FOREST SERVICE HANDBOOK
PACIFIC SOUTHWEST (R5)
VALLEJO, CA

FSH 3409.11 - FOREST HEALTH PROTECTION HANDBOOK

CHAPTER 60 - MANAGEMENT OF SPECIFIC PESTS

64 - Pest prevention and Exclusion

64.1 Firewood Best Management Practices (BMPs) for Reducing the Spread of Invasive Insects and Diseases in Cut Wood

1. Introduction: Invasive insects and diseases are currently threatening numerous hardwood and pine species throughout the country. Introduced bark beetles, wood borers, and diseases can be transported via cut wood to new areas reducing tree and forest health, increasing tree mortality, and impacting forest and urban habitats. Properly managing cut wood can effectively reduce the risk of introducing these organisms to different regions of the state and country, thereby slowing the spread, damage, and threat to native ecosystems. "Cut wood" shall mean any kindling, firewood, logs, chunkwood, boards, timbers or other wood of any tree species or type cut, split or not split, into a form and size appropriate for use as fuel.

2. Recommendations for BMPs in the National Forests of California: Adhering to the following BMPs can reduce certain insects and diseases from spreading via cut wood within National Forests System lands.

   a. Ensure local firewood is more accessible to forest visitors in sites following tree thinning or fuel treatments. Establish firewood cutting areas where un-infested, well-seasoned (greater than 2 years) firewood is available for collection while following standard operating procedures for fuels and forest health concerns. When firewood cutting is permitted in an area, take in to consideration the current distribution of invasive insects and diseases threatening California (e.g. limit wood removal in areas where invasive species

are present), host tree species, and condition of the wood (time since tree is cut and if bark is present or absent).

b. Work with permit holders and forest visitors to minimize the transportation of firewood into sites from long distances (greater than 50 miles) outside National Forest System land boundaries. Direct firewood suppliers and recreationists to

the aforementioned forest thinning and fuel reduction areas or local sources of firewood.

c. Work with concessionaires to only allow commercial loads of firewood onto National Forest System lands from vendors if a bill of sale is provided, firewood is certified un-infested, or the load is issued a phytosanitary certificate by a government official thus verifying the wood is sanitized.

d. Work with local USDA Forest Service, Forest Health Protection staff in developing specific guidelines to minimize the spread of pests if non-quarantined invasive insects or diseases are established on National Forest System lands or in the county. Federally and state quarantined pests should follow specific guidelines set forth by the Animal Plant Health Inspection Service or California Department of Food and Agriculture, respectively.

e. General BMPs for reducing the risk of transporting invasive insects and diseases in cut wood are as follows[1]:

(1) Grinding wood to a particle size of less than one (1) inch can successfully eliminate most wood boring insects.
(2) Chipping wood to a particle size of less than one (1) inch can effectively reduce the risk of wood boring beetles.
(3) Heat treatment of infested wood material to an internal wood temperature of 140° F for a minimum of 60 minutes has been shown to eliminate insects and diseases from firewood.
(4) Removing greater than 95% of the bark from a single tree can kill or reduce certain insects found feeding solely in or under the bark, such as bark beetles and some wood borers.
(5) Drying cut wood on site for greater than two (2) years prior to movement can reduce the human-assisted dispersal of most invasive insects. Processing cut wood into firewood-sized pieces is not an acceptable option for reducing the risk of invasive insects.
(6) Do not issue firewood collection permits in areas with known invasive pests and prevent the movement of the impacted tree species.

f. Promote education and awareness about the threats of moving cut wood to forest staff and visitors at trailheads, administration sites, recreation areas, permitted sites, including campgrounds, recreation residences, resorts, organizational camps, etc., and other high-use areas.

(1) Distribute information packets for Forest Service employees and volunteers to maintain a consistent message that includes talking points,

[1]References for managing cut wood with insects and disease

the threats of moving cut wood, invasive species education, and links to additional information about preventing the movement of cut wood.

g. Associate education and outreach with forest recreation online, annual correspondence for recreation residences, or phone reservations for permitted areas to bring awareness to the threats of moving firewood and associated BMPs. This can be accomplished by adopting a consistent message that is coordinated with other Federal and State partners.

3. Recommendations for BMPs for National Forest System Lands Visitors: Visitors should be made aware of the pest organisms that can be transported by firewood. Visitors should be educated and encouraged to protect National Forests by doing the following:

   a. Buying firewood from local sources.

   b. Not transporting firewood more than 50 miles[2] from the location where initially cut. Prevention is always the safest practice.

   c. Asking for a bill of sale[3] or permit when buying firewood from local dealers. The bill of sale should list the location where the firewood trees were cut, the date cut, and the tree species. Visitors should buy local firewood and avoid species that may contain invasive species.

   d. When camping, buy local firewood and leave the unused wood on site. “Burn it where you buy it” practice should be followed.

   e. Seasoning cut wood on site for greater than two years. Cut wood seasoned greater than two years poses less of a threat to forest health and can reduce the risk of transporting most invasive insects.

