ARIZONA COOPERATIVE EXTENSION

THE UNIVERSITY OF ARIZONA
College of Agriculture and Life Sciences

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Recovering From Wildfire
A Guide for Arizona's Forest Owners

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What Do I Do Now?

Wildfire, the disaster so many forest owners fear has happened—to you. Fire may have burned all or just a portion of your property, over many acres of your land or just your homesite, burned it completely or only partially. Whatever the circumstances, you're now left wondering, "What should I do now?"

After the fire is out, it's time to start making some decisions. Although you may feel that the worst has happened, there are actions you can take now to protect your property from further impacts and to recoup some of your losses.

This publication discusses issues property owners should consider following a wildfire on their property, including how to protect your valuable property from further damage due to erosion, where to go for help and financial assistance, how remove or salvage trees that were lost or damaged, how to claim a casualty loss on your tax return, and how to recover from wildfire damage to your property.

Emergency Help

If you are in need of emergency help, contact the Arizona Division of Emergency Management (AZ DEM) **www.dem.state.az.us** or phone 1-800-411-2336 to find out if a local service center for fire victims has been set up in your area. If a fire is declared a state or federal disaster, other agencies and organizations may be assisting with the situation, however AZ DEM is still the agency to contact.

Assessing Resource Damage

Once the fire is out, the first step is to assess the damage. Recovery actions you may take such as erosion control and replanting depend heavily on the amount of damage caused by the wildfire.

An important determination to make immediately after the fire is out is the intensity at which it burned. While wildfires can be very destructive, in reality, most fires burn at low intensity throughout most of their area, with only occasional pockets of moderate to high intensity burn. Occasionally, fires do burn at high intensity over large areas. Fires which burn at low intensity do not burn up the forest canopy. Most leaves or needles remain on trees, even though some may be brown and the lower branches may be scorched. The ground is still partially covered by old needles, leaves, and decaying wood.

Low-intensity fires are in the long run, beneficial to maintaininga healthy forest. In fact, many Arizona tree species and plant communities evolved with low-intensity fire as part of the natural system. These fires clear out the underbrush, thin out young trees which may be too numerous, and reduce the amount of fuel accumulating on the forest floor, thereby lessening the chance of future high intensity wildfires (Fig. 1).

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Fig. 1 – Low intensity burn, trees retain green, live foliage. Moderate intensity burn, needles killed and brown but not consumed.

Moderate-intensity fires burn into the forest canopy and consume the needles and leaves from many trees but not all. They also consume a portion of the ground cover. Since, moderate-intensity fires typically leave the biggest and most vigorous trees alive, some forest cover will remain (Fig. 2).

Fig. 2 – In a moderate intensity burn trees and foliage are killed within the stand.

High-intensity fires consume from half to all of the forest canopy and everything on the forest floor. The resulting ash is white or gray and offers little protection from rainfall and erosion. Under certain conditions of soil type, fire intensity, and vegetation burned, a water-repellant or hydrophobic layer is formed in the soil that will decrease water infiltration and increase runoff and soil erosion, especially in the first rains following the fire (Fig.3).

Fig. 3 – High intensity burn, trees killed, foliage and forest floor consumed. Soil surface bare and subject to erosion. Log terraces and straw mulch would disperse water and reduce erosion.

Mapping

Landowners should record the burn intensity of the affected areas on a map of their property. Even if a majority of the area burned at low intensity, there may be "hot spots" with greater destruction that are important to note on the burn map. Also, forested land may endure resource impacts even if the fire never actually burns the trees. The map should also show bulldozer lines and areas where trees were felled. The burn map can then be used to plan for forest rehabilitation measures such as erosion control and replanting, if necessary.

Soil Erosion

The most damaging long-term resource impact that can occur after wildfire is soil erosion. Erosion robs land of its soil and its ability to grow vigorous trees. A healthy forest functions to keep soil in place on the land. The forest canopy intercepts raindrops and reduces their impact on the soil. Rain which makes it through the canopy is intercepted by the litter layer which covers the forest floor. Together, the canopy and litter layer protect the soil by keeping the rain from detaching soil particles. Without this protection, detached soil particles can wash down denuded slopes, entering stream channels and reducing water quality and altering or degrading aquatic habitat.

In addition to protecting soil from the force of rain, a litter layer functions to help the soil absorb rainwater. In the absence of litter, rain is more likely to hit the soil surface and run off than infiltrate into the soil, reaching the stream channels faster, leading to an increase in the possibility for flooding.

