

LANDSCAPE *culture*

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Return of the Rose Garden to Manzanar

After an almost 80-year absence, the Rose Garden has returned to [Merritt Park](#) in Manzanar National Historic Site. As it did at the time of the Japanese American incarceration camp, the garden symbolizes purpose, solace and community connection. Only now, the associated community includes park staff, family descendants, local community members and volunteers. Restoration of the garden was realized in 2024, nearly 30 years after the park’s first General Management Plan established an objective to preserve the gardens of Manzanar.



Volunteers weed and deadhead the roses in the newly restored Merritt Park Rose Garden at Manzanar NHS. (Photo by Ken Takahashi and Robin duSaint).

As one of 10 incarceration camps established by Executive Order in 1942, Manzanar War Relocation Camp was hastily built to detain 10,000 people of Japanese ancestry living on the US West Coast. Detainees were permitted to take into the camps only what they could carry. Harsh living conditions were exacerbated by wind-driven sand that whipped through the camp. One impetus for gardens began with sowing turfgrass to control dust. Almost immediately, though, the incarcerated people began sowing

About Us

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Park Cultural Landscapes Program [sharepoint](#).

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The Merritt Park Rose Garden in Manzanar War Relocation Camp, with its principal creator Kuichiro Nishi on the right. (Photo by Toyo Miyatake, © Toyo Miyatake Studio)



Volunteer leader Tia Morita (front right) and her sister Aly, fill planting holes with water before planting the roses. In the rear are Tia's cousin Russell, whose mother was also incarcerated at Manzanar and staff member David Goto. (NPS)



The restored Rose Garden with a large selection of hybrid tea rose plants of resilient varieties. Restored Merritt Park is in the rear, with the Sierra Nevada in the distance. (NPS photo)

vegetables and flowers, and crafting garden features from woody debris. Within a few months, they had organized to develop gardens throughout the camp, ranging in size from a few square feet to 2.5 acres.

Located within a space left open as a firebreak, the “western style” Rose Garden was started by Kuichiro Nishi in the fall of 1942. Like many of the incarcerated people at Manzanar, Nishi had horticultural experience, as the Nishi family business included a nursery that specialized in roses. Nishi persuaded the camp director to allow him to propagate roses by grafting the buds of hybrid tea roses onto wild desert roses of the camp, that would serve as rootstock. His industry, along with incarcerated community members, led to the establishment of a rose garden of approximately 50 varieties.

Nishi worked with Takio Muto and other incarcerated gardeners to design additions to the Rose Garden. Adjacent, they built a Japanese stroll garden with two large ponds, rock features, transplanted trees and ornamental plants. Named “Merritt Park” in honor of the camp director, the park was a much-photographed sanctuary where people could momentarily forget they were imprisoned. At the end of World War II, the incarcerated people were released and the camp was dismantled, leaving the gardens to become inundated by sand and colonizing vegetation.

Since the 1992 establishment of the park, archeological and historical research has revealed that dozens of gardens are still represented at Manzanar by rock and wood features, topography, and to some extent, by vegetation. The 2006 [Cultural Landscape Report](#) and the 2015 [Garden Management Plan](#) incorporated this research, and established an objective to restore

Merritt Park and the Rose Garden. This objective had the support of the local and descendant communities, including Kuichiro Nishi’s son, Henry.

The relationships cultivated by the park with associated communities fueled efforts to restore the Rose Garden. Tia Morita, whose mother was born to her incarcerated grandparents in Manzanar, galvanized a cohort of volunteers to purchase roses, materials and lend their labor to the Rose Garden. The only constraints were that roses should be suitable for USDA zones 4-9 and hybrid teas. With the park’s support, Tia and her family donated varieties to commemorate family members. For a year and a half, Tia commuted three hours every month from Los Angeles to work on site preparation, planting and care of the rose plants.

Begun in 2022, restoration efforts were on target for a rededication ceremony in October 2023. Plans were abruptly halted when Hurricane Hilary flooded the park in August 2023 and dumped silt and debris throughout the Rose Garden. The work turned to uncovering and removing some roses to allow heavy equipment to maneuver. Once again, Tia, the other volunteers and park staff pitched in, clearing and replanting where necessary to salvage the garden. By early 2024, more than 120 rose plants made up the Rose Garden, consisting of varieties that represent a few from the period of significance, but more that are newer hybrids.

Since World War II, the rose industry has developed hundreds of varieties that are more resilient to cold, drought and pests than their earlier counterparts. The new varieties are similar in form but hardier than the originals. Each selected variety has significance to community members. Many of the roses were purchased from Sego Nursery in the San Fernando Valley, owned and operated by the grandchildren of [Seigoro Murakami](#), the Judo master at Manzanar.

Today, the work of the volunteers continues with weeding, pruning, fertilizing, maintaining the well-supplied drip-irrigation system, and sustaining the mulch that covers each rose bed. Gypsum drenches are applied to flush salt from the desert soil, and debris is cleared to deter pack rats that eat the rose bark. Tia credits her ancestors for inspiration to sustain the Rose Garden. In the face of great uncertainty, the incarcerated people of Manzanar created beauty to find purpose and solace. Today, the volunteers feel a great connection to history and each other and enjoy a mutual sense of trust and respect with park staff. We salute and congratulate everyone involved in this remarkable effort.

