

DECISION NOTICE  
AND  
FINDING OF NO SIGNIFICANT IMPACT  
for  
Suppression of Southern Pine Beetle Infestations  
on  
The Uwharrie National Forest

USDA Forest Service  
Southern Region  
Uwharrie Ranger District  
Davidson, Montgomery, and Randolph counties,  
North Carolina

## 1.0 Introduction

This Decision Notice (DN) and Finding of No Significant Impact (FONSI) documents my decision to utilize Cut & Remove, Cut & Leave, Cut & Chip, and Pile & Burn techniques to suppress infestations of Southern Pine Beetles (SPB) on the Uwharrie National Forest during the next five years. Monitoring infestations without suppression action may be appropriate for some SPB spots.

Our analysis shows that of the approximately 50,000 acres of national forest land in the Uwharrie Ranger District, approximately 24,554 acres of pine or mixed pine and hardwood forests are susceptible to damage from the SPB. USDA Forest Health specialists have estimated that, if left unchecked, SPB infestations could cause tree mortality in a majority of these susceptible stands.

The scope of these suppression actions is limited. Suppression methods will not be used if spots have become inactive (beetles are gone from the spot), if a spot has less than 10 active trees and no freshly attacked trees, or if there are few or no host trees available for continued spot growth. When suppression action is undertaken, trees from which all SPB have emerged (called vacated trees) will not be cut, except for safety reasons. Cutting vacated trees will not contribute to SPB control. Leaving them can allow natural enemies of SPB to complete their development and emergence. Also, standing dead trees provide den sites for certain woodpecker species. Leaving those dead trees reduces the expense of Cut & Leave and Pile & Burn, and usually a timber purchaser doing Cut & Remove does not want dead trees since the wood is degraded. Also, loggers doing Cut & Remove could complete their operations on a given SPB spot quicker if they are not removing vacated trees. That makes them available sooner to perform suppression action on other SPB spots.

## 2.0 Decision

Based on the analysis contained in the environmental assessment, I have decided to select Alternative 2 to suppress SPB infestations in management areas: 1, 3, 4, 6, 7, and Special Interest Areas A-G.

Our analysis shows that it is economically and environmentally impractical to treat every spot outbreak of southern pine beetle on the forest. Therefore, the primary goal of suppression activities is to reduce beetle populations to a low level as rapidly as possible to accomplish the following major objectives. These objectives will be used to prioritize where suppression activities may occur:

1. Reduce exposure of forest visitors and workers to standing beetle-killed trees,
2. Reduce risk of infestation to adjacent private lands,
3. Reduce impacts to scenery,
4. Minimize loss of pine communities, including timber resources and wildlife habitat,
5. Reduce the risk of severe wildfires where fuel loading would be increased by beetle-killed trees.

This Decision Notice (DN) and the Finding of No Significant Impact (FONSI) documents my decision, which authorizes up to 5,000 acres total of SPB suppression treatments over the next five years to suppress infestations of Southern Pine Beetles (SPB) on the Uwharrie National Forest. With this total suppression effort, we estimate that approximately 3,500 acres will be treated with Cut & Remove, approximately 1,000 acres with Cut & Leave-Manual, approximately 250 acres treated as Cut & Leave-Mechanical, approximately 200 acres treated as Cut & Chip, and approximately 50 acres treated as Pile & Burn. The actual acres to be treated may be less depending on the duration and extent of SPB outbreaks, and the practical economic and environmental constraints imposed by the location and environment surrounding each spot.

Also, authorized is use and minimum maintenance of existing roads and construction of temporary roads less than ½ mile as may be necessary for access.

### 2.1 Limitations on Actions

As part of my decision other implementation procedures are imposed on the Proposed Action, Alternative 2, as follows:

1. No new system road construction will be permitted for the purpose of implementation of this proposal. In most all cases, suppression activities will be accomplished using existing roads.
2. Temporary roads constructed for any treatment will not cross perennial streams.
3. No hauling or skidding of harvested trees will occur within riparian areas except on existing travelways.

4. Crossing of intermittent stream channels with temporary roads will be at a 90-degree angle, and only one crossing will be allowed per unit/stand.
5. No mechanical suppression methods will be allowed on slopes greater than 40%.
6. After suppression methods are completed, temporary roads will be returned to general forest conditions by stabilizing the site and allowing the travel way to return to a forested condition through natural regeneration.
7. Implementation checks will be conducted for the presence of PETS terrestrial species within all treatment areas and access corridors used for “Cut & Remove”, “Cut & Leave (mechanical)”, “Cut & Chip”, “Pile & Burn” treatments.
8. Implementation checks will be conducted for the presence of PETS aquatic species in streams within or adjacent to stands with the following characteristics:
  - a. Riparian stands containing mixed pine species with little understory vegetation providing shade to the stream.
  - b. Riparian stands containing only pine with little or no understory vegetation providing shade to the stream.
9. Based on the implementation checks, it may be necessary to implement site-specific mitigation measures and recommendations, or to eliminate the area from suppression treatments to minimize effects to rare aquatic species.
10. For Pile & Burn treatment, no burning will occur within 100’ of perennial streams to avoid potential effects of riparian soil heating, increased water temperature, and increased sediment transport on aquatic resources.
11. No burning associated with this project will be conducted in April through October in Davidson County. Furthermore, no burning will be conducted in association with this alternative on days when the Forsyth County air agency predicts the Air Quality Index to be codes orange, red, or purple.

In addition, a series of implementation checks will be required prior to treatment of each area to assure adequate protection for archeological sites, scenery, and aquatic, botanical and wildlife resources. Also, detailed monitoring will be required to ensure compliance with all of the mitigation measures that are included in this decision notice.

The possible location of these actions are listed and mapped in Appendix C to the EA.

## **2.2 Mitigation Measures**

Also as part of my decision, mitigation measures will be applied to meet a variety of resource values or management objectives. Mitigation measures will reduce impacts to resources from suppression activities by implementing the following:

### **2.2.1 Measures to Reduce Effects on Recreation Resources**

1. Alert visitors at recreation areas and trailheads if suppression activities are occurring on the forest.
2. Cut and/or Remove hazardous trees damaged by SPB in the immediate vicinity of trails or recreation facilities.

3. Post information on SPB activity on Forest Bulletin Boards.
4. Use GIS database or stands listing to determine the potential to affect other resources.