Your burned forest land is at increased risk for soil erosion if:

- The forest litter layer has burned off, exposing bare soil
- The forest canopy has burned away, reducing rainfall interception
- The fire was of high intensity causing soil to repel water
- Slopes are steep
- Rain falls in large amounts quickly
- The soil is highly erodible
- Your land is directly downslope from other burned areas

Erosion Control Measures

There are a number of erosion control measures that can be taken to lower the soil erosion hazard and protect your land's productivity and water quality during the first few years after a fire. The goal of these methods is to cover the soil surface to protect it from raindrop impact, to improve the soil's ability to absorb water, and reduce the amount and speed of overland water flow.

The soil can be covered with a mulch and/or planted or seeded vegetation, usually a grass that sprouts quickly and has a dense, fibrous root system to bind the soil. For large areas where covering the soil is not economically feasible or will not occur quickly enough, the next step is to control the water running over the soil and carrying the sediment. This can be accomplished by erecting barriers to runoff which slow and disperse the water, reducing its erosive power and allowing it to soak in or settle out sediment before reaching a stream course (Fig. 4). A combination of measures is recommended when appropriate or feasible. For more

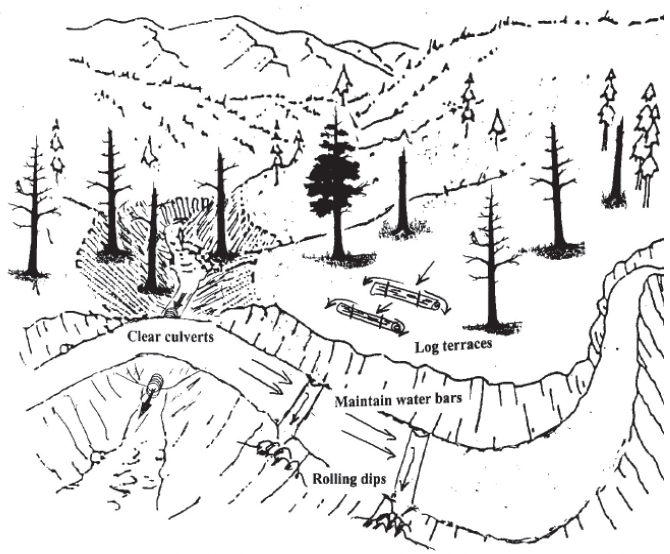

Fig. 4 – Graphic illustrating various erosion control measures.

specifics on the soil erosion control measures that follow use the internet URL links contained in the section titled Links to NRCS Fire Recovery tips listed at the end of this document.

Slash spreading. Tree limbs and branches can be spread on the soil to reduce raindrop impact. If branches are cut small enough (slashed) so that they come in contact with the soil, they will also help disperse overland water flow and reduce runoff and erosion.

Straw mulching. Straw can be spread over the soil at 2 tons per acre, about 100 pounds per 1,000 square feet (an average 74-pound bale will cover 800 square feet). On steep slopes, it helps to "punch in" the straw with a long, narrow bladed shovel sometimes called a transplanting or tile spade. The result should look like the tufts of a toothbrush. The straw should be certified as "noxious-weed free." Hydromulching uses a machine to blow straw, newspaper, or other fiber as a slurry onto the soil. This technique is used by the highway department to stabilize road cuts but is probably infeasible except where large areas are to be covered.

Seeding. Grass seed can be spread which will sprout quickly and put down roots to hold the soil. Depending upon the pre-fire vegetation, the intensity of the fire, and soil disturbance, there may be sufficient grass and herbaceous plant seed in the soil to germinate and provide cover. Soil disturbance from the fire suppression effort or salvage logging will probably remove or bury the native seed and you will have to apply seed. Although native plant seed is often preferable, it can be difficult to find in sufficient quantity (especially if the fire was extensive, thousands of acres) and is more expensive than non-native seed.

Priority areas for seeding include the steeper, more erosive slopes. However, since these slopes are more vulnerable to soil erosion, it is likely that unprotected (by soil or mulch) seed will wash down the slope during the first rains before the seed has a chance to germinate. This is especially likely if the first rains are heavy and the fire was intense enough to make the soil water-repellent. Therefore, where feasible it is advisable to cover seed with an organic or fabric much.

