

# Idaho Department of Lands Forest Health Alert



## Douglas-fir tussock moth (*Orgyia pseudotsugata*) defoliation in Kootenai, Benewah and Latah Counties

### Outbreak Alert

Douglas-fir tussock moth (DFTM) is a native insect that has a history of periodic outbreaks in the Inland Northwest. It is a defoliating caterpillar that feeds on Douglas-fir, grand fir and spruce. Outbreaks usually occur every 8 to 12 years and last between 2 and 4 years. The last outbreak occurred between 2000 and 2002. In Idaho, outbreaks have occurred every decade since the 1940's. Between outbreaks, populations are kept at low levels by natural enemies such as predators, parasites and a naturally occurring viral disease.



**Figure 2.** Grand fir showing symptoms of Douglas-fir tussock moth feeding. Pupal case and egg masses can be found in lower crown



**Figure 1.** Douglas-fir tussock moth caterpillar on grand fir.

### Current Status of Outbreak

Through use of an aerial survey, defoliation of forested areas has been observed near Signal Point and Mica Peak south of Post Falls, in the Worley-Plummer area on the Coeur d'Alene Indian Reservation, and near McCroskey State Park (**Figure 4**). Most of the visible defoliation is moderate (30-50%), though there are some areas of heavy defoliation (>50%). The outbreak is centered in Benewah County (Plummer south to Windfall Pass). Additionally, aerial surveys observed a separate outbreak of approximately 39,000 acres of defoliation in the Nez Perce National Forest east of Grangeville. Defoliation near Signal Point increased in 2011, and damage was observed for the first time during this outbreak in McCroskey Park. Overall defoliation acreage increased from 8,500 acres in 2010 to approximately 68,000 acres in 2011. Damage that was visible in the Twin Lakes area in 2010 was not visible in 2011. Ground surveys conducted in 2011 indicate that the outbreak appears to be collapsing near Signal Point, but the populations in Benewah and Latah Counties appear healthier. Over 850 egg masses were collected during fall sampling, and the University of Idaho will conduct assays on them to determine the level of virus present in the overall population. Viral disease ultimately causes population collapse. Higher resolution maps are available on the IDL website (See link on page 2).

### Signs and Symptoms

Douglas-fir tussock moth caterpillars reach 1 -¼ inch long and are covered with many hairs. Dense hairs arranged in 'tussocks' are found on the abdomen and are distinctive for this species (**Figure 1**). Caterpillars feed on foliage from June through August and form cocoons in late July and August. Cocoons are found on foliage, tree trunks and branches and also on nearby structures (**Figure 2**). Adult male moths are mottled grayish brown with feather-like antennae. Adult females are flightless, approximately ¾-1 inch long and rest on the outside of their cocoon. After mating, the female lays a frothy egg mass, covered with body hairs (**Figures 1&3**).



**Figure 3.** Douglas-fir tussock adult Female (top) and adult male (bottom).

## Silvicultural Options

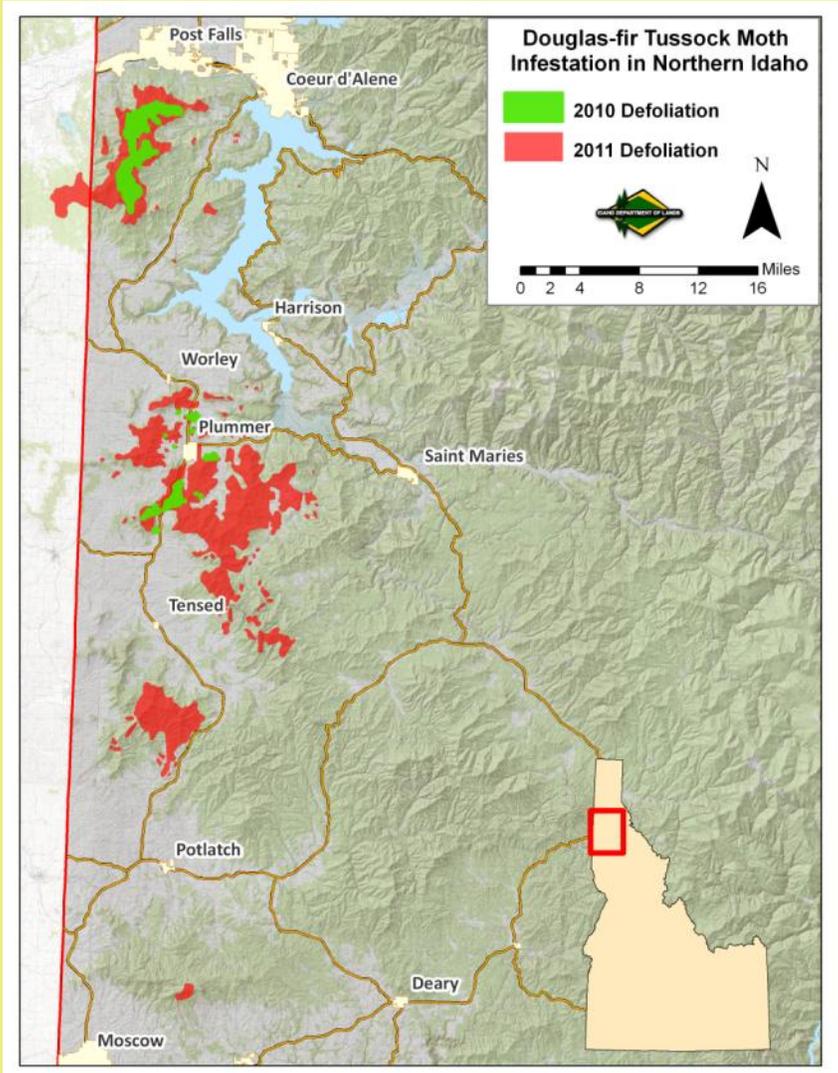
In stands managed for timber production, favoring non-hosts (pines and western larch) will minimize damage from DFTM. Caterpillars will feed on these species, but only incidentally (**Figure 7**). Feeding damage is usually worst on drier sites, where pines are better suited. Defoliated trees may still be alive, so wait until the following spring after bud break to decide if a tree is dead before cutting it. Due to the recurring nature of DFTM outbreaks, silvicultural methods offer the best alternative for minimizing damage long-term. Douglas-fir and grand fir also have other forest health issues such as root disease which make them less desirable in many parts of northern Idaho.

