



Christmas Tree Production Best Management Practices to Protect Water Quality and the Environment

Are you using best management practices on your Christmas tree farm?

High quality trees and profitability are important characteristics of a successful Christmas tree farm. In addition to targeting clear economic goals, a farmer should manage the crop in such a way that production is sustained well into the future. Soil must be protected from erosion. Surface water and groundwater must be protected from sedimentation and contamination by fertilizers or pesticides. Farming practices should minimize impacts on wildlife. The health of farm workers should not be endangered by improper handling, storage, or use of farm equipment or chemicals.

Christmas tree farmers who invest in practices that accomplish these goals usually show a greater long-term profit because the land is maintained more productively. Collectively, the added or alternative production practices that protect the farm economy and environment are called *best management practices*. For production to be sustained, a combination of the best management practices discussed in this fact sheet should be in place on every Christmas tree farm.

Employment and program opportunities are offered to all people regardless of race, color, national origin, gender, age, or disability. North Carolina State University, North Carolina A&T State University, U.S. Department of Agriculture, and local governments cooperating.



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How can we help?

This publication is a summary of best management practices to protect your land, nearby streams, and the environment. The aim is to raise your awareness of the best approaches to accomplishing these goals. By reading each section and answering a series of questions, you will be able to determine which areas need work on your farm.

Each section deals with a different topic. Accompanying each topic is a question designed to help you evaluate your practices within that topic.

- If you answer a or b, you are doing well in this area.
- If you answer c or d, your practices could stand to be improved.

The goal of the North Carolina Farm*A*Syst program is to help you protect the natural resources that all North Carolina residents depend on, while maintaining viable agricultural production practices.

If you would like further help in assessing the condition of your farm, please visit your nearest Cooperative Extension Center, your local Natural Resources Conservation Service office, or your North Carolina Soil and Water Conservation District.

North Carolina Farm*A*Syst Publications

- *Protecting Water Supply*, #1
- *Improving Fuel Storage*, #2
- *Improving Storage and Handling of Hazardous Waste*, #3
- *Improving Septic Systems*, #4
- *Improving Storage and Handling of Pesticides*, #5
- *Improving Storage and Handling of Fertilizer*, #6
- *Improving Storage, Handling, and Disposal of Livestock Waste*, #7
- *Grazing Livestock and Water Quality*, #8
- *Stream Management in the Piedmont and Mountains*, #9
- *Agriculture and Natural Resource Protection*, #10
- *Protecting Your Wetlands*, #11
- *Wildlife on Your Farm*, #12
- *Christmas Tree Production Best Management Practices to Protect Water Quality and the Environment*, #13
- *Managing Pests*, #14

Best Management Practices

1. How are your farm roads constructed?

The roads on many farms are too steep, are constructed of easily erodible material, and/or are poorly designed to manage runoff water. Roads should be constructed at no more than a 9 percent grade to avoid washing out. If drainage ditches lined with large gravel or riprap, they will channel runoff away from the roadbed and fields and prevent the formation of the gullies often associated with unprotected ditches. Installing a stable road surface to handle traffic is also critical. With increasing grade, slope length, and traffic, a gravel surface becomes much more stable than grass. Gravel may be spread just in the wheel tracks to reduce costs. Soil conservationists can help farmers as they plan for long-lasting roads (and fields) or work to solve existing road problems.

1. **Circle the answer that best describes your farm roads.**
 - a. Gravel with slopes less than 9 percent and adequate ditches.
 - b. Grassed with slopes less than 9 percent.
 - c. Grassed with slopes of 10 percent or more.
 - d. Bare soil with slopes of 10 percent or more.

2. Are you using field borders and stream buffers effectively?

Field borders and stream buffers can be very effective in trapping sediment, nutrients, and pesticides present in runoff. To maximize this trapping effect, however, the water leaving the field must be distributed as evenly across the border or buffer as possible. If channels form in a buffer, or even if gullies in the field channel the water entering the buffer, runoff will pass through with very little treatment. Studies have shown that a 15- to 25-foot-wide grassy strip can be very effective in improving runoff water quality. These strips usually can double as field roads as long as the vegetation covers them. Buffers of flowering native plants may serve as habitats for beneficial predators of insect pests.



Field borders and stream buffers.