### **2.2.2 Measures to Reduce Effects on Soil & Water Resources**

1. On temporary developments, including roads and landings, seed bare soil with appropriate annuals at the time of construction.
2. Provide for adequate surface drainage of roads and landings at time of construction, and maintain surface drainage features during all phases of the activity.
3. Where applicable, ensure that surface water control and/or vegetative cover are adequate to control erosion and prevent off-site sediment transport during temporary or seasonal closures.
4. Upon completion of a Cut & Remove treatment unit, rip compacted areas at least 8" deep (except where precluded by stony conditions), construct or reconstruct drainage features, and close seeded areas to unauthorized vehicular traffic. Where unable to rip on the contour or necessary to rip parallel to the direction of run of linear features (roads, etc.), break the length of run with unripped 1'-3' strips or "baffles"; spacing of baffles should be as determined appropriate based on slope and site conditions. This does not apply to small, scattered areas of less than 1000 sq. ft. within the treated unit itself.
5. Establish a minimum of 70% ground cover of permanent vegetation by the end of the first growing season following use of temporary roads, skid trails, and log landings. Include legume(s), inoculated with the proper inoculants for the species, in all permanent seedings.

### **2.2.3 Measures to Reduce Effects on Archeology**

The following mitigation measures will be followed to eliminate adverse impacts to National Register of Historic Places eligible (Class I) or potentially eligible (Class II) sites from SPB suppression treatments:

1. Areas to be treated with the Cut & Leave treatment method will be reviewed through the Heritage Resource Atlas and land acquisition files to determine the presence of historic structure remains. These areas may be subjected to pedestrian survey to verify historic structure presence. Directional felling may be necessary to avoid disturbing structure remains. No further archeological compliance will be needed.
2. All SPB spots scheduled for treatment with the Pile & Burn, Cut & Chip, or Cut & Remove suppression methods will be checked by the zone archeologist or forest archeologist prior to any suppression activity. The implementation check will be documented on the NFsNC SPB Compliance Checklist.
3. SPB spots proposed for pile-and-burn, cut-and-chip or cut-and-remove treatment would be compared to the Heritage Resource Atlas to determine if the area has had prior survey, has known sites and the NRHP eligibility of the respective sites. Areas previously surveyed with no sites or Class III sites require no further review and the activity can be allowed. Areas with known Class II sites

must be avoided by any ground disturbing activities, skidding, road construction, etc. Known Class I and Class II sites within or adjacent to treatment areas will be located and marked prior to suppression activities.

4. Areas with high and moderate probability landforms (0-10% slope) that have a vegetation age of 20 or more years will require intensive archeological field survey prior to any ground disturbance. Areas with low probability landforms (0-10% slope) with a vegetation age of 20 or more years will not require field survey prior to project implementation. Areas with a vegetation age of 20 years or less will not require survey because they have been previously surveyed and previously subjected to terrain disturbance. All newly located/recorded sites will be avoided.

5. Areas with greater than 10% slope will be surveyed only when GIS soil maps and geological type maps indicate there is potential for the presence of historic mining or prehistoric quarry activities. These areas (>10% slope) will need less intensive subsurface testing with coverage largely limited to pedestrian survey. All newly located/recorded sites will be avoided.

6. The final decision to check or not check a project area will be made after the zone archeologist or forest archeologist consults the GIS soil map, geologic map and heritage resources atlas. This will be done to ensure special kinds of sites including prehistoric quarries and historic mines, Traditional Cultural Properties and/or sacred sites are not adversely affected by the proposed activity. Site-specific consultation with Federal recognized tribes may be required prior to any activity.

7. All SPB areas surveyed in a fiscal year will be reported in a forest report to be submitted to the State Historic Preservation Officer (SHPO) no later than June 1 of the following year.

#### **2.2.4 Measures to Reduce Effect to Visual Quality**

The following mitigation applies to all areas visible in the foreground and middle ground from open roads, trails, recreation areas, lakes and rivers. In Appendix "C" there is a complete listing of susceptible host type by stand, which includes VQO assignments. Scenery (VQO) analysis was completed using GIS technology. Data are available for public review. In this GIS layer, assigned VQOs are noted in the *vqo* field of the susceptible stands attribute table. Retention is the most restrictive VQO noted in the attribute table, while Modification is the least. The *vqo* field contains the visual quality objective assigned through the forest plan. If an affected stand has no *vqo* attribute, contact a NFNC landscape architect for clarification.

#### **For all VQOs (MA 1, 3, 4, 6, 7)**

Mitigation techniques:

- Establish irregular shaped openings to avoid straight lines or geometric forms.
- Leave unsusceptible trees and shrubs where practical.
- When cutting buffer, feather edges of openings 30-50 feet into un-infested trees.
- Slope cut-banks on roads and landings (where applicable).
- Seed skid roads, temporary roads, landings, and cut/fill banks (where applicable).

**(R) Retention VQO (MA 4, 7)**

Mitigation techniques:

- No new bladed skid/temp. roads or landings; skid to system road, or use existing skid/temp. roads and landings only.
- Slash treatment when stands are cut and removed.
  - Burn, chip, or lop and scatter slash to within 2 feet of the ground for 150 feet beyond the edge of an open road or trail.
  - No slash treatment required in middleground; burn if needed.
- Log debris treatment when stands are cut and left.
  - Chip, or Lop and scatter to within 2 feet of the ground for 150 feet beyond the edge of an open road or trail; do not pile and burn.
  - To extent possible, lop and scatter in middleground; do not pile and burn.

**(PR) Partial Retention VQO (MA 1, 3, 4, 7)**

Mitigation techniques:

- Contact landscape architect for assistance in road/landing location in foreground areas where a new bladed skid road, temporary road or landing is needed.
- Screen or blend-in skid/temp. roads and landings where visible within 200 feet of open roads, trails, etc.
- Slash treatment when stands are Cut & Removed.
  - Burn, chip, or lop and scatter slash to within 2 feet of the ground for 100 feet beyond the edge of an open road or trail.
  - No slash treatment necessary in middleground; burn if needed.
- Log debris treatment when stands are cut and left.
  - To extent possible, chip, or lop and scatter in foreground; do not Pile & Burn.
  - No treatment required in middleground; Pile & Burn if needed for beetle suppression.