## Impact on Forests

During the current outbreak, over 68,000 acres were defoliated in the northern Panhandle. Trees that are repeatedly defoliated can be killed outright or suffer top kill. Dry sites such as ridge tops and southerly aspects are particularly susceptible to defoliation, especially when grand fir or Douglas-fir makes up a significant proportion of the stand. Historically, damage in North Idaho forests has occurred in the Moscow Mountain area (south and east of Potlatch), in the McCroskey State Park area and on the Coeur d'Alene Indian Reservation. The current outbreak is centered further north, with most defoliation occurring in Benewah and Kootenai Counties. During the 2000-2002 outbreak, defoliation was not observed north of Benewah County, with most of the damage to the south of Plummer.

## Impact on People

Certain people are allergic to the hairs from DFTM caterpillars, cocoons and egg masses. Symptoms are usually mild, with local skin irritation or rash the usual result. Minimize exposure to caterpillars and cocoons by wearing long sleeved shirts and washing with soap and water.



**Figure 4. Douglas-fir tussock moth defoliation in Kootenai, Benewah, and Latah Counties, August 2011. A high resolution map is available at:**

[http://www.idl.idaho.gov/bureau/ForestAssist/forest\\_health/dftm2012/DFTM\\_Map\\_Web\\_Site\\_Latest\\_1\\_13\\_2012.pdf](http://www.idl.idaho.gov/bureau/ForestAssist/forest_health/dftm2012/DFTM_Map_Web_Site_Latest_1_13_2012.pdf)



**Figure 5. Defoliation south of Plummer at the intersection of Highway 95 and Lovell Valley Road, August 2011.**

## Tree Mortality and Hosts

Tree mortality is related to the level of defoliation. Eggs hatch in early June and young caterpillars feed on new growth exclusively. As the caterpillars grow, they will feed on older needles and damage usually progresses from the top down (**Figure 5**). Heavy defoliation (>50%) is more likely to cause tree mortality. Trees further weakened by drought are especially susceptible. Young trees are more vulnerable to DFTM defoliation because they have proportionally more new growth, and if heavily defoliated, they usually experience higher mortality than mature trees. Repeated defoliation can cause death of the tree or result in top-kill. Trees can recover if defoliation is not severe, or is not repeated for several seasons. If the tree is able to form buds in the fall, it will leaf out again the following spring. **Figure 6 shows buds formed in the fall on Douglas-fir and grand fir which will develop into needles in the spring. Do not determine that trees are dead until June.** Larger trees are often more susceptible to top-kill and attack from bark beetles such as the Douglas-fir beetle and fir engraver. Douglas-fir beetle and fir engraver mortality is common after DFTM outbreaks because DFTM feeding causes stress that can make the trees more susceptible to attack by these bark beetles. In the forest, most damage occurs on Douglas-fir (red fir) and grand fir (white fir). In ornamental situations, DFTM will also feed on Engelmann and blue spruce.

## Control

Douglas-fir tussock moth outbreaks will subside on their own within 2-4 years. Natural factors such as weather, predators, parasites and limited food supplies usually cause the populations to collapse without human intervention. A naturally occurring virus disease usually kills large numbers of caterpillars late in the outbreak cycle. Labeled insecticides, both conventional and biological (*Bacillus thuringiensis*) are effective against DFTM in the short term, and have been used in the past. Because product labels and regulations change, please consult the label before applying any insecticide. *Always follow label directions.*



**Figure 6. Douglas-fir (L) and grand fir (R) buds formed in the fall. These trees will normally develop foliage the following spring, and are NOT necessarily dead.**

**Figure 7. Defoliation of Douglas-fir and grand fir south of Plummer in August, 2011. Western larch and ponderosa pine are largely untouched.**



### **For more information:**

If you have questions about this information please contact Tom Eckberg, Lands Program Specialist-Forest Health, Idaho Department of Lands (208-666-8625; [teckberg@idl.idaho.gov](mailto:teckberg@idl.idaho.gov)).

For more information visit the Idaho Department of Lands and U.S. Forest Service's Forest Health Protection websites:

[http://www.idl.idaho.gov/bureau/ForestAssist/forest\\_health/dftm2011.html](http://www.idl.idaho.gov/bureau/ForestAssist/forest_health/dftm2011.html)

[http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5187412.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5187412.pdf)

## Surveys and Monitoring Program

The Idaho Department of Lands (IDL) and the US Forest Service conduct surveys annually to detect and monitor the DFTM populations in North Idaho. Aerial detection surveys (ADS) can detect the presence of defoliated trees and are useful for estimating the number of infested acres. Male moths are monitored through a system of pheromone trap sites throughout the Panhandle region of North Idaho (DFTM Early Warning System-EWS). The Idaho Department of Lands maintains a series of over 140 sites from the Potlatch area north to Coeur d'Alene, while the US Forest Service traps over 30 sites on Federal lands in the Clearwater and Nez Perce National Forests. When trap counts increase to a threshold of 20 male moths per trap, additional surveys for caterpillars and egg masses are conducted in these areas. Areas with high trap counts and supplemental surveys are likely to experience defoliation within one to two years.