

## **STORM DAMAGE TO FORESTS: INFORMATION FOR LANDOWNERS**

**Storms are a naturally occurring feature of our region's forests and are important for maintaining biological diversity and wildlife habitat. They can also result in major economic losses and create significant forest management problems. Some effects of heavy windfall include:**

- Changes in fish and wildlife habitat (habitat for many species may be created, while for others it may be reduced).
- Loss of economic value
- Changes in aesthetic values
- Damaged or blocked roads, culverts, and ditches
- Fuel build up resulting in future forest fire hazard
- In areas of heavy blowdown, potential for future loss due to increased susceptibility to insects, decay, future storm damage, etc.
- Safety hazards for landowner and forest workers

### **What should I do first?**

#### **1. Identify and Respond to Immediate High Priority Safety Issues:**

- Immediate safety hazards to people or structures. (Trees "hung up" or under tension are very dangerous to remove. Consider hiring an experienced contractor.)
- Blocked or damaged ditches, culverts, and roads. (May result in road wash out, erosion, damage to water and fish habitat)
- Damaged trees and limbs which may fall onto roads or power lines (Notify road department or power company)
- Trees blocking forest access roads

#### **2. Conduct A Thorough Damage Assessment:**

- If physically possible, walk entire property -- preferably with a forester. (Good idea to wear your hard hat and other safety gear!)
- Make a simple map showing extent and type of damage. -- Blocked roads and trails. Take lots of photographs!
  - Trees with broken tops
  - Trees with broken limbs
  - Fallen trees
  - Trees severely bent over

Professional assistance is available to help you assess your situation and make informed decisions on how to proceed. The Washington State Department of Natural Resources Small Forest Landowners Office (SFLO) can help you with this initial assessment. Contacts for assistance are:

Pacific County: Rick Kuykendall – (360) 767-7002; [rick.kuykendall@dnr.wa.gov](mailto:rick.kuykendall@dnr.wa.gov)

Grays Harbor County: Mike Nystrom – (253) 350-0018; [mike.nystrom@dnr.wa.gov](mailto:mike.nystrom@dnr.wa.gov) or Ritch Wood- (360) 374-6131; [richard.wood@dnr.wa.gov](mailto:richard.wood@dnr.wa.gov)

For a complete list of program personnel, go to:

(<http://www.dnr.wa.gov/htdocs/rp/foreststewardship/staff.html>).

For a more detailed assessment to determine value losses, we recommend that you contract with a private forestry consultant, (<http://ext.nrs.wsu.edu/publications/forestry/consultingdirectory.htm>).

### 3. Consider Salvage Harvest of Damaged Trees:

If a significant number of "log sized" trees (12" or larger diameter at chest height) are downed or have broken tops, consider planning a salvage harvest.

Contact a professional consulting forester to help you. Consultants can lay out and supervise the sale, and market your timber for maximum return to you. They will know reliable loggers, local market conditions, and regulatory requirements.

You may also find the following resources helpful:

- Consulting Foresters Directory (EB 1303) (<http://ext.nrs.wsu.edu/publications/forestry/consultingdirectory.htm>)
- [Managing Your Timber Sale](http://cru84.cahe.wsu.edu/cgi-bin/pubs/EB1818.html?id=BLygSPD8) (EB 1818) (<http://cru84.cahe.wsu.edu/cgi-bin/pubs/EB1818.html?id=BLygSPD8>)
- Listing of Washington State Accredited Loggers (<http://loggers.com/MLPList.asp>)
- Streaming video presentation: [Managing Your Timber Sale: Advice for Landowners Before Logging](http://ext.nrs.wsu.edu/Video/TimberSale/index.htm) (<http://ext.nrs.wsu.edu/Video/TimberSale/index.htm>)

### 4. How much time do I have before the trees deteriorate and lose economic value?

The DNR Forest Health program has compiled the following information as it pertains to windstorms in our coniferous forests. The general guideline listed below will be helpful. Additional general forest health issues are contained on this site from WSU Extension: (<http://ext.nrs.wsu.edu/publications/foresthealth.html>).

