

Living with **DROUGHT, FIRE** and **BARK BEETLE**



***Understanding natural landscape changes
in Santa Fe County***



The Santa Fe Piñon Initiative Steering Group is a coalition of municipal, county and state agencies that share a concern for the ecological landscape in and around Santa Fe, New Mexico.

The purpose of this publication is to explain the issues and provide basic information on drought, bark beetles and fire. We hope this publication is useful to you and answers your most pressing questions. For more information visit our santafetrees.com website or consult the back cover.

Fellow New Mexicans,

We take great pleasure in living and working in New Mexico, the most beautiful state in the United States. New Mexico's magical vistas, fertile plains and towering mountains are a part of our cultural heritage that should be cherished and preserved.

We are deeply concerned about the prolonged drought and its effects on our landscape. This is apparent in Northern New Mexico, where millions of piñon trees have died due to the drought and subsequent insect attacks.

That is why the New Mexico Energy, Minerals and Natural Resources Department's Forestry Division is joining the City of Santa Fe and Santa Fe County governments, in creating a community awareness program about the drought called the Santa Fe Piñon Initiative. We need to work together to deal with the devastating impact of the drought and its effects.

The loss of our piñon trees is just one of the many consequences of our lack of water. We urge all New Mexicans to do their part to help in conserving water and protect our beautiful state. We encourage you to read this publication to find out more about what is being done in the Santa Fe area and to take an active role in our environment. With your help, New Mexico will continue to be a beautiful place to live for generations to come.

Best Regards,

Bill Richardson
Governor

Larry Delgado
Mayor of Santa Fe

Paul Campos
Santa Fe County
Commission Chair



Why Our Landscape is Changing

Change is natural to any ecosystem. Such factors as precipitation, drought, fire and insects can change what the landscape looks like.

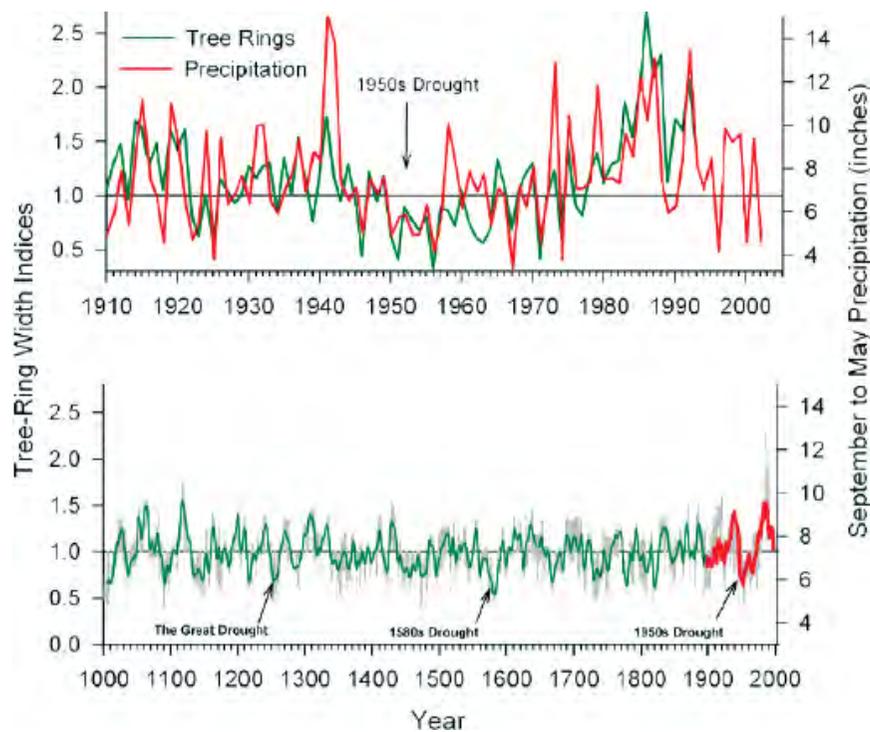
Piñon bark beetles are a natural part of the ecosystem, but the drought has weakened our piñon trees and bark beetle populations have exploded. The beetles are capable of producing multiple generations per year and these can spread for miles.