**(M) Modification VQO (MA 1, 3, 4, 6, 7)**

Mitigation techniques:

- When adjacent to open roads, trails, etc., screen or blend-in skid/temp. roads and log landings where practical.
- Slash treatment when stands are Cut & Removed.
  - Burn, chip, or lop and scatter slash to within 4 feet of the ground for 50 feet beyond the edge of an open road or trail.
  - No slash treatment necessary in middleground; burn if needed.
- Log debris treatment when stands are cut and left.
  - To extent possible, chip, or lop and scatter in foreground; Pile & Burn if needed for beetle suppression.
  - No treatment required in middleground; Pile & Burn if needed for beetle suppression.

**2.2.5 Measures to Reduce Effects to Biological Resources**

The following mitigating measures will reduce impacts to biological resources. Cut & Remove, Cut & Chip, and Pile & Burn suppression activities will not be implemented on

areas where Forest concern, Forest sensitive, and federally listed and candidate species occur. Implementation checks will be conducted prior to **ALL** suppression treatments to assure that potential habitats for Forest concern, Forest sensitive, and federally listed and candidate species are avoided. Known element occurrences are identified through current inventories.

To comply with the Federal Endangered Species Act (FESA, 16 USC 1531), National Forest Management Act, (NFMA, 16 USC 1604) and/ or The National Environmental Policy Act (NEPA., 42 USC 4321), it was determined that the following mitigation is required.

### **2.2.6 Mitigation Measures for Botanical Resources**

Specific mitigation measures to protect TES and locally rare plant species are included in the proposed management action to treat southern pine beetle infestations. These include the suppression methods used to treat infested stands, as well as connected activities to provide access, such as building temporary roadways. These mitigation measures are as follows:

1. Implementation checks will be conducted for the presence of federally threatened, endangered, Forest Service sensitive and locally rare species within all treatment areas, and in access corridors used for “Cut & Remove”, “Cut & Chip” and “Pile & Burn” treatments. A qualified botanist will conduct appropriate season, on-site botanical surveys prior to suppression activities to assess whether rare plants occur in infested areas that could be impacted by suppression activities and/or by temporary road construction.
2. Based on implementation checks, site-specific mitigation measures will be implemented, or areas eliminated from suppression treatments, in order to minimize the effects to rare species.

#### **Specific mitigation measures for this project to protect *Helianthus schweinitzii* if present in or near the treatment area include the following:**

1. Clearly marking and delineating all known locations of *Helianthus schweinitzii* (including a buffer area of at least 20 feet in width) that may be affected by habitat restoration activities, timber salvage, stand regeneration, or other activities that could affect known populations or habitats that could support this species.
2. Locating permanent or temporary roads, and skid trails away from known populations of *Helianthus schweinitzii*.
3. Prohibiting the use of heavy equipment in known populations of *Helianthus schweinitzii*.
4. Conducting all timber felling, harvest, or skidding operations in known populations of *Helianthus schweinitzii*, during the non-growing season (November through April 1), and skidding logs away from the populations, not through the populations.
5. Prohibiting the planting of tree seedlings within *Helianthus schweinitzii* populations.
6. Including in all vegetation management contracts (timber sales, habitat restoration, habitat maintenance) or other contracts that allow activities that could

affect the habitat requirements in *Helianthus schweinitzi* populations, all Conservation Measures, items 1 through 5 above, and an explanation of the sensitive nature of endangered species habitats and the significance of these measures.

7. Monitoring and documenting all ground disturbing activities in known *Helianthus schweinitzii* populations. It is implicit that: (a) a qualified botanist will perform these tasks and work closely with the contractor, onsite, to ensure that all the above Conservation Measures are implemented, (b) monitoring of affected populations will occur for at least two years after implementation of the activity, and (c) the USFS will provide the results of monitoring to the US Fish & Wildlife Service.

### **2.2.7 Mitigation Measures for Aquatic Resources**

1. No burning should occur within 100' of perennial streams to avoid potential effects of riparian soil heating, increased water temperature, and increased sediment transport on aquatic resources.
2. In riparian areas as defined by the Uwharrie Plan, Cut & Leave (manual) will be the preferred SPB suppression method. If other suppression methods are proposed in a riparian area, a site-specific resource plan will be prepared by an Interdisciplinary Team to ensure that riparian-dependent values will be protected.
3. Implementation checks for rare aquatic species presence in streams within or adjacent to riparian stands containing only pine species with little or no understory vegetation providing shade to the stream shall be conducted by fisheries biologist. Based on the implementation check, it may be necessary to implement site-specific mitigation measures and management recommendations, or to eliminate the area from management to minimize effects to rare aquatic species.

### **2.2.8 Mitigation Measures for Wildlife Resources**

1. Cut & Leave is the only suppression method allowed within 100' of bogs and ponds, including seasonal ponds (winter-spring).
2. All mature (16 inches dbh) pine forests with few hardwoods, and an open understory will be surveyed during treatment marking for Red-cockaded woodpecker cavities. The wildlife biologist will be notified immediately of any cavity tree finding.

### **2.2.9 Mitigation Measures to Provide for Public Safety**

Alert visitors at recreation areas and trailheads if logging activities are occurring.

## 2.3 The Monitoring Plan

### 2.3.1 Implementation Checks Procedure

The following items will be done to ensure the proper implementation and reporting of actions taken under the authority of this decision.

The Forest Supervisor will establish a SPB ID team for the Uwharrie SPB Suppression Project, and the District Ranger will establish a project manager. The function of the ID team is to ensure all of the proper implementation checks are performed for each action taken under the authority of this decision. The Project Manager is responsible for implementing the requirements in this decision. The Forest Silviculturist will be responsible for annual reporting.

This decision establishes the procedure for implementation, which is to be followed by the Project Manager. Training on the Implementation Checks procedure will be given prior to any action taken under the authority of this decision.

**Check for disclosure of environmental effects.** If a suppression action is proposed, the stand number must be checked against the Susceptible Stands List - Appendix C of the EA to ensure the stand is covered in the EA.

**SPB Tracking Form and SPBIS Data Sheet.** When a SPB spot is located, a SPBIS Data Sheet will be initiated and updated. For each suppression action proposed, information from the Susceptible Stands List, Appendix C of the EA, must be transferred to a SPB Tracking Form. The Project Manager will describe the proposed treatment. Treatment options, desired treatment, timeframes for implementation, SPBIS #, acres of treatment, elevation, road plan, and water information will be included. The Project Manager will attach the appropriate scenery mitigation based on the VQO.

