

2015



# Colorado Pile Construction Guide



Colorado Department of Public Safety  
Division of Fire Prevention and Control  
& Colorado State Forest Service

March 26, 2015

**NOTES:**

# PILE CONSTRUCTION BASICS

## INTRODUCTION:

This booklet is designed to be used as a basic introductory guide by private landowners, land managers, governmental entities and fire agency personnel in the proper planning and construction of piles with the overall intent of creating safe and cost-effective pile burning projects. Pile burning is but one of many methods utilized to remove vegetation/forest debris, also known as “slash”.

In many cases, following logging, thinning or vegetation manipulation, the remaining materials are piled by hand or with the aid of machinery. After the piling process, the material is left to cure or dry for a period of time, then ignited under specified and managed conditions. This type of burning is one form of prescribed fire, which is defined as: “Any fire intentionally ignited by management actions in accordance with applicable laws, policies, and regulations to meet specific objectives.”

The application of the guidelines covered in this document cannot guarantee safety against accidents, unforeseen circumstances, changing conditions, or negligent actions of the individuals conducting the project. By following the intent of these guidelines and using common sense, the landowner or resource manager can work towards reducing slash accumulations, improve the appearance of the land, and potentially reduce wildfire risk. The reader should contact a local office of the Colorado Division of Fire Prevention & Control (DFPC), the Colorado State Forest Service (CSFS) or their local fire and law enforcement authorities for updated versions of this publication and current local/state legal requirements regarding the use of any type of prescribed fire.

This guide is not intended as a “How To” for pile burning but rather as a guide for the proper planning and construction of piles for future burning. Agency employees wishing to engage in any form of prescribed fire should obtain the proper training, experience and qualifications to engage in those activities through their employing agency. In addition, these individuals must be familiar with their employing agency’s policies and requirements. Private landowners or their representatives are not required to have any specific qualifications to engage in prescribed fire on their lands, however it is always prudent to seek information regarding prescribed fire education and training opportunities. This can be best attained through contacts with local fire, public health and forestry officials. All entities regardless of qualifications and experience must meet local county and state requirements for smoke and fire permits.

**Note: Boulder County now issues burn permits**

**<http://www.bouldercounty.org/safety/fire/pages/openburnpermit.aspx>**

## PLANNING THE BURN PROJECT:

Individuals and/or agency personnel should check with the local law enforcement and/or fire authorities for the current requirements on open fires. It is recommended to find out the specific requirements before starting to build the piles. Generally, one or more of the following steps must be completed before burning slash piles:

1. Complete and have an approved smoke permit from the local (county) Health Department, – this generally applies to burns involving less than 50 small piles. Larger projects or in counties where no smoke permitting program exists may require a permit from the Colorado Department of Public Health & Environment – Air Pollution Control Division (APCD).
2. Obtain authorization or burn or fire control permit from the legally constituted fire authority for your area. This may be part of or in addition to the health department’s permitting process.
3. Local, County, State & Federal land management agencies must follow approved prescribed fire plans and also comply with and have approval of a smoke and/or fire control permit for the jurisdiction the project is governed by and/or the APCD.

## **MATERIALS TO BE INCLUDED IN PILES:**

**Hand Piles:** All limbs, tops, brush, and miscellaneous tree waste recently cut in the area, no greater than 3 to 4 inches in diameter and from 1 to 8 feet in length. Older branches, including ones that were not recently cut, can be used; as long as they still have needles/foliage attached or has not yet started to decay. In the event materials added to the pile do not have any needles, leaves or "finer" materials incorporated; there should be a proportionate amount of fine fuels added to facilitate ignition. Larger materials generally burn longer and require more "chunking" or re-piling and "mop-up" or extinguishment than is cost-effective, and produce greater amounts of smoke. Instead, consider making use of the materials greater than 4" in diameter for saw timber, posts, poles or firewood. Some larger material may be left for wildlife habitat. In all cases freshly cut (green) material should be left to cure for up to 6 months or more to facilitate more efficient burning.

**Machine Piles:** In some cases and locations across the State, especially in areas where the forest debris includes larger woody materials, for example following clearcutting of bug-killed trees, there may be a need to pile and burn larger materials that have been piled by heavy equipment.

The process of burning larger material in piles can be accomplished but carries with it the need for more stringent permitting and on-the-ground management of the burning piles to reduce smoke impacts resulting from long duration burning and smoldering. In these cases, it is best to check with local, county and state permitting authorities before constructing any piles containing large diameter materials.