Normally, the piñon's natural defenses are enough to ward off attack, but with so little moisture in recent years all trees are vulnerable.



1900

Even though there was no severe drought in the early years of the 20th century, historical data and photography show very few trees around Santa Fe. Mature trees were used for fuel, construction, and other purposes. Through time, dependence on area vegetation waned and smaller trees matured.



1940s-50s

A cycle of severe drought swept across New Mexico. Piñon and other trees were stressed allowing the bark beetle to flourish, significantly reducing the piñon population.

A Voice From The Past

Forests Threatened By Beetle Invasion, June 23, 1957

Two species of bark beetles, working as a deadly team, are stripping a vast area of Northern New Mexico of its piñon and ponderosa pine.

Dr. Cal Massey of the Forest Insects Division of the Rocky Mountain Forest and Range Experiment Laboratory, estimates approximately a million acres of trees are already dead or currently being killed. From Santa Fe, the area of dead and dying trees extends northward more than halfway to Taos, southward to the Albuquerque area, east almost to Las Vegas and westward up to the higher slopes of the Jemez Mountains around Los Alamos.

Excerpted from an article in the Santa Fe New Mexican by author *Tony Hillerman*, then a newspaper reporter.

1975-1995

Ample moisture followed and vegetation enjoyed healthy resurgence throughout New Mexico.

1996-2003

Signs of significant drought crept into New Mexico. Larger populations of insect species, including the piñon bark beetle, followed. By spring 2000, prolonged drought, coupled with an overly dense tree population, posed severe fire danger throughout the state. In 2001 signs of a major piñon dieback were seen in and around Los Alamos, Española, and Taos. Santa Fe was next.

Today

Residents in and around Santa Fe are responding to the beetle infestation and piñon dieback. The Santa Fe Piñon Initiative is here to provide reliable information and help our community adapt to changes.

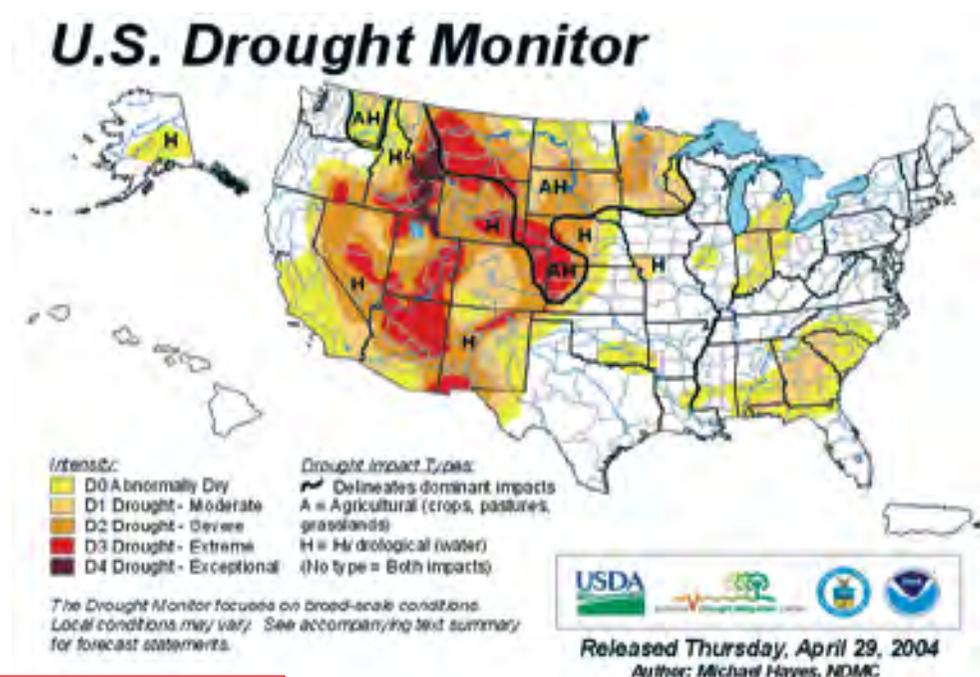
A Look at the Future

Forests we have known will not be the forests of the future. In the short term, shrubs, plants and grasses will dominate affected piñon areas. Already a re-emergence of native grasses and other plant species is occurring. Piñon will still exist where the impact of the beetles is less severe. New piñon seedlings that have sprouted will continue to grow. As these changes take place, much more open area is expected. As long as drought conditions persist, large populations of bark beetle are likely to exist.