Contour log terraces. Log terraces provide a barrier to runoff from heavy rainstorms. Dead trees are felled, limbed, and placed on the contour perpendicular to the direction of the slope. Logs are placed in an alternating fashion so the runoff no longer has a straight down slope path to follow. The water is forced to meander back and forth between logs, reducing the velocity of the runoff, and giving water time to percolate into the soil. Felling of trees can be dangerous and is best done by a professional logger or arborist.

Logs should be 6 to 8 inches in diameter (smaller logs can be used) and 10 to 30 feet long. The logs should be bedded into the soil for the entire log length and backfilled with soil so water cannot run underneath; backfill should be tamped down. Secure the logs from rolling by driving stakes on the downhill side. It is best to begin work at the top of the slope and work down. It is easier to see how the water might flow by looking down on an area to better visualize the alternating spacing of the logs.

Straw wattles. Straw wattles are long tubes of plastic netting packed with excelsior, straw, or other material. Wattles are used in a similar fashion to log terraces. The wattle is flexible enough to bend to the contour of the slope. Wattles must be purchased from an erosion control material supplier.

Silt fences. Landscape fabrics, made of woven wire and a fabric filter cloth, are also used to control erosion. However, they can be expensive compared with straw or natural mulches. Silt fences trap sediment from runoff. These should be used in areas where runoff is more dispersed over a broad flat area. Silt fences are not suitable for concentrated flows occurring in small rills or gullies. Silt fences are made from materials available at hardware stores, lumberyards, and nurseries.

Straw bale check dams. Straw bales placed in small drainages act as a dam——collecting sediments from upslope and slowing the velocity of water traveling down the slope. Bales are carefully placed in rows with overlapping joints, much as one might build a brick wall. Some excavation is necessary to ensure bales butt up tightly against one another forming a good seal. Two rows (or walls) of bales are necessary and should be imbedded below the ground line at least six inches. Make sure the straw bales purchased for use are certified weed free.

Waterbars. Waterbars are mounds or berms of soil, rock, or bedded logs that serve as speed bumps to channel water off roads and trails to help prevent the creation of gullies. Waterbars are angled down the slope to the outlet side. These bars can divert water to a more stable vegetated slope below or redirect it to a channel that will take it to a culvert. On-site soils and the road grade will dictate spacing.

Road Protection

Another element of your forested landscape that may need extra protection after a fire is the road system. The fire has most likely destroyed vegetation and forest floor litter that would have intercepted and slowed runoff water. Also, the soil may have developed a water-repellent layer that increases runoff. The drainage system of roads in a burned area may not be adequate to handle the increased runoff, debris, and sediment after a fire. Roads and trails can also act as conduits for the increased surface flow and may need extra attention to slow water movement.

To protect the road system as well as the downstream water quality, consider taking the following actions. To insure proper design and installation, work with experienced professionals.

To protect the road system:

- Armor culvert inlets or bridge abutments.
- Patrol roads during significant rain events to clean out clogged ditches and culverts.

To slow and divert water:

- Construct cross-drains or waterbars for limited-use roads.
- Remove berms on the outside edge of the road's driving surface to allow for water dispersal.

To trap sediment and debris:

- Install sediment traps below culverts to prevent sediment from leaving the site.
- Install trash racks at culvert inlets to block woody debris from plugging the culvert.

To increase drainage:

- Enlarge the current ditch system.
- Remove or bypass existing culverts or install larger culverts in special cases.

Tree survival is greatest where fire temperatures are low and roots do not receive intense heat.

Both of these pictures show areas of intense heat near the roots of an adjoining tree. Very high temperatures result where roots, logs,and debris build up around the tree. Tree survival is low.

Assessing Tree Damage

Once the intensity of the fire has been assessed and hotspots of resource damage have been identified and treated to reduce the immediate threat of erosion, it is time to begin planning for long-term rehabilitation of the site.

One problem for long-term planning is estimating which trees damaged by fire may die in the future. Even trees in an area where the fire burned at low-intensity may die in the near future if they sustain enough damage. An understanding of how trees are damaged by fire and how mortality occurs can help make this guess an educated one.

The ability of a tree to withstand fire damage is based on the thickness of the bark, rooting depth, needle length, bud size, and degree of scorch. Conifers (e.g. pines, firs, spruces, junipers, and Arizona cypress) are limited in their ability to reestablish themselves after a fire. Unlike some deciduous or hardwood trees and shrubs, the root systems of conifers do not regenerate from new vegetative stems or "sucker sprouts".