Brief Guide to Turf Seed Selection



The Arlington Lawn at Hot Spring National Park requires turf suited for high traffic and full sun. (NPS)

Grass can be established through sodding, plugging, sprigging, or seeding. This article will focus only on seeding. Grass seed is needed not only for establishing new turf areas, but also to improve turf stand through regular overseeding. It may also be necessary to seed new turf areas after site disturbance. Overseeding with a slit seeder, or in conjunction with aeration, is an essential turf management practice that improves stand density and health, and thus, reduces weed growth.

Park staff need to purchase grass seed to overseed existing turf and establish new areas of turf. In addition to the various species of turf like bluegrass, Bermuda grass, and perennial rye, agronomists have developed hundreds of cultivars to choose from. Deciding which seed to purchase and sow can be overwhelming. However, choosing the correct seed is worth the time: it will improve the chance of success while decreasing maintenance time and cost.

Find the Right Turf for Your site

Before purchasing grass seed, collect the following information about the site:

- Square feet: Measure in the field or use Google Earth Pro (available in NPS Software Center).
- Traffic: Does the area have high or low foot traffic?
- Sun exposure: Is the area in full sun, part shade, or full shade?
- Maintenance: Is there available irrigation? How often will the site be mowed?
- Stressors: What are the problems that the current turf is experiencing that could be addressed with new cultivars?



Turf seed selection starts by identifying the growing zone. (University of Kentucky)

- Desired turf character: Turf character includes the texture, uniformity, tolerance of weeds, and height. Uniform, weed-free turf requires significant inputs that may not be necessary or appropriate at many NPS sites. Different seed species and cultivars will support perpetuating the desired turf character. (For more information on NPS turf classes see: [Turf.](#))

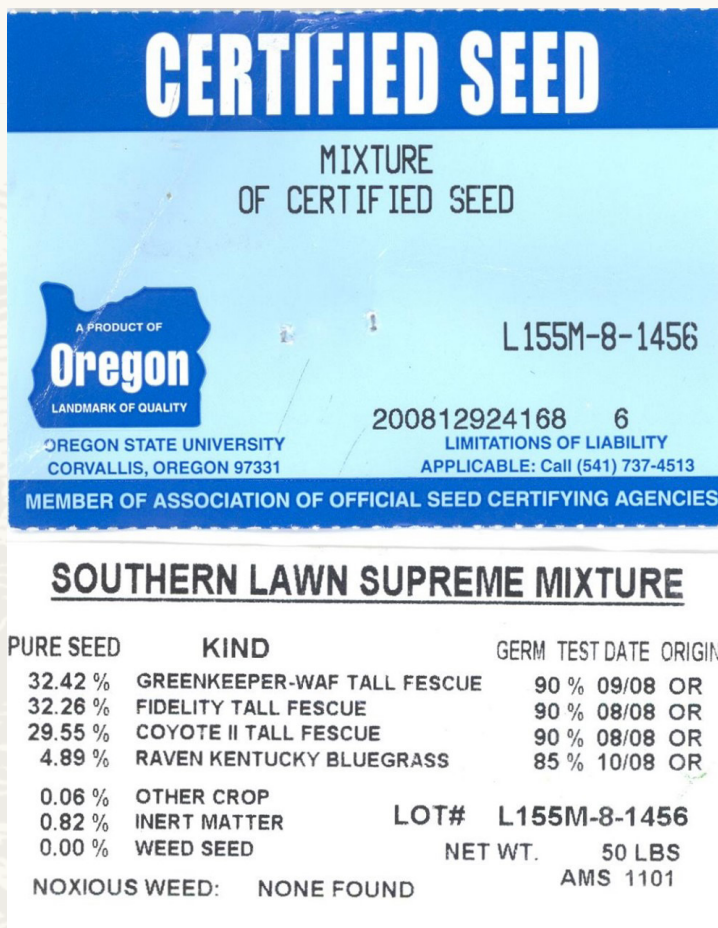
Turf Categories

Turf is organized into category, type/species, and then cultivar. The two main categories of turf grass are cool-season and warm-season. Cool-season grasses grow in the northern U.S. They grow best in the spring and fall and can go dormant in the summer months during drought or high heat. Warm-season grasses grow in the southern U.S. and grow best in the summer and under hot conditions. They have a low frost tolerance and go dormant when the temperature is below 65° F. The transition zone will support both warm-season and cool-season grasses (see below map for the turf category zones). Choose a turf type/species/cultivar that best suits the climate at your location

There are several main types of warm-season and cool-season turf. These types correspond to individual grass species or groups of related grass species. The table at the bottom of this page outlines most major types of cool- and warm-season grasses and provides resources for more information. For each type, numerous cultivars have been developed. You will not only need to select the type/species, but also the specific cultivar(s) to grow. When selecting a seed mixture, you should generally have at least three types/species or three cultivars of the same type.