**Submit forms to resource specialists.** A copy of the SPB Tracking Form, SPBIS Data Sheet, and topographic map will be attached to the Implementation Check Form and submitted to the responsible Wildlife Biologist, Fisheries Biologist, Botanist, and Archaeologist. Each specialist must complete the Implementation Check Form, and return it to the Project Manager. Members of the SPB ID Team shall receive copies of the Implementation Check Form.

**Reporting.** All required forms must be filed in the district files under designation 3400. The Forest Silviculturist will request SPB Tracking Forms in December every year for the duration of this decision (approximately 5 years). They will be consolidated into one report consisting of acres treated by county and compared to information in SPBIS. Reports will be available upon request from the Supervisor's Office.

### **2.3.2 Disclosure of Actions taken under this authority**

As a means of maintaining records and the accountability requirement standards in the analysis, the Forest Silviculturist will compile the following reports:

- Annual report in January to the Forest Supervisor to ensure that acre limits for suppression are not being exceeded.
- Coordinate updating of the SPBIS database to show actual treatments that were implemented.

The Forest Archaeologist will compile the following report:

- Annual report in March to the State Historic Preservation Officer.

## **3.0 Reasons for this Decision**

The suppression methods proposed are long standing and proven methods of control in southern forests and when applied as directed above will safeguard the resource values of the Uwharrie National Forest. I believe the benefits of suppressing SPB infestations far outweigh the risks.

### **3.1 Meets the Purpose and Need for Action**

Alternative 2 will fulfill the purpose and need for the project, which is to reduce SPB populations as rapidly as possible to prevent further spread and subsequent tree mortality. Alternative 2 also addresses the direction for the Uwharrie National Forest given in the LRMP better than Alternative 1, No Action.

Implementation of Alternative 2 will result in actions being taken to safeguard forest visitors and workers. Removal of dead or dying trees in campgrounds, along trails and roads, and administrative sites will reduce the risk of injury to visitors.

Implementation of Alternative 2 will result in quick response to SPB outbreaks on national forest lands, which will reduce the possibility of infestations escaping onto adjacent private lands. Prompt action will preserve the values of our neighbors' lands.

Implementation of Alternative 2 will preserve scenic values intact by reducing the proliferation of SPB spots in sensitive viewing areas. Many of our visitors expect to see a healthy forest and would be alarmed by the sight of large numbers of dead trees. Suppression activities will reduce the number and size of SPB spots, thus keeping more trees alive over the long term.

Implementation of Alternative 2 will minimize the loss of pine communities by reducing the number and size of SPB spots, preserving the timber resources and wildlife habitat on the Uwharrie National Forest. If numbers and size of SPB spots are reduced, fewer trees will be killed, saving timber values and special wildlife habitat for future use.

Implementation of Alternative 2 will reduce the risk of severe wildfires where fuels would be increased by SPB killed trees. Again, suppression of SPB spots will reduce the numbers and size of SPB spots, thus reducing the otherwise increase in fuels caused by increased mortality of trees.

### **3.2 Responds to Issues**

The following statements indicate how the proposed action responds to the issues brought forth by the public during the scoping process. Initially, there were thirteen issues, one of which generated another alternative which was considered but not analyzed in great detail because it would not meet the Purpose and Need for the proposal in all cases. The Cut & Leave Only treatment is ineffective in the winter, thus it would not control SPB infestations. The other twelve issues were concerns of persons if the suppression methods proposed were implemented.

#### **3.2.1 Impacts to Class 1 Air Quality by Pile & Burn Treatment.**

As stated in section 3.2.2 Air Quality, the total particulate emissions from the proposed treatment of Pile & Burn would be very low, since the trees will only be charred enough to kill the larva under the bark and then allowed to decompose. Therefore, the contribution of the fine particle associated with the Pile & Burn treatment as impacts to people's health or visibility in Class 1 areas is likely to be minimal. Also, it is considered that only 50 acres of the area requiring treatment will be treated with Pile & Burn; therefore the magnitude of this treatment is very small. In contrast, the taking no action has the potential of emitting large amount of fine particles if a severe wildfire were to occur.

#### **3.2.2 Protection of Heritage Resource Sites.**

It is known that the Uwharrie Ranger District is the most heritage rich forest in North Carolina, and extreme care has been utilized in past planning and initiation of activities for their protection. Overall the present methods of protection have been successful, therefore, it is unlikely that disturbance of archeological sites will occur with these activities occurring on such limited scale. The use of the Implementation Checks will further improve our protection efforts of Heritage Resource sites. Use of mitigation measures and the Implementation Checks, which are part of this decision, will assure compliance with the National Historic Preservation Act.

#### **3.2.3 Protection of adjacent Landowners' Resources.**

Protection of adjacent landowners' resources is one of the reasons given as a purpose and need for this proposal. It is important that immediate actions are taken to protect the natural resources of our neighbors and through the prioritization of treatments areas

closest to private lands will receive a high priority for treatment. See the above discussions.

### **3.2.4 Maintenance and Encouragement of the Longleaf Pine Community**

This also is one of the reasons given as a purpose and need for this proposal. It is important that immediate actions are taken to suppress SPB infestations in order to protect the pine communities on the Uwharrie National Forest. Although Longleaf Pine is not the preferred host of SPB, Longleaf Pine will become infested when conditions are most favorable. See the above discussions.

### **3.2.5 Protection of Wildlife Species Associated with Pine Communities.**

See the above discussions concerning limiting the numbers and size of SPB outbreaks. Quick suppression of SPB spots will reduce the magnitude of pine tree losses, thus preserving the wildlife habitat of species associated with pine communities.

### **3.2.6 Impact to Aquatic Species from Temporary Road Construction.**

In order to reduce or eliminate the impacts of this action on aquatic species and riparian zones, numerous mitigations and limitations have been built into this proposal. They are found in Section 3.7, Mitigation Measure by Resource. Several listed here are designed specifically to reduce impact to aquatic species, their habitat, and water quality. They are as follows: no new system roads will be constructed to treatment areas, the construction of temporary roads will be limited to ½ mile, and no new perennial streams crossings will be constructed, no hauling or skidding within riparian areas except upon existing roadways, and Cut & Leave will be the preferred method of suppression within riparian areas. Furthermore, implementation checks will assure mitigating measures are employed during treatments.

Although it is not known exactly how much temporary road construction may be necessary, the existing system roads network should limit its magnitude. Temporary roads are a short-term use, which then are prepared for water drainage and erosion control measures immediately after their intended use.