Bark: In order for a conifer tree to survive, some of the roots, the cambium of the main trunk, and buds must survive. The cambium is the sensitive layer of growing cells that produces the vascular system that conducts water and nutrients throughout the tree. The bark insulates the cambium from the damaging intensity of a fire; the thicker the bark, the better the protection. Bark thickness varies with age and differs by species.

Buds: Buds are located at the ends of tree branches. Buds begin forming at the end of spring to provide for next years growth. The foliage (needles) of a conifer provides some protection to the buds. Longer needles provide more protection than short ones. When the fire occurs it can impact the development and survival of the buds. New buds may not have been formed prior to an early summer fire, which reduces the chances for tree survival.

The amount of scorched foliage in the tree crown can predict conifer survival to a certain degree. Even with severe scorch damage, the buds may survive and grow the following spring. Basing survival estimates on scorch alone can be misleading; foliage color after a fire can be deceptive. Buds should becarefully examined—they should be firm and green when cut open, and the terminal stemflexible. The bud or stem should not break off easily.

Roots: Damage to roots depends, in part, on the nature and overall depth of the root system in the soil profile. The amount and depth of the duff layer (needles, leaves, and other litter on the forest floor) can impact a fire's effect and damage to the root system. Fast moving fires may not destroy the duff layer and may cause little root damage.

Survival of ponderosa pine and Douglas-fir after wildfire. Two common conifer species in Arizona are ponderosa pine and Douglas-fir. The degree of damage to roots, stems, and the crown determines whether trees species will survive a fire. Bark thickness plays an important role in their survival. As a ponderosa pine matures, it develops a very thick bark that insulates the cambium from damaging heat. Even if the bark is considerably scorched, the cambium can remain undamaged. Ponderosa pine roots are deep enough to be insulated from the heat of low to moderate intensity fire.

Trees beyond the pole stage (about the size good for fence and corral posts) are resistant to fire damage if they are not too crowded. The crowns of larger trees are more elevated, thus protecting the buds and foliage from heat scorch.

Cambium damage can be evaluated by chipping away a small section of bark with an axe. A healthy cambium is a light tan or cream color. Dead cambium is dry, brown or gray, and has a sour fermented smell. A large amount of pitch exuding from deeply charred bark can also indicate cambium damage. Crown scorch and bud kill is considered the principle cause of death. In healthy, well-spaced stands mortality is usually low. Ponderosa pine's lengthy needles can provide sufficient protection to the buds, which are large and well protected by heavy scales.

Douglas-fir shares similar bark characteristics with ponderosa pine. Both are more fire resistant than spruce and true fir. Douglas-fir needles are very short in comparison with ponderosa pine. These offer little protection to the small buds. Douglas-fir saplings are more prone to loss than ponderosa pine.

Trunks 9 inches in diameter or larger can survive low to moderate intensity fires. If 25 percent of the cambium is damaged, a Douglas-fir will most likely die. In addition, Douglas-fir has shallow lateral roots that are susceptible to damage. Currently, many ponderosa pine/Douglas-fir forests are over-crowded. This leads to higher mortality rates due to fire than in well-spaced stands.

Two other pine species unique to Arizona are Apache pine and Chihauhua pine. Apache pine is probably even better adapted to withstand fire than ponderosa pine as it can withstand high scorch levels and, when younger, has a "grass stage" that protects the buds from surface fires. Chihuahua pine is more susceptible than either ponderosa pine or Apache pine, however it is one of the few pines that has the ability to resprout from the root system after being damaged by fire.

Estimated survival of ponderosa fine from wildfire. The following table lists estimated ponderosa pine tree survival percentages following a wildfire, provided root damage has not occurred and under normal precipitation and weather conditions. The table was prepared by Gayle Richardson, Silviculturist with the USDA Forest Service Black Mesa Ranger District on the Apache-Sitgreaves National Forest in Arizona. The methods for calculations were taken from "Effects of Fire Caused Defoliation and Basal Girdling on Water Relations and Growth of Ponderosa Pine" by Kevin Christopher Ryan (1993).

The crown is measured from the very top of the tree to the bottom branch of the tree. The percentage of the tree still green is used to estimate the percent of possible survival.