3. Do you use low-impact site preparation methods in areas that need it?

Some land currently in Christmas tree production is too steep and erodible to bear extensive mechanical site preparation. Soils also may be too shallow or easily compacted to withstand heavy equipment. Compacted soils contribute to poor transplant establishment and to the onset of *Phytophthora* root rot disease. Less disruptive site preparation practices have been developed for such sites. Timber and brush should be cut close to the ground without disturbing the mat of roots that hold the soil in place. Saw logs and firewood should be harvested. Brush should be buried or piled in draws or field edges. Leave all or most of the stumps undisturbed. Do not attempt tillage. If seedlings are planted mechanically, plant areas near stumps by hand or leave them empty. Hardwood sprouts from stumps are a greater problem with this approach, but herbi-



Low-impact site preparation.

2. Circle the answer that best describes the buffers or borders at the edges of your fields.

- a. They have good cover and no gullies or deep channels leading to or in the buffer.
- b. They have good cover, but some gullies have formed leading to or in the buffer.
- c. They are sparsely vegetated and have gullies or deep channels.
- d. There are no buffers or borders adjacent to streams or drainage ways.



3. Circle the answer that best describes how you prepare your site for planting.

- a. I cut all vegetation and remove it as firewood or place it in burn piles and leave all stumps in the ground.
- b. I cut all vegetation and remove it as firewood or place it in burn piles and pull stumps using a track hoe.
- c. I push and pile all vegetation using a bulldozer and pull stumps using a track hoe.
- d. I push and pile all vegetation and stumps using a bulldozer.

cides such as Roundup and Garlon* can control them. Achieving optimum fertility, particularly for phosphorus and lime, may also be more difficult without tillage because nutrients are not incorporated into the soil. Minimizing the disturbance of the topsoil, however, may allow sustained Christmas tree production on sites where heavy equipment could permanently damage soil productivity through compaction.

Where heavy equipment is employed, using track hoes to pull stumps from the ground disturbs less soil than pushing the stumps out with a bulldozer. Before using heavy equipment, be sure soils are dry enough to minimize compaction.

4. Do you use pest scouting to minimize pesticide applications?

By scouting for pests, growers can reduce the frequency of pesticide applications and the cost of pest management while increasing the effectiveness of their efforts. Pest thresholds and scouting methods have been developed for many of the major Christmas tree pests (see AG-573, *Scouting Fraser Fir Christmas Trees*). Information generated by scouting confirms whether pesticide applications are needed and assures that such applications are targeted to only potentially damaging pest populations.

5. Are you making safe pesticide application decisions?

When such choices exist, Christmas tree pests, once properly identified, may be controlled with more than one pesticide. Growers can select the material that is the least toxic to beneficial insects, the environment, and wildlife. The toxicity of certain pesticides to specific groups of animals, such as fish or aquatic insects, can vary significantly. Safe pesticide choices will change depending on how close a site is to critical habitats or even the season and life cycle of vulnerable wildlife species. Some less-toxic materials may require different equipment, handling, or timing than are needed for traditional pesticides. Be sure to evaluate all factors when selecting a pesticide and to read and follow label directions. For some pests, growers can apply pesticides at alternative times, such as fall or winter, when beneficial insects or at-risk wildlife are not present.

*Recommendations for the use of agricultural chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention or listing of commercial products or services in this publication does not imply endorsement by the North Carolina Cooperative Extension Service nor discrimination against similar products or services not mentioned. Individuals who use agricultural chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Be sure to obtain current information about usage regulations and examine a current product label before applying any chemical. For assistance, contact your county Cooperative Extension Service agent.

4. Circle the answer that best describes how you apply pesticides.

- a. Pesticides are applied only after a regular scouting reveals a pest population at or above the treatment threshold in that field.
- b. Pesticides are applied only after a pest problem is noticed and the field is scouted.
- c. Pesticides are applied when someone notices a pest problem.
- d. Pesticides are applied on a schedule developed over the years or on a regular basis as time allows.

5. Circle the answer that best describes the factors you consider when selecting the pesticides to use on your farm.

- a. The product and timing that are least toxic to people, non-target organisms, and the environment.
- b. The product requiring the lowest application rate or the product least toxic to the person applying the pesticide.
- c. What my neighbors are using.
- d. The least expensive product available.

6. Do you manage ground covers to optimize sustained production?

Production of quality Christmas trees depends on managing weeds. Unchecked weed competition hurts tree growth, but total removal of ground cover results in erosion that will shorten the productive life of a field. Because of this, growers have moved away from the predominant use of long-lasting pre-emergent herbicides and bare-ground weed control. How they use ground covers is the primary tool for stabilizing the soil within a field of trees. Best management practices involve suppression of native vegetation using low rates of post-emergent herbicides and/or establishment of cover crops. This reduces competition for nutrients, water, and space while protecting the soil. Suppression using herbicides favors broadleaf weeds, whereas mowing favors more competitive grasses. An alternative practice is to sow cover crops, such as clover, winter wheat, red fescue, or rye, that reduce germination of native weed seeds and that can be managed more uniformly. Regardless of the approach, ground covers are a second crop that must be properly managed in any Christmas tree field to optimize sustained production.