#### **Forest Health Issues Associated with Windthrown and Flood Damaged Timber in Western Washington.**

**Karen Ripley, DNR Forest Health Program Manager.  
January, 2008**

When trees are wounded, broken, or blown down by severe winds and flooding, landowners worry about additional impacts from insects and disease organisms. Will insects and diseases degrade the wood? Will pest populations rise and affect surviving trees? What can be done to reduce the long term vulnerability to future storms? This paper is intended to briefly discuss each of these issues. Landowners may seek the assistance of trained forest professionals to answer more species-, site-, and damage-specific questions.

**Degradation of wood.** Wood degradation includes color changes, tunnels or holes, and strength changes associated with chemical, insect, and fungal activity. The impact of degraded wood to the timber owner often depends on the product that will be manufactured. Appearance-grade products may be devalued merely by discoloration. Wood products sold for pulp or wood strength can endure more significant effects without devaluation.

Factors that affect the occurrence, nature, and expansion rate of wood degradation include the tree species, the season of the storm, exposure to oxygen, exposure to insects and fungi, and temperature. In western Washington, red alder tends to degrade faster than softwood/conifer trees. Western hemlock and true fir degrade more rapidly than Douglas-fir or redcedar.

When initially cut or killed, where the bark is removed, wood surfaces of red alder develop a reddish discoloration. This staining can be reduced by using appropriate kiln-drying procedures and does not affect wood strength. A more intense orange stain that cannot be effectively removed during drying is caused by the penetration and expansion of

wood decay fungi. These fungi grow slowly at normal winter temperature and moisture conditions. In tests on Vancouver Island, alder bolts cut in November had virtually no stain development from cut ends within 4 months. When stored in cool, moist field conditions, bolts had less than 10 cm of stain penetration after 6 months. But stain developed rapidly (up to 55 cm of stain penetration in April-May) in bolts stored on warmer, drier sites. Fungal stain can also grow, albeit more slowly, in wood adjacent to exposed surfaces. Note: When bolts were cut during spring or early summer, fungal growth and stain progression was rapid. So, in summary, alder trees which fell or were broken in December should be processed by April or May.

At this time, I do not have specific information about decay rates in other tree species, but it would generally be a less serious case than alder because conifers decay more slowly than alder, and particularly if the wood is not destined for export or appearance-grade products.

Insects tend to be dormant or inactive during winter months, but can move into wood in early spring. Ambrosia beetles tend to be the earliest active wood borers. They infest the outer rings (sapwood) of virtually any species of log, so the amount of potential damage to an attacked log is primarily related to log diameter. Damage consists of narrow pinhole size tunnels with black stain penetrating the surrounding wood.

Ambrosia beetles emerge from their overwintering sites when the temperature exceeds about 16 °C or 61° F. Logs in the forest generally are safe until March. Logs either heavily soaked with water or quite dry are not suitable for attack. In general, the control of these beetles is very difficult and the prompt utilization of wood (milling and drying or at least debarking) is recommended. Ambrosia beetles only infest dead or nearly dead wood/tree parts in a specific moisture range. They do not threaten living trees that survive the storm.

Deep wood boring beetles such as Cerambycid ("long-horned wood borers") and Buprestid ("metallic wood borers") beetles can make extensive tunnels into recently cut, blowdown or killed wood. Adults tend to fly and lay eggs on log surfaces in early summer. Tunneling is initiated that season. Eggs hatch, larvae begin feeding on the inner bark, and the larvae then turn and tunnel into the wood. Larval growth and penetration rates into the wood depend on moisture and temperature conditions. The worst damage I have observed was to trees in eastern Washington killed by mid-July wildfires and attacked immediately. Larval tunnels penetrated logs up to four inches deep by late October. In western Washington, logs damaged by floods and windthrow won't be attacked until adult beetles fly in early summer. Tunnel penetration will likely occur more slowly because of moderate temperatures.

In summary, trees which fell or were broken in December should be processed no later than April or May to prevent losses from ambrosia beetles and fungal stain.

**Death or damage to injured trees.** Trees injured and broken by wind and flooding are susceptible to secondary bark beetles and wood rotting fungi that infest wound sites where bark is removed and wood is exposed. When a live tree is invaded by wood decay fungi, the tree can often produce substances that compartmentalize the decay within and interior to those annual rings that are exposed. Vertical compartmentalization is much slower. The most severe example of wood decay in a living tree would likely parallel that of red alder (the example above).