Crown remaining	Chance of Survival
60%	85%
50%	75%
40%	65%
30%	50%
20%	35%
10%	20%

Natural regeneration of ponderosa fine and Douglas-firafter wildfire. Natural reestablishment of ponderosa pine and Douglas-fir can occur from seed depending on the presence of cones on the tree. Most pines do not develop cones every year. Cones of pine require two seasons to mature. Cones typically mature and release their seeds to the wind in late summer and early fall. In some cases cones may continue to mature on a top-killed tree and release a viable seed crop. While most pines have variability in cone crop production, Douglas-fir is more regular.

In a severe fire only live trees around the perimeter of a burned area may produce viable seed. Wind dispersal of the seed is often limited to a few hundred feet from the seed-bearing tree; birds and rodents also help distribute seed.

Even with a good seed crop, moisture conditions must be optimal for seed germination and seedling survival. Fire effects on the forest floor will impact the success of seedling establishment. Most conifers require bare mineral soil for successful germination. The litter layer is often consumed in slow moving fires, which exposes the necessary mineral soil.

Recovery of Engelmann spruce and subalpine fir after wildfire. Stands of Engelmann spruce, subalpine fir and white fir occupy the higher elevations of Arizona's mountains; moisture and temperature conditions here are often less favorable for development of an intense fire. Catastrophic fires are less frequent in this zone; however, when fires do occur, they can be intense. Both tree species share characteristics making them highly susceptible to fire mortality. The bark is thin and ignites easily, the roots are shallow and the branches grow near the ground.

Recovery of these tree species after a fire can be difficult and slow. Both are adapted to a cool and shady environment. Seedlings may become established in small burns of 1/10 acre or less. Larger areas may not reestablish because seedlings are intolerant of the intense sunlight at this elevation. New seedlings may establish at the perimeter of a larger fire. The seedlings require the shade the larger trees provide.

Wildfire effects on pinons, junipers, and Arizona cypress. Piñon pines, limber pine, most juniper species, and Arizona cypress are very susceptible to fire damage and are easily topkilled. Most have thin, highly flammable bark that provides little insulation to the cambium. Alligator juniper with its thicker and blocky bark is more insulated from the effects of wildfire on the trunk or cambium of the tree. Alligator juniper also sprouts profusely and is very capable of recovering from wildfire provided it has reached a height of 4 feet or more. Reestablishment of these trees is from seed; rodents and birds often store large amounts of seed. However, this can be a very slow process. Typically, a severely damaged stand will convert to a shrub community with gradual reintroduction of trees at 60 to 100 years.

Effects of wildfire on quaking aspen. Quaking aspen can form extensive pure stands in Arizona, and are also present to a greater or lesser degree in many other forest types. As a result, the aspen component in a conifer stand can greatly increase after a fire. In addition, while conifers successfully out-compete aspen in a non-fire situation, after fires occur, aspen may regenerate in a pure stand. This is due to the extensive suckering from roots when the main trunk of the aspen is destroyed.

Thin aspen bark makes it susceptible to fire damage. Pure stands are often missed or jumped in some fires due to the low flammability of aspen. Again, the diameter of the trunk influences the trees resistance to fire. Diameters of six inches or more are often quite resistant.

Recovery of shrubs, grasses and forbs after wildfire. Unlike conifers, many shrubs, forbs and grasses readily sprout from underground root structures after a fire. These root structures vary in size, shape and depth in the soil profile. Fire severity directly impacts these structures and influences which species regenerate. Slow moving fires destroy the duff layer and heat the soil to lethal temperatures. Sometimes shallow root structures are destroyed favoring those species with deeper roots. However, when a forest canopy is so dense that there is little or no understory, it may take considerably longer for grasses and shrubs to come in after a wildfire.

Salvaging Damaged Forest Timber Trees

If you have a sizeable property with forest trees of commercial value, whether to harvest trees killed as a result of wildfire is a personal decision, but will need to be made fairly quickly after the fire is out. This decision will also be affected by the availability of markets for commercial trees in your area. In some parts of Arizona because of the lack of markets for wood this may not be a viable option.

Trees sustaining heavy damage from fire die and lose their commercial value rapidly. Trees which sustain medium damage may survive, but typically do not fully recover their previous vigor. This leaves them vulnerable to attack by insects and to future droughts.