### **3.2.7 Conserve the Ecological and Economic Value of Forest Resources.**

See the above discussions concerning limiting the magnitude of a SPB outbreak. Limiting the size and numbers of SPB spots will preserve the present ecological and economic value of the forest resources, including the visual quality (scenery), timber products, pine and mixed hardwood/pine ecosystems, wildlife habitat of species which inhabit pine communities, and recreational opportunities, such as hunting.

### **3.2.8 Retain Public Safety within Recreation Sites and Travel Ways.**

Protection of public visitors and forest workers is one of the reasons given as a purpose and need for this proposal. It is important that immediate actions are taken to protect the public from the hazard of standing beetle-killed trees within our recreational sites and travel ways. Through the prioritization of treatments, standing dead trees closest or within recreational sites and travel ways will receive a high priority for treatment. See the above discussions.

### **3.2.9 Impacts to Rare/endangered Wildlife and Plant Species Associated with or Adjacent to Treated Areas.**

It is important that immediate actions are taken to suppress SPB infestations in order to reduce the size and number of SPB spots and reduce impacts to rare or endangered wildlife and plant communities by alteration of vast acreages of pine community habitat. Retaining mature pine communities will preserve the habitat of the RCW, if in the future the RCW were ever present on the forest. Mitigation measures, designed to protect rare plant communities within treatments areas, and use of the Implementation Checks, will preserve those communities to a greater degree much more than allowing SPB infestations to advance unchecked across the landscape. The mitigation measures used for many years on the Uwharrie National Forest have been successful in preventing impacts to wildlife habitat and plant communities in harvest areas; therefore, it is unlikely that action initiated in this decision would impact them negatively.

### **3.2.10 Forest Fragmentation.**

Immediate action taken to suppress SPB infestations in order to reduce the size and number of SPB spots will reduce forest fragmentation to a greater degree than allowing SPB infestations to expand and kill large acres of pine forest in many widespread areas around the forest. Introduction of small areas of young age classes into the forest will increase diversity of plant and animal species within pine communities and are less likely to impact travelways and habitat of species requiring pine communities of various ages.

### **3.2.11 Potential Increase to Susceptibility to Catastrophic Wildfire.**

This also is one of the reasons given as a purpose and need for this proposal. It is important that immediate actions are taken to suppress SPB infestations in order to reduce the potential of catastrophic wildfire. Quick suppression of SPB spots will reduce their size and number, thus reducing the increase in fuels that otherwise would be added if vast areas of pine forest were permitted to be killed by unchecked SPB infestations. See the above discussions.

### **3.2.12 Impacts to Visual Quality.**

This also is one of the reasons given as a purpose and need for this proposal. It is important that immediate actions are taken to suppress SPB infestations in order to reduce the size and number of SPB spots, thus preserving the scenic values. Implementation of Alternative 2 with associated mitigation measures, designed to protect the visual quality, and use of the Implementation Checks, will protect scenic values much more than allowing SPB infestations to devastate the pine and mixed hardwood and pine forests. Mitigation measures used for many years on the Uwharrie National Forest have been successful in preserving the visual quality in harvest areas, therefore, it is unlikely that action initiated in this decision will impact visual quality to an unsatisfactory degree. See the above discussions.

## 4.0 Scoping and Public Involvement

Scoping is defined by the National Environmental Policy Act as “an early and open process for determining the scope of issues to be addressed, and for identifying the issues related to a proposed action.” Scoping continues throughout project planning and analysis.

After initial internal scoping with a Forest Service interdisciplinary team, the SPB Suppression Project was listed in the October, 2002 Schedule of Proposed Actions mailed to the Forest-wide list of over 100 recipients. The project has been listed in the quarterly Schedule of Proposed Action since that time. On October 25, 2002, a scoping letter was mailed to individuals on the Uwharrie Ranger District mailing list, which contains approximately 60 persons. This letter identified the proposed actions necessary to control SPB infestations, included a description of the project area, and a request for comments. A notice requesting comments was also placed in the Montgomery Herald on October 23, 2002. In response, comments were received from one individual, one government agency, and two non-governmental organizations. From their comments, thirteen major issues were identified and addressed in the EA. These are listed in the EA and are part of the administrative record for this project. The scoping letters, the mailing list, and the project proposal are filed in the administrative record.

Upon completion of the analysis phase and the writing of the EA, there begins a Notice and Comment Period, which for this project began on May 21, 2003 and ended on June 20, 2003. A request for comments was also published in the Montgomery Herald on May 21, 2003. Two letters were received. One letter supported the choice of the preferred alternative and mitigation measures for the protection of sensitive wildlife and botanical species. The other letter expressed numerous concerns on many subjects. These concerns were addressed in Appendix D of the environmental assessment, Response to Comments.

## 5.0 Alternatives Considered

Two alternatives were considered for detailed analysis. Alternative 2 is the alternative I selected for implementation, as described in detail in the previous pages. Alternative 1 is described briefly below, along with my rationale for not selecting that alternative. Another alternative was considered but not analyzed in detail because it would not meet the purpose and need and was not effective in suppression of SPB at certain times of the year.

### **Alternative 1: The No Action Alternative**

No suppression methods would be implemented under this alternative. Spread of southern pine beetle and associated pine mortality on the Uwharrie National Forest would continue without management intervention.

**My reasons for not selecting this alternative:** Although, the Southern Pine Beetle is indigenous to the piedmont of North Carolina and though some might say, “their existence and activities are part of nature,” the implementation of the No Action alternative would not result in the attainment of the desired conditions for the Uwharrie National Forest as determined in the Croatan & Uwharrie LRMP. Not suppressing SPB infestations and not confining their activities to as small an area as possible may jeopardize many of the LRMP goals, objectives, and standards. Some of the most negatively affected are as follows:

1. Provide goods and services to satisfy public demands while improving long-term healthy conditions of the forest environment.
2. Provide the quality habitat for wildlife that is unique to federal lands.
3. Provide a high level of visual quality.
4. Provide a place where plant and animal diversity will be maintained and suitable habitat for animals depending upon older forests will be increased.
5. PETS plant and animals, including RCW, will be protected and population recovery goals reached to the extent practicable.
6. Provide a continuous supply of wood products.
7. Provide for the safety of forest users and workers.
8. Provide for the prevention and detection of wildfires.