However, conifers decay more slowly than hardwoods. The eventual vertical extent of decay depends on the surface area exposed, the tree species, the nature of the tree recovery, and some luck. When Douglas-fir trees that had been top-broken at about 6 inches diameter by ice and snow were dissected 20-30 years later, the decay extended from about 6 inches to 3 feet. Decay was mostly confined to the area also affected by resulting tree growth abnormalities such as crooks, and forks.

Injured trees can be subsequently killed by the effects of their injuries (such as root breakage, bark removal, and live crown loss) or by bark beetles. Susceptibility may depend on the tree's vigor and stored nutrients present before the tree was injured and the population of bark beetles in the area. In western Washington, secondary bark beetles generally put an injured tree out of its misery; they don't kill trees that would otherwise survive.

When landowners assess whether their trees are likely to live or die as a result of storm damage, they should evaluate how much of the tree's height remains in live crown (consider removing trees with less than 20 to 40% of the height left in live crown); the percentage of a tree's circumference that is de-barked (consider removing trees whose circumference has been girdled more than 50%), and the extent of other injuries. Decisions whether to remove injured trees can also be affected by questions associated with the

landowner's management goals, such as whether the height of a stem injury will affect a future product from the tree (can you still get a 12- or a 16- foot log from below what probably will be a scarred or crooked segment?); whether there are benefits to leaving trees of this size and structure for wildlife habitat; and whether a target exists that would be threatened by the development of defective danger trees over time.

**Death to trees that would otherwise survive.** In western Washington, there are two important bark beetles that breed in injured or windthrown timber that have the potential to rise to epidemic levels that subsequently could kill healthy or moderately injured trees. They are the Douglas-fir beetle (spruce beetle follows the same model) and the alder bark beetle.

Douglas-fir beetle adults lay their eggs under the bark of freshly windthrown or storm broken logs in early spring (April to June). They prefer pieces greater than 12 inches diameter that are lying in the shade. The larvae require one year to mature before they emerge as adult beetles. So, the following spring (two springs after a winter event that created the initial breeding material for the parents to lay eggs on) this second generation will seek additional windthrown or damaged Douglas-fir. If they succeed in entering those damaged trees and quickly attracting enough beetles to overwhelm them, the trees will be killed. If they can not find damaged trees, some beetles will try to attack standing green trees. The vigor of the green trees that are attacked affects how many beetles die trying to kill them and how many larvae are produced. When events cause huge accumulations of large diameter Douglas-fir blowdown, the tree killing epidemics that follow usually last three years.

Landowners who wish to avert such an epidemic can salvage the blowdown and infested material before the second spring after the initial event. Currently infested logs and any nearby standing trees that also are infested should be removed and milled before the beetles mature and fly away.

Pheromone chemicals can also be used to affect insect communication and reduce tree damage. They can be deployed before the first spring beetle flight (before April 1) to reduce the initial population build-up or can be deployed a year later to protect individual surviving trees and stands from attack.

Alder bark beetles breed in logs and severely injured trees the first spring after the storm. They have two generations per year so salvage of infested trees and logs must be employed more rapidly, no later than the first June after a winter storm. There are no commercially available pheromones for managing alder bark beetle.

**Reducing long term vulnerability.** As landowners observe damaged forests, there is an opportunity to assess the patterns of trees that were damaged or failed and to change management when possible to avert or reduce future damage.

Examine the nature of tree failures. Did the trunks snap off (stem failure)? Did the roots break (root failure)? Did the entire intact root plate or ball lift or pivot (soil failure)? If root or stem failure occurred, what contributed to these weaknesses (large height to diameter ratio? Decay fungi from old wounds? Root disease?). Take this opportunity to learn how the trees in your forest responded to high winds and heavy rains. Adapting your management to reduce future impacts from winter storms will be important as you make decisions about salvage, recovery, and replanting strategies.