7. Are you using a nutrient management plan?

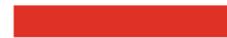
Maintaining proper tree nutrition is important in order to maximize productivity. Be sure to base fertilization on soil and tissue analyses conducted at the appropriate time. Younger plantations need less fertilizer than older plantations, and different soil types and rotations require different fertility programs. In the mountains, leaching of fertilizer into the groundwater is not generally a major problem, but some precautions are still necessary. Runoff can carry surface-applied fertilizer into nearby creeks and ponds, where the nutrients can cause algal blooms that lead to fish kills. Best management practices depend on regular use of soil and tissue analysis as the basis for all fertilizer and lime applications. Applications should match the fertilizer requirements determined for each field. Where practical, split annual nitrogen requirements into two applications to reduce the leaching potential and the risk of salt injury to tree roots.

8. How do you handle, store, and dispose of pesticides?

Pesticides are most hazardous when they are in concentrated form during mixing, storage, and disposal. Pesticides should always be mixed and loaded far from wells, springs, or streams. Progressive farmers are installing covered and contained concrete mixing pads, which capture any spills or rinse water. They build secure pesticide storage areas on the same pads. Portable field mixing pads eliminate the risk of spills that may occur while pouring from pesticide containers and cost less than permanent facilities. Be sure to triple rinse and puncture all empty liquid pesticide containers before taking them to landfills or recycling centers. Other methods of container disposal are

6. Circle the answer that best describes the ground in your plantation.

- a. It is planted in a cover crop and managed to reduce competition with the trees.
- b. It is covered in mowed or suppressed weeds except immediately under the trees.
- c. There are narrow strips of mowed or suppressed weeds between trees and wide strips of bare soil under the trees.
- d. Bare soil.



7. Circle the answer that best describes how you manage your nutrients.

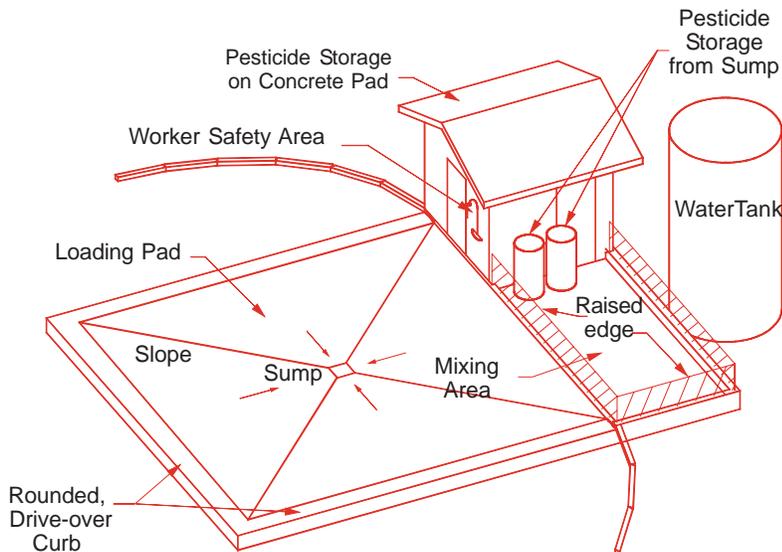
- a. I test soil and tissue and apply recommended rates as split applications.
- b. I test soil and tissue and apply recommended rates.
- c. I apply increasing amounts of fertilizer as the trees grow.
- d. I apply the maximum fertilizer rate on a regular basis regardless of tree size.



8. Circle the answer that best describes how you handle pesticides.

- a. I use an integrated storage/mixing/loading facility on a rinse pad.
- b. I mix and load on a solid surface to catch potential spills and I store, mix, and load away from wells, springs or streams.
- c. I store, mix, and load away from wells, springs, or streams.
- d. I store, mix, and load near wells, springs, or streams.

illegal and risk groundwater contamination. For liability and safety considerations, all farm managers and foremen should all be knowledgeable about the handling, storage, and legal disposal of pesticides and their containers. Pesticide handlers must complete the appropriate licensing and pesticide training.