It Rained a Lot this Weekend, Isn't the Drought Over?

Recent rains, while beneficial, are not sufficient to overcome multi-year deficits in precipitation and soil moisture. Forecasters predict above-average temperatures across New Mexico through the spring and summer months, suggesting persistent drought conditions for virtually all of New Mexico (The Climate Assessment Project for the Southwest, April, 2004). We must live within our means - using the water we do have as efficiently as possible and getting the most from every drop.



"You don't need a weatherman to know which way the wind blows..."
Bob Dylan (Subterranean Homesick Blues, 1965)

How Do I Know if My Trees are Infested with Bark Beetles?



To determine if a piñon has been infested with bark beetles look for evidence of a “pitch tube,” a small hole surrounded by a buildup of sap. Other signs include small piles of sawdust around the base of the tree or in branch cross-sections, and browning of needles on the entire tree. While we would like to believe something could be done at this point to save the tree, there really is nothing that will save it.



Twig & Bark Beetle Identification Table

Comparison	Piñon Bark Beetle	Twig Beetle
Species	<i>Ips confusus</i>	<i>Pityophthorus sp.</i>
Size of beetle	3.5-4.2mm	2 mm
Hosts	Piñon	Piñon and other pines
Preferred diameter of host material	Greater than 3 inches	Less than 1/2 inch
Preferred bark	Thick	Thin
Preferred point of attack	Trunk of the tree. Can attack branches 3” or larger in diameter	Twigs and branches. May attack larger branches and trunks of small trees with thin bark during drought conditions
Sign and symptoms	Uniform needle dieback	Single branch dieback
	Pitch tubes on trunk	Pitch tubes on branches
	Boring dust at base	No boring dust at base
	Bark appears normal	Bark on branches appears sunken
	Holes in bark on trunk	Holes in bark on branches
Can the tree be saved if infested?	No	Yes, prune infested branches. Tree can be saved if the bark beetle is not in the trunk of tree

Twig Beetles are Here, too.

Be on the lookout for the twig beetle, an insect that attacks piñon and other pines, particularly in times of drought.



The twig beetle does not normally kill trees.

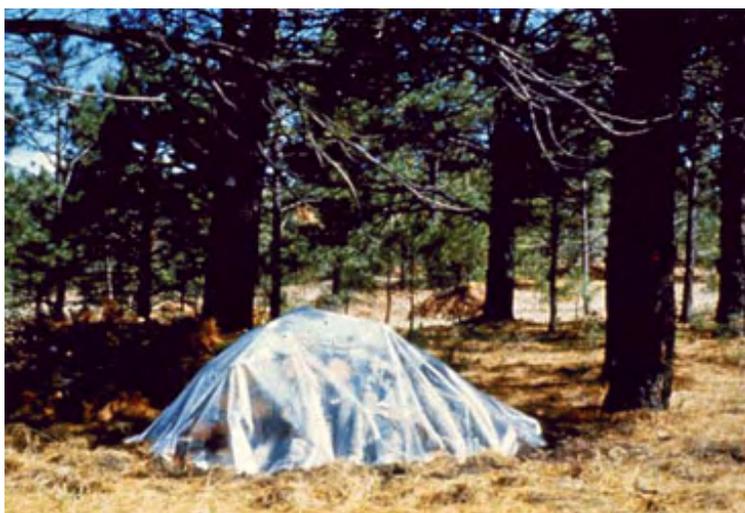
Should I Remove My Dead Trees?