## **5. Do any of my trees have value for wildlife?**

Yes, consider retaining some storm-damaged trees and downed debris for wildlife habitat. Trees with broken tops or large broken limbs, and larger diameter downed wood, provide valuable habitat for wildlife. This type of habitat is often limited in many forest areas. If possible, retain some larger trees with broken tops and/or limbs and larger downed wood. Choose only trees in areas where they will not be a future safety hazard or impede future management activities.

The Forest Stewardship Program Wildlife Biologist can be reached at: 360-902-2599 or at [jim.bottorff@dnr.wa.gov](mailto:jim.bottorff@dnr.wa.gov) if you have questions or wish to schedule a site visit to your property.

## **6. Am I required to clean up downed trees and forest debris (slash) caused by a storm?**

No. However, it will likely be necessary to do so in order to satisfactorily replant the affected property. Clean up is also highly desirable to reduce the future potential for wildfire and bark beetle infestation. When slash results from human activity, including salvage logging, satisfactory slash disposal is required within 100 feet of roads and may be required within 200 to 500 feet of structures, campgrounds, schools, and other areas of frequent public use. If you have questions about your situation, call your DNR Region Office.

## **7. Do Forest Practices rules still apply after this storm?**

Yes, all of the rules under the Forest Practices Act apply. DNR has compiled a list of common storm-related Forest Practices questions and answers, which is reproduced below. Forest Practices Foresters are available to answer questions specific to the circumstances on your property. Contact your DNR Region Office for assistance ([www.dnr.wa.gov](http://www.dnr.wa.gov)).

Additionally, DNR will give top priority to Forest Practices Applications on storm-damaged forest land and attempt to expedite their processing. Affected persons should write the words "Storm Damage" clearly at the top of their application.

A copy of Forest Practices Illustrated is available from this website: (<http://www.dnr.wa.gov/forestpractices/illustrated/>).

### **Commonly Asked Storm-Related Forest Practices Questions**

#### **How long will it take to get an approved Forest Practice Application (FPA) for storm related damages?**

Applications take 5 to 30 days to process. We are expediting storm related FPAs, so if you indicate on your application that it is "Storm Damage" we will do our best to approve it as quickly as the rules allow.

#### **What are the marking requirements or how do I mark my units, roads and Riparian Management Zones (RMZ's) with all the blow down?**

Units – Mark or describe the boundaries in such a way that anyone, without a global positioning system, could locate them from your description. Identifying the extent of the existing blowdown is not sufficient.

Roads – Roads with 'resource issues' must be marked and approved prior to operating. Forest Practice Forester can condition Forest practice applications for 48 hour notice that before you grub or grade a field review will be needed.

RMZs – RMZ's must be marked to the extent possible.

In cases where a Forest Practice Forester believes there is an issue that needs to be clarified, more detailed marking of units, roads and/or RMZs will be required.

#### **Do standard rules apply to RMZ's, unstable slopes, and habitat issues?**

Yes. Even though blow down has occurred, standard rules still apply when it comes to dealing with RMZ widths, unstable slopes, and habitat issues. Different agencies or expertise may be needed to evaluate specific issues.

#### **What is salvage?**

Salvage harvest is a type of harvest method which is removal of snags, down logs, windthrow, or dead and dying material.

**Can I do an Alternate Plan on a blow down salvage?**

Yes. A landowner may submit an alternate plan that departs from the specific provisions of chapters 222-22 through 222-38 - Washington Administrative Code (WAC). Blanket Alternate Plans will not be issued. There currently is not an Alternate Plan Template for salvage logging and none is currently being developed.

**What if there are trees that haven't blown down but are leaning?**

If these trees pose a safety hazard, then felling the tree would be appropriate. Remember, tree(s) that are cut within the core or inner zone must be left on the ground.

**When can someone add some storm damage activities to an already approved FPA?**

Each site or issue will be evaluated on a case-by-case situation and determined if it is a significant deviation (WAC 222-20-060). Consult the local forest practices forester.

**Can salvage of down wood occur within the bank full width if the rootwad was out of the bank full width?**

No, unless approved as part of an alternate plan that was addressing something like a catastrophic windstorm. An approved Hydraulics Project Approval (HPA) may be required.