**Do not place garbage, construction materials, treated lumber, tires, plastics or other debris in the piles.** Many un-natural materials contain hazardous compounds that when burned give off toxic smoke, gases and fumes. Do not burn stumps, wood chips, sawdust, matted leaves, grass, hay or anything raked up off the ground. Smoke permits may be difficult if not impossible to obtain if any of these materials are present in the piles.

## **LOCATION OF PILES:**

Piles should be located in forest openings or between remaining trees, in unused logging roads and landings, meadows, and rock outcrops. Preferably, piles should be located at least 10 feet from the trunk of any overhead trees. In denser stands of trees, piles can be located closer to the trees and even under the overhanging branches, but these piles should be smaller in size and burned when snow or moisture is present in the tree crowns.

Piles should NOT be located on active road surfaces, in ditches, near structures or poles, under or around power lines, or on top of logs or stumps that may catch fire and continue smoldering.

Be careful when building piles on steep slopes, because as the piles burn down, they can break apart and send burning material rolling downhill into unwanted areas.

## **CONSTRUCTION OF PILES:**

Piles should be constructed by hand whenever possible, but if constructed by machine, the piles should be clean of dirt, rock and other debris. Piles should be started with a core of kindling-like materials such as needles, small branches, or paper in the bottom of the pile. Try to think of pile construction as similar to building a campfire. Pile slash soon after cutting (while still green) and before winter snowfall. Do not include large wood products such as firewood and logs. Pile the branches and tops in a "teepee" style and try to limit butt ends or tops that protrude too far from the main pile body. Place the limbs and branches overlapping so as to form a series of dense layers piled upon each other.

The piles should be compact, packed down during construction, and with no long branches that will not

burn because they protrude outside of the pile into the surrounding snow. Piles should be no larger than the following dimensions: 8 ft. wide X 8 ft. long X 8 ft. high. Open burn smoke permits require a limit on pile volume so do not exceed these recommended dimensions. These dimensions were designed to provide for good consumption and proper smoke management. These pile construction measures prevent snow and moisture from filtering down into the piles.

If the fuels do not have sufficient needles or fine fuels to carry the fire or keep moisture out (such as brush or very old branches), the piles should be covered with 6 mil plastic sheeting or "craft paper" to keep them dry until the day of the burn, and then removed. Regardless of the cover material, be sure to place a few limbs or branches on top of it to keep it from blowing off the pile. **Do not burn the plastic!**

The following photographs show differences between good and poor pile construction:

#### EXAMPLES OF GOOD PILE CONSTRUCTION:



The hand pile above illustrates proper construction techniques and appropriate height to diameter ratios.



The above pile is well formed and despite the snow cover, is ready to ignite.





Although the above piles are fairly small, they are well constructed and proportioned.



This is well-designed pile constructed by machinery and consists of larger materials from logging operations.



### EXAMPLES OF POOR PILE CONSTRUCTION:



Both of these examples are too small and are loosely constructed. These piles are less than 4 feet high. For scale, the bottle in the lower photo is approximately 8 inches high and the material in this pile is not yet dry enough to burn.





Both of the piles in these photos are poorly designed and not tall enough to burn during periods of heavier snow cover. Neither pile contains enough fine material such as needles to sustain ignition. The bottom pile appears to contain larger diameter fuels than are desired and also contains dirt and stump materials.





The piles above contain larger logs that could have been better utilized for firewood purposes and when burned could potentially roll downhill. These heavier fuels will burn for extended periods of time and may conflict with state and local smoke management requirements.



This pile contains both raked up site debris and dirt. It will not burn readily, may cause fire control challenges, will create unnecessary smoke, and can never truly be cleaned up even by rebuilding it.

**ADDITIONAL ASSISTANCE:**

Anyone having questions about burning piles and the associated smoke management requirements should contact the local Colorado Division of Fire Prevention and Control Office, the local Colorado State Forest Service Office or the Colorado Department of Public Health & Environment – Air Pollution Control Division. Please see the links below for agency contact information. Local fire departments, county government, and non-governmental organizations (NGO's) such as The Nature Conservancy may also be available to assist with planning or conducting prescribed fire projects.

Colorado Department of Public Safety - Division of Fire Prevention & Control

<http://dfs.state.co.us>

Colorado State Forest Service

<http://csfs.colostate.edu/districts/>

Colorado Department of Public Health & Environment – Air Pollution Control Division

<https://www.colorado.gov/pacific/cdphe/categories/services-and-information/environment/air-quality/outdoor-burning>