Pros -

- May create more aesthetically pleasing scenery
- Reduces some forms of fire danger, especially around structures
- Could lower the risk of attack on adjoining trees by reducing bark beetle population
- Allows for easy replanting

Cons -

- Removing infested trees does not necessarily protect the remaining trees from large populations of bark beetles living in nearby trees
- Birds and other wildlife use dead trees for nesting and feeding.
- Dead trees are natural parts of the ecosystem
- Dead trees and branches can reduce erosion
- Dead trees provide protection and shade needed for native grasses and other vegetation to germinate and grow



Solarization Helps Prevent Spread of Bark Beetles... Here's How to Do It

Stack cut wood larger than three inches in diameter in a sunny spot and cover with clear plastic. The plastic must be sealed at ground level using dirt or rocks. Duct tape any tears in the plastic. Beetles will not be able to survive the high temperatures generated under the clear plastic and will die after several weeks.



Can Dead Trees Spread Beetles?

The answer is “maybe.” Before you remove dead trees or trees that you suspect are infested, peel back some of the bark and see if beetles are still in the tree. If no beetles are present you can use the wood for firewood after a period of drying. Chip or lop the branches with appropriate tools and scatter small branches and twigs.

If you see beetles:

- Chip or lop the branches and scatter small branches and twigs
- In late fall and winter months, after the first freeze, beetles will be dormant. Chip tree and leave residue on site. Chips will have time to dry out and beetles will die
- As an alternative to chipping, solarize wood; heat will kill beetles
- If chipping or solarization is not an option, remove tree from your property

Facts to remember:

- Bark beetles seldom attack small branches and twigs; they prefer stems three inches or larger in diameter
- Wood residues can reduce soil erosion and provide mulch or shade for new plants
- Reduce the fire risk by keeping the residues close to the ground and away from structures
- Chipping does not kill all the beetles. Chipping infested trees during warmer months may allow remaining beetles to escape

What Happens to Trees Taken to the Landfill:

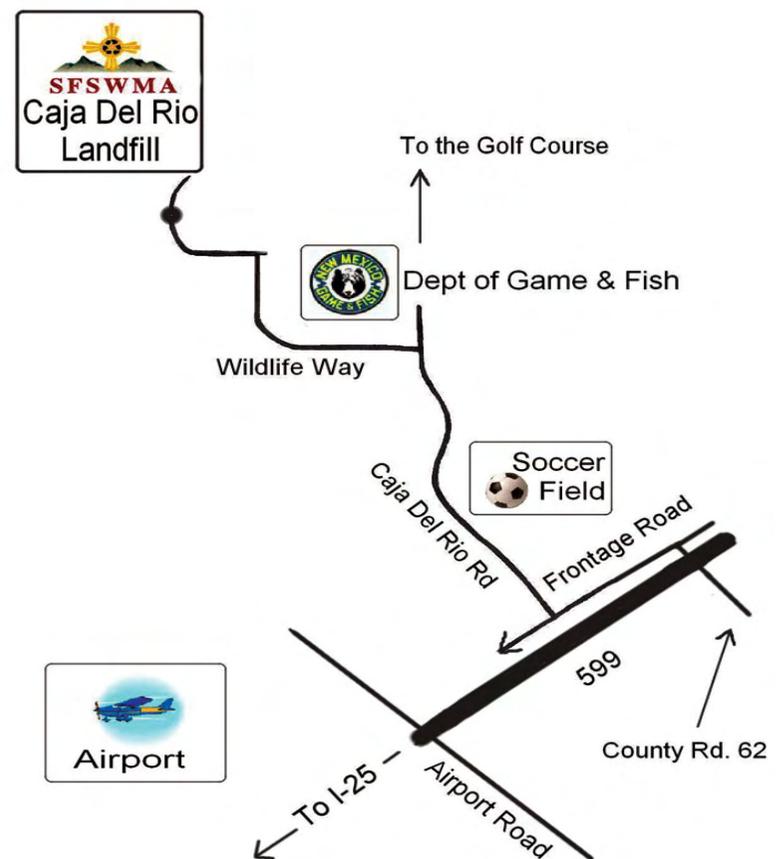
One of the best alternatives is to take your slash and trees to Caja del Rio landfill. The city and county have established an innovative program that safely treats green waste and recycles it into compost or mulch that you can reuse. The New Mexico Department of Transportation and the City of Santa Fe, Parks and Recreation Department, are also making good use of large amounts of compost.



