

Keeping the way clear for safe, reliable service



March 2010

In 1996 and 2003, massive power outages struck large sections of the country and left millions of people in the dark.

Both blackouts were triggered by a similar event. Overgrown trees came in contact with high-voltage transmission lines, causing a protective shutdown that created cascading power outages across the regional power grid.

Power outages like these are much more than an inconvenience to consumers. They can be dangerous and costly, straining vital community services such as hospitals and bringing commerce to a standstill.

Here in the Pacific Northwest, the Bonneville Power Administration operates three-fourths of the region's high-voltage transmission system. BPA's transmission system includes more than 15,000 miles of high-voltage power lines that move large amounts of power from hydroelectric projects and power plants to urban centers hundreds of miles away. To keep

the electricity flowing safely and reliably across our transmission network 24 hours a day, 365 days a year, BPA must keep our power line rights-of-way clear of tall trees and other objects that could disrupt delivery of electricity or threaten public safety.

Trees and power lines: A growing concern

Trees and power lines have never been good neighbors. That's why BPA works hard to keep a safe distance between high-growing vegetation and power lines through a comprehensive vegetation management program.

Vegetation growing near high-voltage lines is hazardous in two respects. First, if trees or tall brush come in contact with a transmission line, they can shut down that line and disrupt the flow of electricity. For example, during storms or high winds, tree limbs can topple on power lines, which can knock out



power to communities. Because a single line in BPA's system serves thousands of homes and businesses, an incident like this could trigger outages that impact the entire West Coast.

And second, trees and other vegetation can conduct electricity, a situation that can jeopardize people, pets and property. If electricity flows through a tree to the ground, that tree essentially becomes "electrified," and anyone who touches it can be seriously injured or even killed. Another danger is that electricity from the line can make a tree branch so hot it catches fire, which can threaten homes in residential neighborhoods and spark wildfires in rural areas.

Trees don't even have to touch power lines to be dangerous. In the case of high-voltage transmission lines, if circumstances are right, electricity can jump or arc between wires and vegetation or other objects connected to the ground that are up to 15 feet away.

Preventive maintenance: A new national requirement

After the big blackout in the Northeast in 2003 — the one that left 50 million people without power and cost billions of dollars in lost productivity — investigators determined that it was trees coming in contact with high-voltage lines that initiated the outage.



Trees that grow too close to high-voltage power lines are a hazard. In certain circumstances, electricity can jump or arc from the lines to the trees, which can cause power outages, fires and serious injuries to anyone near the trees.

Why keep rights-of-way clear?

BPA manages vegetation in our transmission line rights-of-way to:

- Maintain a high level of power reliability
- Ensure public safety
- Prevent damage to land and property

As a result, the North American Electric Reliability Corp. (a national regulatory body that oversees reliability of the U.S. power grids) issued new, more stringent vegetation management standards for electric transmission lines. BPA and other utilities must comply or face the possibility of fines of up to \$1 million a day. If BPA had to pay such fines, that would raise our costs, putting upward pressure on rates.

For decades, BPA has kept our transmission rights-of-way clear through regular vegetation maintenance. But in response to the new national regulations, BPA has set new standards to ensure we can reliably maintain a safe distance between vegetation and our power lines.

Under the new standards, BPA's crews will manage vegetation to keep a safety zone of 25 feet between high-voltage transmission lines and the trees and brush beneath and around them.

The 25-foot safety zone considers two key factors. One is the mature potential height of the tree, and the second is the maximum distance the power line will sag under periods of high use. When power lines carry more electric load, they normally heat up, which causes the wire to expand and sag. In summer, for example, when the air is hot and customers demand lots of electricity, lines can sag up to 14 feet.

This means that with BPA's new clearance standards, if a tree can grow close enough for a power line to sag into the range where it can cause an outage, the tree must now be removed.

