Description and guarantor of access;
- Detailed contract performance provisions and Performance Bond requirements (applicable BMP guidelines, residual stand condition requirements; responsibilities for fire, litter, hazardous waste spills; and related information);
- Damage restrictions (including acceptable damage limits on residual stems);
- Statement of insurance needs and legal requirements to protect the buyer, logger and seller;

5. **Submit a Memorandum of Timber Sale Agreement to the appropriate County Courthouse to be attached to the tract's records.**

The memorandum will identify the seller and buyer of the titled property (forest products); describe the location of the tract, harvest area, and forest products being transferred; and state the duration of the contract.

6. **As a courtesy, prior to beginning the harvest, write letters or make calls to neighboring landowners informing them of the upcoming operation.**

The letters will briefly describe the objectives of the harvest, the harvest type, the logging system, and the method used to locate property and harvest area boundaries. Each letter should also include the forester's name and number, and invite the landowner to contact them with any questions or concerns.

10.3 Goals and Guidelines for Harvesting Timber

Harvesting operations have two interrelated goals:

1. To remove selected stems from harvest areas as directed by the silvicultural prescriptions in the tract's management plan.
2. To use environmentally appropriate logging techniques and harvesting guidelines that will ensure the long-term health and productivity of the forest and the environment.

CHOOSING TIMBER STANDS and DESIGNATING HARVEST AREAS

Using Management Plan recommendations, the forest manager will develop an annual list of "timber production" stands for potential harvest, and prioritize those stands based on the need to produce high-quality hardwood sawtimber. Where size or internal characteristics prohibit harvesting a complete stand, forest managers may delineate smaller harvest areas within the stand. (*see Management Planning chapter*)

Timber production stands must meet the following criteria:

- Operability:** Sufficient volume and value in forest products available to make logging economically feasible using the system appropriate for the existing environmental conditions (*see "Determining an environmentally appropriate logging system"*)
- Forest Type:** Dominated by merchantable species that have the potential to grow into products;
- Site Productivity:** At least "fair" for the production of timber products (i.e. an oak site index of at least 60);
- Water Quality:** Not a primary streamside management zone (*see Water Quality chapter*);
- Access:** Necessary access for the selected logging system exists, or can be constructed without degrading soils or water quality (*see Road Location and Construction chapter*)





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- ❑ **Habitat:** Not habitat for any rare, threatened or endangered species, and not a rare and unique natural community (*see Rare Species and Natural Communities chapter*)
 - ❑ **Cultural Resources:** Logging will not negatively impact any cultural resources;
 - ❑ **Other:** Logging will not significantly impact any ecological or socioeconomic considerations or landscape-level aesthetics (*see Aesthetics and Landscape Level Considerations chapters*)

Each year, forest managers will select and prioritize qualified timber production stands for harvest as follows, with #1 having the highest priority:

1. **Stands of poor quality and health on fair to good sites:** Tree quality and/or volume is lower than expected for the site. The stand requires a salvage or a regeneration harvest because of extensive fire, storm, past high-grading, or insect or disease damage. In general, trees are declining in health and volume growth.
2. **Stands with moderate quality, moderately healthy sawtimber on fair to good sites:** Silviculture treatments can improve stand productivity, concentrate growth on better stems, and promote desirable regeneration.
3. **Stands of good quality, healthy sawtimber, on good sites, that are economically mature:** Stand growth has slowed or stagnated because site is fully stocked; lowering the stocking will increase or maintain the volume growth possible on the site and encourage desirable regeneration.
4. **Stands of fair to good quality sawtimber on poor to fair sites:** Stand productivity has slowed or stagnated with respect to site potential; lowering the stocking will increase or maintain the volume growth possible on the site and encourage desirable regeneration.
5. **Stands of fair to good quality sawtimber on fair to good sites that are approaching or at maturity:** Stand growth is still relatively good, and stocking is less than 100% full. Letting the stand grow will not incur volume losses, but treatments such as harvesting would benefit regeneration.

Managers will then designate harvest areas within the selected stands based on:

- ❑ **Acres or Volume:** Enough acres to make the sale economically attractive to buyers based on the expected volume per acre harvested;
- ❑ **Slope:** No slopes with a grade over 60% unless skid trails already exist, or unless a cable or helicopter logging system will be used;
- ❑ **Access:** Appropriate access available for chosen logging system;
- ❑ **Water Quality:** Primary streamside management zones of at least 75' on perennial streams or rivers and 50' on intermittent streams in place (*see Water Quality chapter*).