Once a tree has died, it loses its commercial value quickly due to decay. The speed at which this occurs depends on the tree species. White fir and subalpine fir are especially quick to decay, while ponderosa pine and Douglas-fir are much more resistant and will typically take several years longer. In addition, dead trees which still contain sound wood become infected with blue stain fungus, which does not weaken the wood, but decreases the value and grade of lumber which can be made from it.

Salvage harvesting provides a number of advantages to private property owners. Most importantly, accumulated dead and damaged trees provide fuel for future fires, and their removal reduces the risk that additional fires will burn through the damaged area. Removal also reduces the spread of insects which proliferate in dead and damaged trees.

Any income received from salvaged trees can be used to recoup losses as well as to finance rehabilitation of damaged areas through replanting and installation of erosion control measures.

While salvage harvesting can produce these benefits, it must be carried out properly to avoid further resource damage. Improperly done harvesting can increase soil damage when too much soil is disturbed or the wrong equipment is used. In the long term, some dead trees are needed for wildlife habitat and cover. Also, dead trees return nutrients to the soil.

Because of these risks, it is important that salvage harvesting be carried out with the help of a professional forester. A professional forester can be contracted to help you sell your trees, secure the best price for them, plan and execute the sale and harvest, and develop a reforestation plan for your land. A professional forester can also help you in addressing any state or federal regulations dealing with the protection of water quality, soil erosion, riparian areas, and wildlife habitat. Neighbors and friends who have harvested timber before are good leads to registered professional foresters or you can consult the phone book yellow pages under the listings of "Forester, consultant." The Association of Consulting Foresters also maintains a web site that lists ACF member registered consulting foresters by state (www.acf-foresters.com).

Removal and Replacement of Damaged Landscape Trees and Shrubs

Once tree damage has been assessed, homeowners can make decisions as to which trees may need to be removed. Candidates for removal most certainly include heavily and moderately damaged trees near structures and roads since these hazard trees are likely to fall and cause damage in the near future. Felling and removal of trees is hazardous work and is best done by a certified arborist using proper equipment.

In the case of removing fire damaged trees that were prominent in the home landscape prior to fire, it is important to take photographs of the trees that were burned or damaged prior to their removal. This is especially important if you do not have any previous photographs of your home and the trees and shrubs that existed prior to the fire. Photographs are useful in helping to document losses that may be covered by your insurance policy or as a casualty loss on your income taxes. Prominence of the trees or shrubs in the home landscape, their placement, size, and species are some of the factors that are used by a consulting arborists in generating, establishing, and documenting tree and shrub losses and values.

Replacement of damaged landscape trees can be a difficult and long process. Native trees are very slow to reestablish on their own. Landowners can assist in the establishment process by planting nursery grown trees and caring for them until they are established. Irrigation, weeding and protection from wild animals are essential.

For more information on selecting trees in Arizona, refer to:

University of Arizona, College of Agriculture and Life Sciences Bulletins:

- Planting Guidelines: Container Trees and Shrubs, AZ1022;
- Drought Tolerant Trees for Mid-elevation Deserts of Arizona (3,000 to 4,000 feet), AZ1239;
- Watering Trees and Shrubs: Simple Techniques for Efficient Landscape Watering, AZ1298;
- Plant Selection and Selecting Your Plants, AZ1153.

Flagstaff Community Tree Board Publication:

- Beyond the Ponderosa: Succesful Landscape Trees for the Higher Elevations of the Southwest

Tax Implications of Fire Losses

Timber tax considerations. A loss of a portion of the forest stand on your property due to wildfire can be claimed on your federal income tax statement as a casualty loss (see the definition of a casualty loss in the next section that addresses landscape tax considerations). Calculating the amount that can be claimed as a deduction requires sound data on your forest stand, probably best collected by a professional forester. In some cases, the expense of collecting the necessary data will not offset the reduced tax burden that results.

If you decide to replant burned areas, you may claim a ten percent tax credit for your planting and reforestation expenses, up to a maximum of $10,000 per year. These expenses may also be amortized over a seven-year period.

You should strongly consider getting the advice of an income tax professional to help you evaluate your tax situation and advise you on the most tax advantageous method for selling timber.

Landscape tax considerations. A homeowners insurance policy may or may not cover the removal, replacement, and installation costs for yard or landscape trees and shrubs lost as a result of fire or other natural disaster. Thus it is best to first check your coverage thoroughly with your insurance agent. If the insurance policy does not cover such losses there is another avenue that may be pursued by the property owner —a casualty loss deduction on the homeowner's federal and/or state income-tax returns.