4. Invasive pests associated with moving cut wood in the U.S. and California: The following insects and disease currently represent threats to hardwood and conifer species. Movement of cut wood from the impacted areas should follow federal and state quarantines, if applicable, or incorporate additional management practices to limit the human-assisted dispersal of these non-quarantined organisms.

[2]Local infestations should follow current restrictions (County) or certifications, and National Firewood Task Force Recommendations, March 2010
[3]California Penal Code **384.5.** (a)

Federally quarantined species in the U.S.:

Emerald ash borer, *Agrilus planipennis*
http://www.emeraldashborer.info/
http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/index.shtml
http://www.dontmovefirewood.org/gallery-of-pests/emerald-ash-borer.html
http://www.invasivespeciesinfo.gov/animals/eab.shtml

Asian Longhorned Beetle, *Anoplophora glabripennis*
http://www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/index.shtml
http://www.na.fs.fed.us/fhp/alb/
http://www.beetlebusters.info/
http://www.dontmovefirewood.org/gallery-of-pests/asian-long-horned-beetle.html
http://www.invasivespeciesinfo.gov/animals/asianbeetle.shtml
http://cisr.ucr.edu/asian_beetle.html

Federally quarantined species in California:

Sudden oak death, *Phytophthora ramorum*
http://www.suddenoakdeath.org/
http://www.dontmovefirewood.org/gallery-of-pests/sudden-oak-death-syndrome.html
http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74151.html
http://www.invasivespeciesinfo.gov/microbes/suddenoak.shtml
http://cisr.ucr.edu/sudden_oak_death.html

Non-quarantined invasive species in the U.S.:

European woodwasp, *Sirex noctilio*
http://www.invasivespeciesinfo.gov/animals/sirexwasp.shtml

Redbay Ambrosia beetle, *Xyleborus glabratus*, and Laurel Wilt disease, *Raffaelea lauricola*, complex
http://www.fs.fed.us/r8/foresthealth/laurelwilt/
http://www.invasivespeciesinfo.gov/microbes/laurelwilt.shtml
http://www.dontmovefirewood.org/gallery-of-pests/laurel-wilt.html
http://cisr.ucr.edu/redbay_ambrosia_beetle_laurel_wilt.html

Non-quarantined invasive species in California:

Goldspotted oak borer, *Agrilus auroguttatus*
http://www.gsob.org
http://www.dontmovefirewood.org/gallery-of-pests/goldspotted-oak-borer.html
http://cisr.ucr.edu/goldspotted_oak_borer.html

Pitch canker disease, *Fusarium circinatum*
http://www.dontmovefirewood.org/gallery-of-pests/pine-pitch-canker.html
http://ufei.calpoly.edu/pitch_canker/index.lasso

Redhaired pine bark beetle, *Hylurgus ligniperda*
http://www.na.fs.fed.us/spfo/pubs/pest_al/redhaired/red_haired_bark_beetle.pdf
http://www.dontmovefirewood.org/gallery-of-pests/red-haired-pine-bark-beetle.html
http://na.fs.fed.us/pubs/fidls/invasive_bark_beetles/inv_bark_beetles.pdf

Mediterranean pine engraver, *Orthotomicus erosus*
http://www.dontmovefirewood.org/gallery-of-pests/mediterranean-pine-engraver-beetle.html
http://nrs.fs.fed.us/disturbance/invasive_species/pine_engraver/
http://na.fs.fed.us/pubs/fidls/invasive_bark_beetles/inv_bark_beetles.pdf

Thousand canker disease, *Geosmithia morbida*
http://www.thousandcankerdisease.com/
http://www.dontmovefirewood.org/gallery-of-pests/thousand-canker-disease.html
http://www.invasivespeciesinfo.gov/microbes/thousandcankers.shtml
http://www.aphis.usda.gov/plant_health/plant_pest_info/tcd/index.shtml

Polyphagus shot hole borer, *Euwallacea* sp.
http://cisr.ucr.edu/tea_shot_hole_borer.html

5. Additional information about the threats associated with moving cut wood:
USDA Forest Service: http://www.na.fs.fed.us/firewood/
CA Firewood Task Force: http://www.firewood.ca.gov/
Continental Dialogue: http://www.dontmovefirewood.org/
APHIS:
http://www.aphis.usda.gov/newsroom/hot_issues/firewood/index.shtml

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