**What if there are trees within the RMZ that pose a safety threat?**

Felling these trees would be appropriate. Remember, tree(s) that are cut within the core or inner zone must be left on the ground. If it is obvious that you will have safety trees within the RMZ, indicate in your FPA that they exist and how you plan on marking those trees once on the ground (e.g, branding, painting stump and end of log, etc.).

**For answers to other questions specific to your situation, contact your local Forest Practices Forester through the DNR Region Office.**

**8. Where can I get advice on site preparation and reforestation?**

Foresters from the DNR's Small Forest Landowners Office (SFLO) (<http://www.dnr.wa.gov/htdocs/rp/foreststewardship/staff.html>) can help you with site preparation and reforestation questions.

**9. Where can I get trees to plant?**

Due to the size of this most recent windstorm; seedlings are apt to be in very limited supply. For a list of forest nurseries go to: <http://cru84.cahe.wsu.edu/cgi-bin/pubs/EB0790.html>).

It is important to plant trees suitable for the local "seed zone". For a list of seedling transfer zones go to: [www.dnr.wa.gov/webster/seedzonebook](http://www.dnr.wa.gov/webster/seedzonebook)

**10. Where can I get advice and assistance on damaged roads, culverts and bridges?**

Forest Practice Staff , Small Forest Landowner Foresters, and Stewardship Foresters located at DNR Region Offices (<http://dnr.wa.gov>) can advise you on road-related issues.

**11. Is there any financial assistance available for slash (debris) cleanup, site preparation, and reforestation?**

Possibly. The USDA-NRCS administers the Environmental Quality Incentive Program (EQIP) which may have the potential to be of financial assistance. For a list of USDA-NRCS offices, go to: [www.wa.nrcs.usda.gov](http://www.wa.nrcs.usda.gov)

Additionally, the Commissioner of Public Lands has requested that the 2008 Legislature consider funding a cost-share program for storm-damaged forest owners. At the time this information was compiled, the legislature had not yet considered this proposal.

There is assistance available for debris removal from agricultural lands. See this website: ([http://dnr.wa.gov/htdocs/adm/comm/2007\\_news\\_releases/nr08\\_009.html](http://dnr.wa.gov/htdocs/adm/comm/2007_news_releases/nr08_009.html)).

## **12. Are there tax considerations from this storm?**

Yes, at both the federal and state level. Federal income tax consideration includes casualty loss provisions and reforestation tax credits/amortization. A good source of federal timber tax information is: [www.timbertax.org](http://www.timbertax.org) Specific information about casualty losses can be found at: [fs.fed.us/spf/coop/library/LossDeduct.pdf](http://fs.fed.us/spf/coop/library/LossDeduct.pdf)

The Washington State Department of Revenue Timber Excise Tax has provisions for valuing storm-damaged timber. See this link for additional information: [www.dor.wa.gov/Docs/forms/Misc/DamgTimAdjstApp.pdf](http://www.dor.wa.gov/Docs/forms/Misc/DamgTimAdjstApp.pdf)

Complete details about the state Timber Excise Tax are available at: [www.dor.wa.gov/content/FindTaxesAndRates/OtherTaxes/Timber/default.aspx](http://www.dor.wa.gov/content/FindTaxesAndRates/OtherTaxes/Timber/default.aspx)

## **13. Where can I find information on safety issues created by storm damaged timber?**

A: The Washington State Department of Labor and Industries has compiled the following information which may be helpful: <http://www.lni.wa.gov/Safety/Topics/AtoZ/default.asp?KWID=180>

There is also information on this link for basic tree felling and chain saw safety.

## **14. Where can I get additional education and assistance about managing my forest land?**

Washington State University Extension offers educational materials and programs for family forest owners. To locate your local Extension Office: (<http://ext.wsu.edu/>). Additionally, the Extension Forestry Program has a website with additional information and links. (<http://ext.nrs.wsu.edu/>).

The DNR Small Forest Landowner Office provides on-site forest management advice to family forest owners and administers several programs designed to assist them: [www.dnr.wa.gov/sflo](http://www.dnr.wa.gov/sflo)

***Washington Department of Natural Resources and WSU Extension Personnel compiled information in this document.***