Wood is chipped and mixed with manure in compost pits or windrows.



The composting process generally takes three months to complete, during which time the windrows are watered using treated effluent and turned to speed decomposition. When this process is complete, finished compost is ready for use on your land for revegetation and erosion control.



“Living with Drought, Fire and Bark Beetle” publication photos and graphs courtesy of: Craig Allen, Dave Bervin, Hank Blackwell, Colorado Weed Management Association, Todd Haines, Gerard J. Martinez, Shelley Nolde, Dave Powell, Terry Rogers, Stephanie Sandoval, Bob Sivinski, Justin Stockdale, Laura Trader and Dan Ware. Publication design and layout, Maria Clokey and Fred Rossbach

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www.santafetrees.com

I Don't See Signs of Bark Beetles...How Do I Keep My Trees Healthy?

Water is a tree's best friend when it comes to staving off insects and disease. The following suggestions help you to strengthen piñon and other trees.

- Use a drip irrigation system or soaker hose to avoid wasting water
- Place drip emitters away from the trunk of the tree, to better reach roots
- Plan to water three to four times a month during warmer months of spring and summer (water at least once a month during the winter)
- Place a layer of mulch around the tree to cool the soil and conserve water, but keep mulch away from the trunk of the tree
- Remove weeds and other competitive vegetation around trees to ensure efficient water usage.
- Do not fertilize; fertilizer can increase tree stress levels
- To further conserve water, only apply during evening or early morning hours to avoid the heat of the day

Healthy trees are dependent on a variety of factors and local nurseries are excellent resources to answer more questions on tree health.

O-Piñon

The Santa Fe Piñon Initiative does not promote spraying pesticides for beetle prevention, but spraying is an option for landowners with a limited, un-infested piñon population. If you have extensive acreage spraying may not be economically feasible and could be ecologically harmful.

A good source of information is the National Pesticide Information Center, www.npic.orst.edu.

Want more information on pesticide use? Contact the Santa Fe County Cooperative Extension office at 471-4711 or the New Mexico Department of Agriculture, Pesticide Management Bureau, Las Cruces, New Mexico (505) 648-2133.

Many alternatives to carbaryl, permethrin and aggressive watering have been offered to homeowners, including systemic treatments (such as fertilizers, vitamins, garlic compounds) and holistic remedies. While there are anecdotal reports of success, at this time there is no scientific evidence supporting the use of these methods.

Be sure to follow water conservation requirements in your community.

To Spray or Not to Spray Pesticides

- Be sure the trees to be sprayed are un-infested; spraying will not save infested trees
- Before spraying, carefully read the package, follow all instructions and observe warnings
- Permethrin and carbaryl are chemicals used for spraying to prevent bark beetle
- Be sure that spraying occurs when there is no wind
- Spray trees from top to bottom and make sure that trees are properly saturated with pesticide
- Consider hiring a licensed, professional applicator for the job
- Do not inject trees with pesticides
- Notify your neighbors so they can take appropriate action

Before spraying, consider the impact chemicals may have on human health and the environment

The Skinny on Thinning

Thinning (removal of living trees) can reduce the immediate fire risk near the home and increase the long-term health of remaining trees. These days, thinning can be a difficult choice because trees are dying due to effects of drought and insects. If you choose to thin, consider the following guidelines:

- Select the best trees to leave standing (including some young ones)
- Take care to protect trees around those that you are thinning (especially seedlings and saplings)
- Call your local power company to remove trees from around electrical utilities
- If you have a large acreage of trees, complete the project over several years
- If you are dealing with large numbers of dead trees consider using an experienced tree removal professional



O-Piñon

Always seek out a professional, licensed contractor who has property damage and injury insurance. It's also a good idea to review your property insurance policy.

Shall I Do the Work Myself or Hire a Contractor?

Cutting trees and spraying pesticides is dangerous business. If you are not confident doing the job yourself, consider finding a qualified contractor to help with:

- Dead tree removal
- Thinning
- Spraying
- Tree care and health

Although the Santa Fe Piñon Initiative does not recommend specific contractors, a list is available at www.santafetrees.com. Check with local nurseries for professional tree care advice or look in the phone book under tree service and maintenance.