To one degree or another, the above listed goals and objectives would not be met if SPB infestations were permitted to spread unchecked. Vast acreage of pine and mixed pine and hardwood forest types could be lost, many in the older age classes, which would negatively impact the accomplishment of the above listed goals and objectives of the LRMP.

For these reasons I have not selected Alternative 1- No Action as the means to achieve the Purpose and Need of this project. Also, it would not meet the goals and objectives of the Croatan & Uwharrie LRMP or those of the NFMA.

## **6.0 Finding of No Significant Impact**

I have determined that implementation of Alternative 2 is not a major federal action, individually or cumulatively, and will not affect the quality of the human environment. Therefore, an environmental impact statement will not be prepared. I have considered both context and intensity, as described in 40 CFR 1508.27 in my determination that is based on the analyses documented in the environmental assessment.

### **6.1 Context:**

**6.1.1** The actions of this decision and resulting physical and biological effects are limited to the Uwharrie Ranger District and adjacent landscape, and are, therefore, local in nature. The activities are limited to those susceptible forest types on a small portion of the landscape.

**6.1.2** Treatment areas are narrowly defined as follows:

Actions are limited to forest types that contain greater than 30% Southern Yellow Pine trees species, the host trees of SPB. Although this is approximately 49% of the Uwharrie National Forest, it is proposed that only 5000 acres (10%) of the forest area will need treatment. Treatments are limited to areas that are within one-half mile of existing roads and to slopes of less than 40 percent grade. Actions are restricted in wilderness areas.

**6.1.3** Before actions are taken, implementation checks will be conducted to determine if the effects of actions are covered by the EA, BE and reasons for this decision. Therefore, the limited context of the actions in this decision will not cause significant effects to the environment.

**6.2 Intensity:**

**6.2.1.** Both beneficial and adverse impacts are considered. Reducing the spread of SPB would keep more trees alive, reduce wildfire risks, reduce adverse impacts to scenery, minimize loss of pine communities, and protect adjacent private landowners' property. Any potential adverse effects are reduced through mitigation measures and implementation checks. There will be no significant effects as a result of the action (EA Chapter 3).

**6.2.2.** The actions will have minimal effects on the public health and safety, as dead trees will be removed or felled near recreation sites and trails. Smoke management guidelines will be applied during the prescribed burning to alleviate air quality concerns. (EA pp. 20, 27-31, 80, 89). The actions we take will reduce risks to public health and safety.

**6.2.3.** The actions in this decision will not affect any unique characteristics of the geographic area (historic or cultural resources, park lands, prime farm lands, wetlands, wild and scenic rivers, or ecologically critical areas). The limitations on actions, implementation checks, and the mitigation measures cited in the EA have been included as part of this decision to protect these valuable resources.

**6.2.4.** Based on the public involvement, the effects of suppression efforts on the quality of the human environment are not highly controversial. (EA section 1.10, and Appendix D)

**6.2.5.** The actions do not involve highly uncertain, unique, or unknown environmental risks to the human environment (EA throughout Chapter 3). All actions described have been conducted before, and district staff members have considerable expertise in carrying out these actions. The risk of taking action is relatively insignificant compared with risks of taking no suppression efforts to contain an epidemic.

**6.2.6.** The limitations, mitigating measures and implementation checks assure that this action does not adversely affect cultural resources listed or eligible for listing in the

National Register of Historic Places and will not cause loss or destruction of significant scientific, cultural, or historical resources. (EA pp.11-15, 22, 84, 90-91).

**6.2.7.** The cumulative effects of the proposed actions have been analyzed and no significant effects are anticipated. (EA, Chapter 3).

**6.2.8.** The actions in this decision will not set a precedent for future actions with significant effects nor do they represent a decision in principle about a future consideration. All actions have been conducted previously in other parts of the forest. The physical and biological effects are limited to the area of planned activity.

**6.2.9.** The degree to which this action may adversely affect an endangered or threatened species or its habitat have been considered. The proposed project will have no effect on any other federally proposed or listed species. (EA, Appendix A) The project may impact individual plants or animals, but will not impact their viability across the Forest. No direct, indirect or cumulative effects are anticipated to any threatened or endangered species. Implementation checks will assure that potential impacts on sensitive species from our actions are minor and will not cause a trend toward federal listing.

The Uwharrie Ranger District is currently informally consulting with the US Fish and Wildlife Service as part of a programmatic consultation for *Helianthus schweinitzii*. An additional letter from the USFWS was also received on July 21, 2003, stating that this project would not likely adversely affect the RCW or *H. schweinitzii*'s sunflower and that the requirements of section 7(a)(2) of the Act have been satisfied.

**6.2.10.** This action does not threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment. This will be ensured by carrying out the proposed action in a way that is consistent with the standards and guidelines, management requirements and mitigation measures established in the LRMP and this Decision Notice. For water quality, North Carolina Best Management Practices will be met through application of LRMP standards.

## **7.0 Findings Required by Other Laws and Regulations**

The suppression actions are consistent with the Land and Resource Management Plan (LRMP) for the Croatan and Uwharrie National Forests and the National Forest Management Act. The following paragraphs discuss my reasoning for the finding:

**7.1** The actions of this project support the goals, objectives, and standards for the affected Management Areas, as described in Chapter III (pages 1-16) of the LRMP. See Chapter 1- Purpose and Need for the Project in the EA.

**7.2** Required mitigating measures to prevent or lessen adverse impacts have been fully applied in the actions. The project is reasonable and feasible, and will result in applying

the management practices that meet the LRMP overall direction for protecting the environment.

**7.3** The actions of this project will meet all requirements of the Endangered Species Act and all agreements with the State Natural Heritage Program, in that the impacts to Proposed, Endangered, Threatened, and Sensitive (PETS) species or critical habitat for these species are insignificant and will not affect the population viability of any PETS species.

**7.4** The suppression actions meet the following criteria.

**7.4.1.** The actions of this project are suited to the multiple use goals established for the area; potential environmental, biological, cultural resource, aesthetic, engineering and economic impacts have been considered.

**7.4.2.** Regeneration checks of existing harvested stands in the area show that these lands can be reforested within 5 years. Another environmental analysis, with public participation, will be necessary for the follow-up regeneration methods.

**7.4.3.** Actions were not chosen primarily because they will give the greatest dollar return or the greatest output of timber.

**7.4.4.** Actions were chosen after considering potential effects on residual trees and adjacent stands.

**7.4.5.** No permanent impairment of site productivity is expected from these actions.

**7.4.6.** Actions will provide benefits, consistent with desired conditions, for water quality and quantity, wildlife and fish habitat, regeneration of desired tree species, recreational use, and other resources.