Pesticide loading and storage facility

9. Are you protecting your wellhead?

Contamination of groundwater often occurs as a result of poor well construction, which allows contaminants to seep into the well. Good wells are grouted and sealed with concrete and enclosed in a concrete cover with a concrete pad. Generally, newer wells are built like this. In addition, several management practices can reduce the risk of groundwater contamination regardless of well construction. Never mix agricultural materials at the wellhead. Draw water from hoses or faucets at a mixing area away from and preferably downhill from the wellhead. Maintain a grassy buffer at least 100 feet wide to protect it from high traffic areas or any pesticide application areas. Make sure the well cover and casing are above the surrounding landscape, and that the immediate land slopes away from the well. If production areas are above a well, consider the leachability of the fertilizer or pesticides used. Furthermore, channel runoff from those areas away from the well.

Summary

Christmas trees should be a renewable and sustainable crop. Best management practices can protect both the environment and the long-term productivity of your farm. If you answered a or b to the questions in this fact sheet, you have invested in these practices already. If you answered c or d to the questions, the long-term productivity of your farm may be at risk.



REMINDER
If you circle
c or d for any
question, long-
term productivity
may be at risk.

9. Circle the answer that best describes your well.

- It is properly constructed and at least 100 feet from application or mixing areas.
- It is at least 100 feet from the nearest application or mixing area but I don't know how it was constructed.
- It is less than 30 years old, properly constructed, and located in or near application or mixing areas.
- It is more than 30 years old or without grouting or a concrete pad, and located in or near application or mixing areas.

Your county Cooperative Extension Service Center agent can help you implement best management practices on your farm.

Related publications

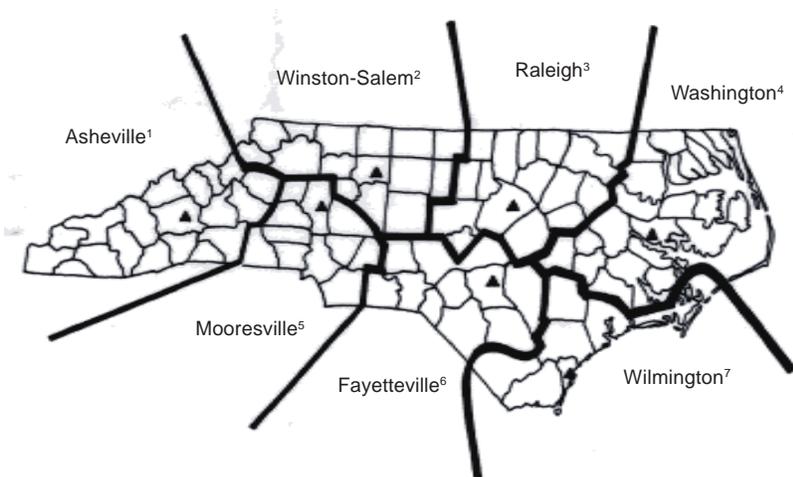
The following publications are available from Communication Services, Box 7603, North Carolina State University, Raleigh, NC 27695-7603, Tel: 919-515-3112:

- *Growing Christmas Trees in North Carolina*. Also available on-line at <http://www.ces.ncsu.edu/nreos/forest/xmas/growing/>
- *Pesticides and Human Health / Christmas Trees*, AG-Med-16.
- *Los Pesticidas y La Salud Humana, arboles de Navidad*, AG-Med-17 (Spanish version of AG-Med-16).
- *Scouting Fraser Fir Christmas Trees*, AG-573.

Contacts for Further Information

- Your county Cooperative Extension Service Center
- Natural Resources Conservation Service, U.S. Department of Agriculture; your county office or Agricultural Services Building, Suite D, 4001 D Carya Drive, Raleigh, NC 27610, Tel: 919-250-1070, Fax: 919-250-1058, Website: www.nc.nrcs.usda.gov
- North Carolina Christmas Tree Association, P.O. Box 1937, Boone, NC 28607, Tel: 828-262-5826 or 1-800-562-8789, Fax: 828-265-1558, Website: www.ncchristmastrees.com, E-mail: info@ncchristmastrees.com

To Find Your State DWQ Location



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²505 Woughtown St., Winston-Salem, NC 27107; 336-896-7007

³3800 Barrett Drive, Suite 101, Raleigh, NC 27609; 919-571-4700

⁴1424 Carolina Avenue, Washington, NC 27889; 252-946-6481

⁵919 North Main Street, Mooresville, NC 28115; 704-663-1699

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