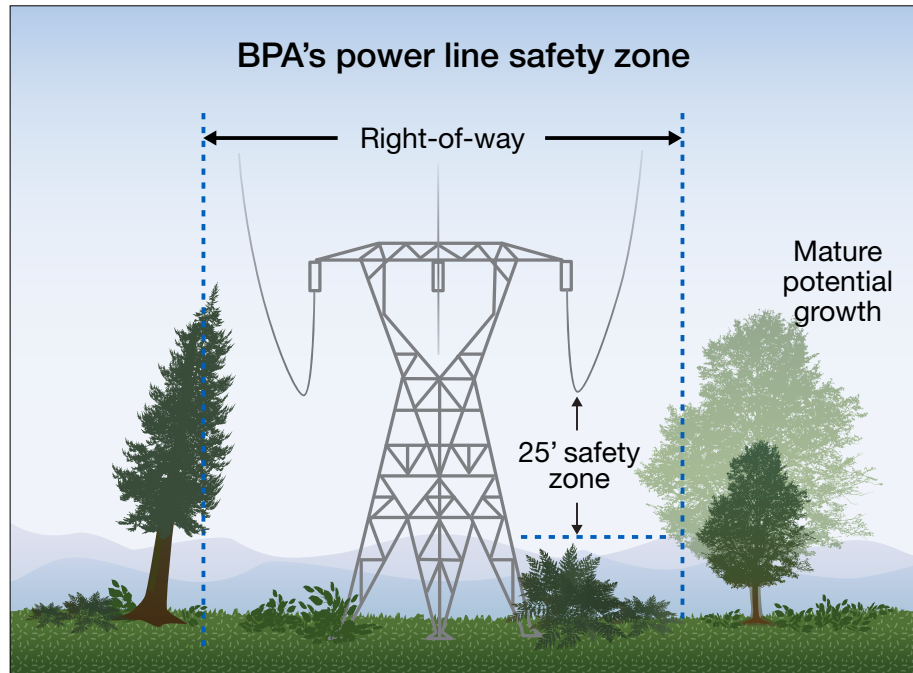
Maintaining a safe distance

The electricity carried by BPA's high-voltage transmission lines ranges from 69,000 volts to 500,000 volts. That's about 50 to more than 100 times the amount of electricity that flows through the distribution lines that bring power to your home. Higher voltage lines require greater clearances than power lines in your neighborhood. That's why BPA's power lines are supported by taller towers and why we must maintain a greater distance between the lines and objects on the ground.

To manage the 50,000 acres of rights-of-way across our service territory in the most cost-efficient manner, BPA has established regular maintenance cycles to remove vegetation before it gets close enough to the lines to threaten system reliability and public safety. Depending on topography, climate and vegetation in a particular area, these maintenance cycles range between three and 15 years.

By keeping a 25-foot safety zone around the power lines, we can be sure the rights-of-way will have a safe clearance until we return for the next maintenance cycle.

For additional assurance, we conduct ground and aerial patrols on every mile of every transmission line every year, looking for vegetation trouble spots. BPA also routinely surveys areas bordering our transmission corridors to watch for "danger trees," large trees that may fall over on power lines or grow close enough to swing into them with the help of a little wind.



BPA crews will maintain a 25-foot safety zone between the highest point the vegetation will potentially grow and the lowest point the power line will sag under extreme conditions. Sometimes, even though a tree is outside the right-of-way boundary, BPA crews will remove any growth that comes within the 25-foot clearance zone or remove the tree if it's unstable and likely to topple over on the power line.

Managing vegetation

BPA natural resource specialists, who have extensive education and training in forestry practices and electrical safety, direct our experienced contract crews. When they determine that trees in or adjacent to the right-of-way are a current or future hazard to the transmission line, those trees will be removed.

The combination of fast-growing trees and BPA's cyclical maintenance program means that removal, rather than trimming, of tall trees is the best way to ensure the new safety standards are met.

For example, if we discover a 10-foot Douglas fir tree growing under the line, we don't just trim it to the proper clearance. Instead, we remove it because the tree's mature height will eventually violate the 25-foot clearance limit. Also, rather than trimming trees repeatedly, BPA removes them because that is the

more cost-effective approach, conserving resources that can be used to strengthen the transmission system elsewhere.

In addition to maintaining the appropriate safety clearance between vegetation and power lines, our crews also work to establish low-growing native plant communities and treat noxious weeds along the rights-of-way.

Keeping communities informed

Before starting vegetation management activities, BPA makes every effort to contact landowners and residents near the project area to inform them about the work to be done. We also listen to their concerns and let the local community know when our crews will be in the area.

When it's necessary to remove trees near power lines, our crews work with landowners to minimize the impact. We will remove tree limbs and any debris we create. Generally, cut logs are left for the landowner's use or are hauled away on request.

Why does BPA have the right to manage vegetation near power lines?

Generally, before a power line is built, BPA purchases an easement or right-of-way from the landowner. As the easement holder, BPA has the legal right to maintain and protect its transmission equipment and facilities. This includes keeping the right-of-way clear of trees and other obstructions that could interfere with the safe and reliable operation of the line.

How you can help

Even though we regularly inspect our transmission lines, you can help by notifying us if you see trees or vegetation that might be growing too close to the lines.

For your own safety, it's important that you never attempt to trim or remove a tree that's near a transmission line because working around energized power lines is very hazardous. Instead, call BPA and our specially trained crews will take care of it.

You can also help stop potential power line problems before they start. If your property borders a transmission corridor, avoid planting new trees directly beneath power lines or too close to electrical equipment. Generally, smaller-scale native or ornamental shrubs, ferns and grasses are allowable options in a right-of-way.

Before you plant any vegetation on BPA rights-of-way, be sure to coordinate with us by filling out one of our Land Use Applications. This will enable us to maintain a safe distance between the vegetation and our power lines and ensure that the vegetation will not block access to the lines, towers or poles.

For more information

If you have any questions about our vegetation management program or would like to request a BPA Land Use Application, call us at (800) 836-6619.

For more details on BPA rights-of-way and how to stay safe around high-voltage power lines, visit our Web site at www.bpa.gov/corporate/pubs. You can also obtain a copy of BPA's Land Use Application from the Web site.