**7.4.7.** Actions are feasible and practical in terms of transportation requirements, labor supply, and contract administration costs.

**7.4.8.** The use of even-aged timber management is appropriate for suppression of SPB infestations on suitable and unsuitable lands as described in LRMP standards. Suppression activities will provide for safety of Forest visitors and workers, reduce the risk of infestations on adjacent private land, reduce impacts to scenery, minimize loss of timber resources, and reduce the risk of damage from wildfires by minimizing increased fuel loading.

**7.5** There are no significant irreversible or irretrievable resource commitments.

## **8.0 Appeal Rights**

This decision is subject to appeal pursuant to 36 CFR 215.7. A written Notice of Appeal must be postmarked or received within 45 days after the date notice of this decision is published. Any appeal of this decision must be fully consistent with 36 CFR 215.14, "Content of an Appeal," including the reasons for appeal, and must be filed with the Appeal Deciding Officer at this address: Regional Forester, USDA Forest Service Regional Office, ATTN: Appeals Deciding Officer, 1720 Peachtree Rd. NW, Suite 811N, Atlanta, GA 30309.

For additional information on the appeals process or this decision, contact Lawrence Hayden, at USDA Forest Service, P. O. Box 2750, Asheville, North Carolina 28802, (828) 257-4864.

## **9.0 Implementation**

This decision may be implemented no sooner than 5 business days following the close of the appeal filing period. If an appeal is received, implementation may not occur for 15 days following the date of appeal disposition.

/s/ John F. Ramey

October 7, 2003

**JOHN F. RAMEY**  
**Forest Supervisor**

**DATE**

## **Appendix D Response to Comments**

### **Key Interest: Financial Analysis**

**Comment:** There was no indication in the EA of a financial analysis that actually included estimates of the revenue generated by the potential timber sale.

**Response:** The purpose of this EA is to analyze the feasibility of suppressing SPB on the Uwharrie Ranger District using various suppression methods. Estimates of financial analyses were disclosed using samples from previous similar projects as follows. Since the amount and locations of SPB suppression activities are unknown at this time, an exact financial analysis is not practicable.

This is not to say that economic analysis has not been done on SPB suppression activities. In Chapter IV of the Final Environmental Impact Statement for the Suppression of the Southern Pine Beetle, Volume 1, beginning on page 4-20, there is a discussion of economic analysis of SPB suppression projects. This analysis was conducted on actual projects after the project was completed, and the actual project data was used to determine the economic efficiency of the project. The analysis program provided a present net value (PNV) and a benefit/cost ratio (B/C) for each of three projects. In all instances it was determined the control investment was economically justified, because the PNV exceeded the suppression project expenditures and the B/C ratio was greater than one.

From this we conclude the value of suppression is greater than taking no action. For the Cut and Remove option, we will allow marketplace economic forces to determine the economic value of the removal. If in the suppression of the SPB sufficient values of trees are to be removed, a sale package will be prepared for sealed public bid. Also, any revenue received from Cut & Remove is better than paying someone to cut down buffers as we do with Cut & Leave. It has been proven that suppression is also more effective with Cut & Remove, especially in winter, and results in less mortality. More surviving trees have greater value as future timber products, as wildlife habitat, and aesthetics.

The timber values and cost of control for projects conducted on the Uwharrie National Forest would be similar to the control efforts studied in the above listed FEIS once adjusted to current dollars. It is clear there is positive financial value in controlling SPB spots. Additionally, if no control effort were to be made and the spots allowed to spread to their natural extent there would still be a need to enter these areas and perform reforestation activities. These reforestation activities would be more costly without any prior control efforts due to the amount of dead material remaining on site as well as the fact the spots would generally be larger in size. Therefore, in conclusion while there are costs to treat SPB spots these costs are clearly out weighted by the value of the timber harvested; reduced spot size and reduced post control reforestation activities.

**Comment:** If the lumber is not sold, what is done with it? How much does a salvage operation cost, and is it worth the return on your investment?

**Response:** We do not sell “lumber”; we receive sealed bids for the value of standing trees from which lumber is cut. Cut and Remove is one of the four alternative treatments considered as a suppression method and is the only method in which the value of the tree would be captured in the form of lumber production. In all other methods the lumber value of the tree would be lost because the tree bole is destroyed and remains in the forest.

The per-unit cost of a salvage sale would be inversely proportional to the size of the salvage operation. That is, small salvage areas would have a higher per unit cost, because of the fixed costs involved, than a larger area. We would mark the buffer area under any suppression method, so the additional cost of tree removal is in administration of the timber sale contract. See the previous response for a discussion of the financial analysis.

### **Key Interest: Cut and Remove Method**

**Comment:** We are concerned about the magnitude at which this operation will occur. We feel that the resultant amount of biomass removed may be a detriment to the nutrient cycling and habitat availability of the area.

**Response:** It is estimated that approximately 3,500 acres or 7% of the entire 50,000+ acres of the Uwharrie Ranger District will be treated by Cut and Remove method of suppression. This represents a small portion of the national forest when you consider this could be spread out over three years of the normal SPB cycle. Past SPB events resulted in Cut and Remove treatments that averaged about seven acres in size; therefore, in a given area within the forest, timber removals associated with Cut & Remove suppression activities, would be limited to small areas if the Forest Service can respond quickly after infestations are detected.

In the Cut and Remove treatment, only the tree stems are removed from the site, the limbs, needles, stumps, and roots are left on the site to deteriorate. Studies show that the greatest concentration of nutrients in a tree is stored in the smaller limbs, leaves and roots. Since these portions of the tree will remain on site, only minor amounts of nutrients are being removed from the forest in the bole of the tree.

**Comment:** We are concerned that the impacts of SPB suppression have not been considered in the USFWS recovery plan for RCW and that more research should be done to consider the potential direct and indirect impacts of the Cut and Remove technique on the RCW.

**Response:** The US Fish and Wildlife Service did prepare and send a letter of concurrence to Lawrence Hayden of the US Forest Service concerning this project. This letter states, “Based on the information provided and other information available, the Service believes that this project, as described in the EA, is not likely to adversely affect

the red-cockaded woodpecker...”. The letter continues with this statement: “We believe that the requirements of section 7(a) (2) of the Act have been satisfied.” This letter is in the project file and also has been made part of this Appendix to the EA.