CHOOSING TREES for HARVEST

Silvicultural prescriptions, designed to promote the growth of high quality sawtimber, will guide all harvest preparations. To aid harvest planning, these prescriptions include (*see Silviculture chapter*):

- ☛ Goal for the harvest prescription;
- ☛ Recommended harvest method (i.e. single-tree selection with timber stand improvement cut);
- ☛ Desired residual stand conditions (number of crop trees per acre, desired crop tree species);
- ☛ Desired regeneration (desired species and numbers) and special treatments before or after the harvest to promote regeneration or control competition;
- ☛ Recommended logging system (which influences tree removal, skidding methods, and skid trail locations).

Using these prescriptions, experienced foresters will decide and mark which trees to leave, and then which trees to take (or harvest) in each area.





DETERMINING an ENVIRONMENTALLY APPROPRIATE LOGGING SYSTEM

To select the most environmentally appropriate logging system for each harvest area, the forest manager will assess site characteristics, harvest volumes, and harvest values. Because the logging system directly influences tree selection and marking, the forester will include the selected system in the Management Plan's silvicultural prescription whenever possible to facilitate harvest planning.

Logging systems may be classified by the way the stems are moved or skidded from the forest to a landing for processing; all harvests will use one of the four primary systems currently utilized in the southern Appalachian forests.

1. **The most common**, and therefore “conventional,” **system** for southern Appalachia **uses skidders** and/or small bulldozers to drag stems from their felling place to the landing. Felling occurs either manually or with a feller-buncher machine, in which an operator mechanically grabs and cuts stems, then lays them on the ground. A system of skid trails throughout the harvest area enables the skidders' cables to reach all cut stems. This system is typically the most cost-effective for the region because of the equipment involved and the number of loggers practicing it, and consequently will be used for most timber sales. It is most appropriate when:

- Appropriately located skid trails and forest roads already exist for the harvest area;
- Soil conditions permit new forest roads to be constructed according to required specifications (see Road Location and Construction chapter);
- The average slope is less than 40%;
- Steep areas with slopes greater than 20% can be accessed on contour.

2. **The High-Lead logging system**, used infrequently in this region, uses a high cable running from a yarder, typically located at the top of a harvest area, to an anchor on a stump or bulldozer near the bottom. Operators connect cut stems to the cable and the yarder pulls them from the forest along the cable's skidding corridor. High-Lead logging requires a good system of roads adjacent to the yarder to provide access to the whole harvest area and to truck the logs from the yard. It is most appropriate when:

- Slopes are greater than 35%;
- Soils conditions (frequent ledge rock, high erosion potential) make most of the area unsuitable for traditional skid trails;
- Good access exists, or can be constructed, to a ridgetop or other high point in the harvest area for uphill skidding (common on energy company lands that were developed for gas well access or strip-mined and now have high strip benches), or to a lower yarding area for downhill skidding;
- The silvicultural prescription calls for a heavy selection cut so that trees can be selected to account for the required skidding corridors.

3. **Helicopter logging**, in which a helicopter lifts groups of stems out of the forest, is gaining popularity in Appalachia as the value of high-quality hardwoods increases and environmental protection concerns grow. The equipment needed and the skills required by the logging crew increase the operational costs over other methods, but the only access roads are those needed to get the ground crew into the site. Helicopter logging is most appropriate when:

- A high volume, high value sale makes the cost of helicopter logging economically feasible;
- The site is otherwise inoperable because of steepness, soils, and/or the common occurrence of streams/springs, or other fragile resources that limit road building;
- Road building costs would be very high;
- A large landing area, with good haul road access, is available nearby to handle the high number of stems a helicopter can deliver in a relatively short time;
- Site aesthetics make new roads undesirable.





4. **Animal logging**, in which horses, mules, or oxen drag stems from their felling locations on forest trails, is also increasing in the southern Appalachians. Because animals are lighter, smaller, and more maneuverable than mechanical skidders, animal logging can lessen the impact on certain sites and may substantially reduce the total area dedicated to skid trails. According to a recent study, soil damage from horse logging is significantly lower than damage from mechanical skidding. Animal logging is most appropriate when:

- The acreage is relatively small (less than 40 acres);
- The downhill slopes for skidding are gentle or moderately steep (less than 10%);
- Few or no skid roads exist, or narrow trails exist;
- A high volume and value per acre make the higher cost per unit and slower production of animal logging economically feasible;
- The site is a high visibility area where visitors will watch, or is in/near public recreation areas;
- The site is near residential areas, which regulate noise and other factors.

MARKING the SALE AREA (boundaries, trees, roads, SMZs)

Forest Managers will carefully and thoroughly plan and prepare every timber harvest to substantially limit the possibility of environmental damage. Clear tree demarcation is obviously critical. Just as important is skillful road and trail layout to give loggers the access they require. Due to the high erosion rates that can occur on logging roads and skid trails; minimal numbers of properly located roads and trails will lessen road-related erosion problems and soil losses.