A casualty loss is a sudden and unanticipated loss resulting from fire, storm, or other natural disasters, and must, by IRS rules, be 10% or greater of the annual gross income before it can be claimed.

Whether for insurance or income tax services, documenting costs, losses, and values is best done by engaging the services of a registered consulting arborist who is skilled in establishing monetary values for landscape trees and shrubs using the "Guide for Plant Appraisals". The guide is authored by The Council of Tree and Landscape Appraisers and is published by the International Society of Arboriculture. The American Society of Consulting Arborists maintains a list of registered consulting arborists by state who specialize in plant appraisal work (www.asca-consultants.org). Property owners should also check out the cost of obtaining such services as it could exceed the amount of any savings on their income taxes.

Forestry Assistance and Cost Share Programs

A number of technical assistance cost-share programs may be available to assist landowners with reforestation, replanting and other resource conservation practices. Technical assistance may also be available from federal or state agencies in the event there are no consulting foresters in the area. Agencies providing education, technical assistance and cost-share programs are listed in the section titled "For More Information."

Links to NRCS Fire Recovery Tips

Silt Fences
http://efotg.nrcs.usda.gov/references/public/AZ/silt.doc

Jute Netting
http://efotg.nrcs.usda.gov/references/public/AZ/netting.doc

Burlap Bag Check Dams
http://efotg.nrcs.usda.gov/references/public/AZ/burlap.doc

Drainage Tips
http://efotg.nrcs.usda.gov/references/public/AZ/drainage.doc

Establishing Grasses and Legumes
http://efotg.nrcs.usda.gov/references/public/AZ/establishing.doc

Sandbag Protection
http://efotg.nrcs.usda.gov/references/public/AZ/sandbag.doc

Straw Bale Check Dams
http://efotg.nrcs.usda.gov/references/public/AZ/strawdam.doc

Straw Bale Dikes
http://efotg.nrcs.usda.gov/references/public/AZ/strawdikes.doc

Straw Mulching
http://efotg.nrcs.usda.gov/references/public/AZ/mulching.doc

Vegetation Establishment
http://efotg.nrcs.usda.gov/references/public/AZ/vegetation.doc

Reference

www.az.nrcs.usda.gov

For More Information

For more information on the topics in this brochure or contact information for other sources of information, education, and technical assistance, contact:

- Arizona Department of State Lands – Fire Management Division. Website: **www.azstatefire.org**
- US Dept. of Agriculture, Natural Resources Conservation Service (NRCS), local office in the Phone Directory, Government Listings, United States Government Offices, Agriculture, Dept. of, Natural Resources Conservation Service. Website: **www.az.nrcs.usda.gov**
- US Dept. of Agriculture, Farm Services Agency (FSA), local office in the Phone Directory, Government Listings, United States Government Offices, Agriculture, Dept. of, Farm Services Agency. Website: **www.fsa.usda.gov**
- University of Arizona Cooperative Extension, local office in the Phone Directory, or Government Listings, County Government Offices. Website: **www.ag.arizona.edu/extension**
- University of Arizona Firewise Website: **www.cals.arizona.edu/firewise**

For information regarding tax treatment of timber:

- National Timber Tax Web site: **www.timbertax.org**

This publication is based on and borrows heavily from a University of California-Berkeley Extension publication titled "Recovering from Wildfire: A Guide for California's Forest Landowners by Susie Kocher, Staff Research Assistant; Richard Harris, Forestry Specialist; and Gary Nakamura, Forestry Specialist and a Colorado State University Cooperative Extension publication titled "Vegetative Recovery After Wildfire" by R. Moench.

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This information has been reviewed by University faculty.
cals.arizona.edu/pubs/natresources/az1294.pdf

Originally published: 2002

Other titles from Arizona Cooperative Extension can be found at:
cals.arizona.edu/pubs

Arizona FIREWISE Communities Cooperators

University of Arizona, Northern Arizona University, Arizona State Forestry, Arizona Fire Chiefs Association, Arizona Fire Districts Association, Arizona Emergency Services Association, Arizona Planning Association, Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, Inter-Tribal Council of Arizona, National Park Service, USDA Forest Service, USDA Natural Resources Conservation Service, U.S. Fish and Wildlife Service