In the summer of 2002, the Forest Wildlife Biologists did an extensive field review of numerous potential RCW stands for the presence of RCW cavity or “start” trees. No cavity or start trees were found even though the search was conducted in the most suitable habitat on the forest. From this survey and the vast wealth of familiarity we have with the forest, we are able to state there are no known RCW colonies on the Uwharrie RD. According to the US Fish and Wildlife letter suppression activities would not adversely affect the RCW. Also, suppression methods would seemingly protect potential RCW habitat in terms of increasing the availability of older trees by limiting their loss to SPB.

**Comment:** We are concerned about the high level of mechanization that will be employed on the ground to remove the timber. The high level of mechanization and heavy equipment used is directly damaging to the local economy and directly degrading the environment by compacting the soil and reducing the air and water quality.

**Response:** Purchase, operation, and maintenance of equipment for logging have positive effects on local economies and its use is a financially and environmentally sound method of harvesting trees; therefore, it would not be damaging to the local economy.

Currently, erosion control and revegetation measures employed during and following soil disturbing activities, adherence to NC Forest Best Management Practices and LRMP standards for protection of soil and water resources are considered adequate to minimize adverse impacts during the project and to prevent significant post-disturbance soil movement or degradation of water quality. Post project review of past soil disturbing activities on the Uwharrie RD have indicated the above measures are suitable for the protection of soil and water quality within the project area. The analysis shows the effects to soil resources will be short-term and of relatively small extent; and the cumulative effects of this proposal will be minimal.

Section 3.2.2 Air Quality discusses the potential impacts of the alternatives to air quality. Basically, there is a risk to the air quality with either alternative. Not suppressing SPB outbreaks and not removing the dead trees would result in much larger fuel loads in the forest, which would lead to much greater air quality impacts if a catastrophic fire were to start. On the other hand, implementation of the SPB suppression treatments, removal or burning, under controlled conditions and in compliance with mitigation measures would result in small amounts of air pollution with minimal negative impact.

**Comment:** The temporary roads proposed to accompany removal equipment are slated to be naturally revegetated. There is no mention of how this will be done and what species will be either restored or introduced.

**Response:** At the conclusion of their use, planting a perennial grass, an annual grass, and a legume mixture according to LRMP standards would stabilize temporary roads. Drainage structures including water bars would limit soil erosion. Over time herbaceous and woody vegetation would replace the planted grasses and legumes, and trees such as pine, yellow-poplar, and sweet gum would grow within the temporary road corridors. Through succession, these tree species would be replaced by oaks and hickories if left undisturbed over a long period of time.

**Comment:** There does not seem to be any effective mitigation measures in place to prevent exotics. We are opposed to the use of herbicides as an effective means of controlling the vegetation on our National Forests.

**Response:** The potential for establishment of exotic, invasive species follows any major vegetation disturbance. The largest opportunity for exotics to become established may occur with the No Action alternative, where no SPB suppression would be performed resulting in large areas of pine mortality, and the greatest potential for the exposure of mineral soil. By implementing suppression activities soon after SPB infestations are detected, disturbances would remain small.

There are contract requirements in Forest Service timber sale contracts that require purchasers to clean their logging equipment to prevent the spread of exotics, if they are to operate or have operated within certain areas.

The use of herbicide is not included as a proposed action in this analysis.

**Comment:** An effective description of how the restoration planting will be carried out long term is not addressed in the EA. We are concerned about the use of herbicides to eliminate competition, and that the restoration planting be done in a way that will effectively prevent SPB epidemics in the future.

**Response:** Site preparation and reforestation treatments are outside the scope of this SPB suppression analysis.

The use of herbicide is not included as a proposed action in this analysis.

### **Key Interest: Pile and Burn Method**

**Comment:** If allowed to burn too hot, the mineral soil can be permanently devastated and sterilized. This is of major concern to species in the area.

**Response:** It is estimated that approximately 50 acres or 0.1% of the entire 50,000+ acres of the Uwharrie Ranger District will be treated by Pile and Burn, and only a fraction of those acres would be affected by fire since the trees within the treatment area would be piled together for burning. Of course with suppression efforts beginning immediately after detection, it is expected that treatment areas would be small and scattered. The objective would be to char the bark of infested, green logs; heating the

bark enough to kill the pine beetles underneath. A fire of such intensity to consume the logs would not be necessary. Logs would be spread out to cool after they are heated sufficiently. Effects of this treatment have been addressed in the EA.

**Comment:** We are not convinced that the Pile and Burn method will not have a significant air quality impact.

**Response:** The pile and burn treatments will only be conducted on days when the predicted air quality index in Forsyth County is predicted to be by code good or moderate, and no burning will be conducted in Davidson County during the April through October ozone season. These mitigation measures will protect the public health against any harmful effects from the low level of pollution emissions caused by Alternative 2. It should be kept in mind the treatment will consume only a small portion of the outer portion of the trees and emissions of particulate matter and nitrogen oxides will be very low. Emissions from the operation of diesel equipment for the low numbers of hours are also not expected to result in adverse effects to air quality.

You can find additional information concerning air quality in section [3.2.2 Air Quality](#) of the EA and in the previous response.

**Comment:** With the associated intensity of pile and burn, the risk for streams to receive thermal pollution is increased. Sudden change in temperature is known to directly affect stream ecology and potentially killing of organisms some of which may be threatened and endangered.

**Response:** [Section 3.7.1 Limitations on Proposed Action](#), statement 9, indicates for Pile & Burn treatment, no burning will occur within 100' of perennial streams, which enough distance to adequately protect water temperature. [Section 3.8.2 Mitigation Measures for Aquatic Resources](#); statement 2 indicates Cut and Leave to be the preferred method of suppression in riparian areas.

Also, see explanation of Pile and Burn objective above.

### **Key Interest: Alternative Method of SBP Suppression and Control**

**Comment:** We do not believe that the Forest Service has exhausted all possible alternatives for management of southern pine beetles. The Verbenone treatment when used with felling can be an effective means of controlling epidemics.

**Response:** The use of semiochemicals has not been approved for general use on US Forest Service land per the SPB EIS. Secondly, verbenone has not been approved for use commercially and has only been applied experimentally by qualified professionals. Studies indicate that verbenone is only useful on small (<120 trees), slowly enlarging beetle spots namely when infestations are small and isolated. The use of verbenone with felling would have little effect on epidemic beetle populations.