Once you have selected a contractor ask for references and call them. Before work is started, develop a clear understanding of work to be done and put it in writing.



My Trees are Gone, Now What Do I Do?

As piñon trees die or are removed for fire hazard reduction, the landscape “face” of Santa Fe will change. We think it’s a good idea to get advice from county extension agents or qualified nursery personnel on what to plant and when, as well as how to plant, so that your land and the Santa Fe area will remain beautiful.

Don't plant large piñon or other pines during beetle infestation; they are particularly susceptible to insect attack.

-  Evaluate existing vegetation composition and density and consider fire risk
-  Do not over-plant on slopes below your home. Preparing a landscape plan with the assistance of a professional can help you avoid erosion, reduce fire risk, and plant the most suitable vegetation for your soil type, slope and aspect
-  Plant native species which are drought tolerant and fire resistant. Lists of suitable plants can be found at www.santafetrees.com
-  Consider mulching or shading the ground with some branches, to keep the soil cooler and moist
-  Plant new piñon seedlings in the shade of existing vegetation to increase moisture and protect them from the wind. You can also set up blocks of wood, mounds of soil, wood chips or branches to the west and southwest side of the seedlings. Use this technique to protect existing piñon seedlings as well
-  From late November to mid-April, the New Mexico State Forestry Division sells trees through its Seedling Distribution Program. The program is designed for restoration of multi-acre properties, and is available to people who own at least one acre. The Forestry Division Web site, www.nmforestry.com, has a list of available plant species.



 Russian Knapweed

Watch For Invasive Plants

Non-native plants species can damage ecosystems by crowding out native plants. Russian knapweed and toadflax are examples of plants that might move into areas where the ground has been disturbed. Control them quickly, or they may become the only plants you have.

Wildfire Potential in the Santa Fe Area

Whether piñons are alive or dead does not change the fact that we live in an area that is highly susceptible to fire. It is a part of our natural environment. Seasonal conditions compounded by long-term drought increase the risk even more.

Danger is high where green piñon trees grow closely together and are stressed by the drought. Risk is also elevated where piñon trees have recently died, though the danger is greatly reduced as the needles fall off the dead trees. Fire will no longer burn from tree crown to tree crown, but may spread along the ground and will be easier to put out.



Whether your property adjoins a thousand acres of national forest, or you live in town, everything you do to reduce fuels makes your home safer. Visit www.firewise.org for more information.

How Do I Assess My Fire Risk?

Look at your land and try to figure out how and where a fire would ignite (i.e., what would be a possible cause of fire) and then imagine how it would move. From which direction are the prevailing winds? How steep are your slopes? How close together are the crowns (tops) of trees? Is there any ground vegetation?



If you live within the City of Santa Fe the riskiest things are:

- Coniferous trees directly in front of windows
- Dense piñon and juniper trees on slopes leading up to the house
- Wood trim or fencing which could hold smoldering embers and catch fire
- Firewood stacked next to the house



If you live outside the City of Santa Fe fire risk is increased by:

- Wood shake roofs
- Wooden decks (especially with vegetation growing under them)
- Pine needles around the home and on the roof

If you must evacuate
remember the five "Ps"
People, Pets, Pills,
Pictures and Papers.

REDUCE THE THREAT OF WILDLAND FIRES Protect Your Home From Wildland Fires



Take Time To Protect Your Home!

1. Dispose of ashes properly
2. Screen dryer vents
3. Maintain a circle of safety (at least 30 feet, greater on slopes)
4. Thin and prune trees near the house
5. Keep roofs and gutters clear of debris
6. Stack firewood away from house
7. Keep grass and weeds mowed down
8. Dispose of trash legally (don't burn)
9. Remove tree limbs overhanging structures
10. Keep immediate area clear of debris
11. Install spark arresters on chimneys
12. Replace or treat wood shake roofs with fire retardent materials
13. Provide adequate access for emergency vehicles
14. Provide outdoor water supply
15. Keep fire extinguisher charged and available, and a hose near outdoor faucets



Santa Fe Pinon Initiative Steering Group

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For more information visit www.santafetrees.com