To create an environmentally sound timber harvest that meets The Nature Conservancy's standards, the forest manager must communicate clearly and unequivocally with the logger in these areas. In particular, foresters will flag and mark each harvest area as follows:

1. **Flag harvest area boundaries** in bright pink to indicate harvest area and cutting boundaries to the buyer and logger.
2. **Mark trees to be harvested** or given special consideration during the logging operation with special Tree Marking paint to make them easily distinguishable, using the following system:

- ✓ **Trees tallied as sawtimber:** Blue marks at eye height on bole, uphill and downhill side; blue stump mark (blue spot at lowest point– downhill side, in deep crevice or between roots on butt so mark will be visible on stump)
- ✓ **Trees tallied as pulpwood:** Blue slash at eye height on bole, uphill and downhill side; blue stump mark
- ✓ **Cull Trees to be felled:** Large blue X with stump mark
- ✓ **Cull trees to be turned into snags:** Double blue X's, one on top of the other, no stump mark. Turning cull trees into snags is useful for very large trees or trees with large crowns that might damage crop or residual trees if felled; typically, the loggers will girdle these trees.

Trees not being cut, but requiring special attention from logger:

- ✓ **Wildlife trees** (to be noted by logger but not cut or damaged in any way): Large blue W, no stump mark
- ✓ **Crop trees:** Orange band encircling the trunk. Marking crop trees is useful when the site has a lot of residual trees and the forester wants to alert the logger to the most important crop trees.

3. **Lay out skid trails and new logging roads**, flagging their proposed locations with skidtrail yellow flagging. Also flag existing trails that should be reopened. Roads will be located as far as practical from streams, along the contour of the slope, and within grade limits (See *Road Location and Construction chapter*). Where stream crossings are unavoidable, the forester will select and mark the best locations for culverts, bridges and fords to limit disturbance to the litter layer and streambanks.

4. **Flag Primary Streamside Management Zones (SMZs)** with blue, making SMZ boundaries clear to the logger and creating highly visible, distinct areas where loggers know they cannot bring in machinery or impact in any way.

An old tree such as this has good potential as a wildlife den tree and should be marked for special attention from the logger.



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5. **Flag special and unique areas that must remain undisturbed by loggers** and their equipment or activity with bright pink. These areas include cemeteries, old house sites, springs, extra steep slopes not being harvested, patches of rare plants, active raptor nests, or landowner project areas.

6. **Photograph existing roads and trails, streams, streambanks** at proposed crossings, and special and unique areas, to document pre-harvest conditions.

HARVESTING the TIMBER

Forest managers expect all loggers to perform to the standards outlined in the Timber Sale Contract. The State Best Management Practice Guidelines (BMPs), developed by the Virginia and Tennessee Forestry agencies to help loggers operate in an environmentally sound manner, represent the minimum requirements for each harvest. The Contract will state any additional harvesting expectations. Standard requirements for all loggers working on these harvests include:

- Cut only trees marked with blue paint at the stump by the forester, leaving a low stump.
- Trees marked with blue paint at the stump by the forester will be cut, leaving a low stump.
- Use directional felling techniques to protect the residual stems.
- Construct or reopen skid trails only where directed; do not create new roads without prior approval.
- Construct landings using BMP's and place them only where directed.
- Install adequate erosion control measures on skid trails, other logging roads, and landings.
- Honor all SMZs and Special and Unique Areas – no felled trees, tree tops, machinery, or tree damage allowed in these areas.
- Immediately correct any erosion and siltation problems.

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- Place culverts and bridges at stream crossings only where agreed upon and using methods of installation approved by the manager.
 - Use all merchantable stems.
 - Do not leave trash or litter the woods.
 - Maintain a plan that specifies the use and storage of hazardous materials as well as for hazardous waste cleanup on the logging job.
 - Immediately clean up fluid leaks or spills.
 - Proceed in a timely and continuous manner.
 - Once an area is finished, close its roads as described in “*Closing out a harvesting area.*”

CLOSING OUT a HARVEST AREA

To limit erosion and stream siltation problems, loggers will reclaim logging roads, landings, and stream crossings promptly as follows:

Roads

- Grade and outslope roads and trails to move water off the paths and onto undisturbed forest floor.
- Install water bars or broad-based dips in steep grades of road as specified in the Virginia Best Management Practices manual.
- Fertilize, lime, seed, drag, and mulch the disturbed areas; use native grasses and forbs when possible.

Landings

- Grade landings; spread and bury or remove block piles.
- Install necessary water diversion and erosion control measures.
- Fertilize, lime, seed, drag, and mulch the disturbed areas; use native grasses and forbs when possible.





Stream Crossings

- Pull culverts and remove bridges if not permanent structures.
- Reshape the streambank if necessary; remove any loose debris from streambed and streambanks.
- Seed and mulch disturbed areas; use native grasses and forbs when possible.

