

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 with this assessment and to help you make decisions. The Washington DNR Forest Stewardship Program can help you with this initial assessment. Contacts for assistance are:

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

Grays Harbor County: Mike Nystrom – (253) 350-0018; mike.nystrom@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.

Obtain a copy of the following publications from your WSU Extension Office (<http://pubs.wsu.edu/>) or DNR Stewardship Forester (<http://dnr.wa.gov/htdocs/rp/foreststewardship/staff.html>):

- Consulting Foresters Directory (EB 1303)
(<http://ext.nrs.wsu.edu/publications/forestry/consultingdirectory.htm>)
- Managing Your Timber Sale (EB 1818)
(<http://cru84.cahe.wsu.edu/cgi-bin/pubs/EB1818.html>)
- Listing of Washington State Accredited Loggers (<http://loggers.com/MLPList.asp>)

Or, view the following streaming video presentation: Managing Your Timber Sale: Advice for Landowners Before Logging (<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 if you have questions or wish to schedule an on-site visit to your property.

6. Do I need to clean up excess debris?

Clean Up Excess Debris:

- Downed debris, under 3" diameter, can result in extreme forest fire hazard next summer. At a minimum, it is especially important to remove hazardous slash accumulations within at least 100 feet of public roads and 500 feet of buildings.
- Downed yew, maple, madrone, ash, and cottonwood may have value as a speciality wood. Seek advice from carpenter shops and other businesses if they are interested in purchasing your wood.
- Debris clean up may be necessary to allow reforestation or access to the stand.
- If debris will be burned, check burning regulations and obtain necessary permits.

7. Do Forest Practices rule still apply after this storm?

Yes, all of the rules under the Forest Practices Act apply. DNR is compiling a list of common storm-related Forest Practices Questions and Answers, which will be added when it becomes available.

Forest Practices Foresters are available to answer questions specific to the circumstances on your property. Contact the DNR Region Office that serves your area for assistance.

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

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

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

The Washington DNR Forest Stewardship Program (<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?

Do to the size of this most recent windstorm; seedlings are apt to be in very limited supply. Listed below is a link of the forest nurseries in the state. We do not recommend that you plant off-site seedlings, especially from seed sources east of the Cascades. (<http://cru84.cahe.wsu.edu/cgi-bin/pubs/EB0790.html>).

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

Road Maintenance and Abandonment Program Foresters (RMAP), 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

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 financial assistance available for debris removal from agricultural lands. See this website: (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. See this link for federal tax considerations: (<http://www.fs.fed.us/spf/coop/library/LossDeduct.pdf>). Or for general tax information this link: (www.timbertax.org).

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

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 educational assistance about my land

Washington State University has Extension Offices in each county of the state. (<http://ext.wsu.edu/>). Additionally, the Extension Forestry Program has a website with additional information and links. (<http://ext.nrs.wsu.edu>).

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