ADMINISTERING the TIMBER SALE

When administering a timber sale, forest managers will follow the protocol described below. This protocol facilitates clear and open communication among the forester, the logger, and the landowner, to prevent misunderstandings and avoidable mistakes throughout the harvest operation.

Forest managers will conduct four types of meetings during the process of a timber sale:

1. **Preharvest Planning Meeting:** To make sure the logger is absolutely clear on the harvest area location, the trees to be cut, and other Timber Sale Contract provisions, the forester will meet on-site with the buyer and/or logger before the logger unloads **any** equipment at the property. At this meeting, the forester and buyer/ logger will review the Timber Sale Contract and the Preharvest Plan, as well as walk the harvest area with the Preharvest plan and map. In addition, arrangements will be made for contact with the Virginia Department of Forestry to inform them of when the logging operation will begin.

The Preharvest Plan will contain:

- ✓ A map showing the locations of harvest area boundaries, logging roads, landings, stream crossings and bridge locations, streamside management zones, and special concerns and unique areas;
- ✓ A description of the harvest type;
- ✓ Types and descriptions of water resources and associated streamside management zones and buffers;

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- ✓ Logging road locations and considerations (expected erosion control installations);
 - ✓ Landing location and considerations (road approaches and water diversions);
 - ✓ Skid trail locations and considerations (necessary erosion control installations);
 - ✓ Other potential erosion and sedimentation control measures (silt fences, hay bales).

2. **Logging Operation Inspections:** Foresters will visit harvest areas unannounced and walk through all areas worked in since the last inspection (unless active cutting is underway). To document and facilitate the process, the forester will mark and date the inspected areas on a map. The frequency of these inspections varies with the size and difficulty of the logging job, but is primarily determined by the skill, experience, and reputation of the logger:

- ✓ For operators that have worked on past sales, clearly understand the expectations, and routinely satisfy all contract obligations, a visit every week or two once work begins will be sufficient.
- ✓ For new operators not familiar to the managing forester, visits should occur at least twice a week for the first two weeks to make sure the operators understand the expectations and are complying with the contract.

At every inspection, the forester will complete a Logging Operations Inspection form to document contract compliance, progress, harvest area condition, and any new actions required of the logger. The forester will assess the following items as Acceptable or Unacceptable (or Good, OK, Poor), comment on performance, and when necessary, prescribe actions required to correct problems or bring an operation into contract compliance:

- Truck Road:** condition, erosion control measures;
- Landing:** condition, water diversion measures, and runoff containment;
- Trash:** contained on landing, absent from forest;
- Fluids:** no leaking equipment; emergency cleanup supplies available, spills cleaned up;
- Streamside Management Zones and Other Buffers:** intact and undisturbed;





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- Streams:** free of tops and debris, water flowing clear, no silt originating from this property;
 - Residual Stand:** condition of residual trees, stumps less than or equal to 10" high, culls cut, flagged broken stems cut;
 - Merchandising:** all merchantable wood removed from forest;
 - Skid trails:** location, condition (constructed properly), stream crossings and culverts;
 - “Closed” trails:** graded, water barred, outsloped, stream crossings reopened and culverts pulled, closed promptly;
 - Reclaimed log landings:** graded, cull wood piles addressed, landing fertilized, limed, seeded, dragged, and mulched;
 - OVERALL logging score:** Excellent, Good, Average, Poor, Unacceptable.

3. **Final Close-out Inspection:** After the loggers have felled and removed all trees, but before they move any equipment off-site, the forester will perform a final, scheduled inspection. The inspecting forester will review all the areas on the Inspection Form and all provisions required by the Timber Sale Contract to insure that the loggers have completely satisfied all terms and conditions. Key areas include (but are not limited to):

- All roads have been closed to meet erosion control standards specified by the Virginia Department of Forestry Best Management Practices.
- Waterbars and other water diversion measures have been properly and adequately constructed (angle, depth, height, frequency, and location).
- Stream crossings have been cleaned and returned to natural grade.
- Disturbed areas have been seeded.
- All trees marked with a blue spot at base or flagged for felling by forester during inspection visits have been cut and removed – no merchantable stems are left lying in the forest.

If any area does not meet the standards of Contract, or has not been completed as required by inspection visits, the forester will not close the harvest. Instead, the forest manager will give the logger clearly defined tasks to complete in a defined time period (typically two weeks, though weather limitations may extend the period to several months if necessary). If the logger/buyer does not comply within this time period, the manager will use the Performance Bond to hire someone to complete the work so that the operation can be closed.

4. **Final Communication:** With contract provisions met and the harvest officially closed, the forester will write letters to the landowner, the logger/buyer, and the Virginia Department of Forestry stating that the harvest was completed successfully and all contract provisions were satisfied. The Nature Conservancy will return the buyer/logger's remaining Performance Bond at this time.



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