Grass Seed Categories

Name	Characteristics	Propagation	Some Cultivars	More Information
Kentucky bluegrass	Higher maintenance grass, germinates slowly, resilient to foot traffic, full sun, high maintenance.	Seed	Award, Baron, Kenblue, Prosperity, Shamrock, Skye, Starr	Turfgrass Selection: Bluegrasses, UT Extension
Perennial rye grass	Full sun, germinates quickly for repairing a bare spot, resilient to foot traffic. Does not tolerate high or low temperatures.	Seed	Bastion, Citadel, Grimalda, Nestor, Reveille, and Taptoe	Ryegrass, Penn State Extension
Tall fescue	Heat and drought tolerant, full sun with some shade tolerance, prefers well-drained soil.	Seed	Clash, Daybreak, Expanse, Providence, Serenade, Spyder 2 LS, Stealth, Teacher, Titanium G-LS, Xanadu	Tall Fescue, OSU Dept. of Horticulture
Fine fescue	Tolerates some shade, often planted in no-mow areas, low foot traffic resilience.	Seed	Creeping red fescue, Chewings fescue, hard fescue, sheep fescue (with many cultivars of each)	Fine Fescues, Understanding the Differences, Purdue Extension
Bermuda grass	Drought and heat tolerant, early fall dormancy. Considered an invasive species in some areas.	Seed or sprig	Celebration, GN-1, Latitude 36, Northbridge, Sundevil, T-10, Tahoma 31, TifTuf, Tifway 419, Yukon	Cynodon, NC State Extension
Buffalo grass	Native plant, drought and heat tolerant, low sun, prefers no water or fertilizer.	Seed or sprig	Bison, Bowie, Cody, Legacie, Prestige, Sundancer	Buffalograss Lawn Establishment Using Seed or Plugs, CSU Extension
St. Augustine grass	Shade tolerant, requires irrigation during drought, poor cold and wear tolerance.	Sprig or plug	Bitterblue, common (straight species), Raleigh, Palmetto, CitraBlue	St. Augustinegrass Lawns, Alabama Cooperative Extension
Zoysia grass	Slow to establish, wear-resistant, somewhat shade tolerant, not drought tolerant.	Plug	Coarse: Belaire, Compadre, El Toro, Empire, Innovation, JaMur, Meyer, Palisades, Zenith Fine: Emerald, Zeon, Royal, Leisure Time, Geo, Cashmere	Zoysiagrass Factsheet, Clemson Cooperative Extension



Seed label of mix containing three tall fescue cultivars and one Kentucky bluegrass cultivar.

Example of mixture with three types/species:

- 40% Rebel tall fescue
- 40% Pennington red fescue
- 20% Blue Bonnet Kentucky bluegrass

Example of mixture with three cultivars of one type:

- 35% Michelangelo tall fescue
- 35% Leonardo tall fescue
- 30% Davinci tall fescue

This diversity will result in a more resilient stand with a variety of characteristics. Because seed mixing is a refined science, purchase a premixed blend that fits your needs. Avoid mixes where the cultivars are not indicated

Reading the Label

Read the label on turf mixes to understand their key properties. When shopping online for turf seed the label information will be listed. The following elements are printed on high-quality grass seed labels:

- Purity/pure seed-Percent by weight of mixture. The label will show each species and cultivar within the mixture. The cultivar is listed first and the common name of the species is listed second.



Slit seeders can be used to sow seed. (NC State Extension)

- Germination percentage-Percent of seed that will germinate in ideal conditions. Choose mixes with at least 80% germination percentage.
- Crop seed percentage-Percent by weight of crop seed such as clover within mixture. This percentage should be close to zero.
- Weed seed percentage-Percent by weight of weed seed within mixture. This should be at zero to avoid introduction of unwanted species.
- Inert matter percentage-Percent by weight of soil or seed parts that will not grow. This should be as low as possible.
- Noxious weeds-Indication that no noxious weeds are present.
- Date tested-Date the germination was tested. The seed should have been tested in the last 9 months.
- Blue Tag/Certified-Blue tag certified seed indicates the seed is certified by an official seed certifying agency that tests the authenticity of each cultivar in the seed mixture.



NTEP turfgrass trials. (UMass Extension)

Sowing Seed

- Application Rate

The application rate will vary by seed mixture and is generally shown on the seed bag. Application rates vary from Kentucky bluegrass with an average of 2-3 pounds per 1,000 square feet to tall fescue with a rate of 6-8 lbs per 1,000 square feet. When overseeding, seed should be distributed evenly over the aerated soil using a drop or broadcast spreader or a slit seeder. Spread seed in two directions for a more uniform application. Calibrate the spreader to deliver half the amount of seed in each of two passes.

- Timing

The best time to seed is late summer to early fall for cool season grasses, with early spring being a close second. Warm season grass is best seeded in the late spring to early summer. Summer heat and dry spells prevent establishment success, but seeding windows can be expanded if irrigation is available

- Purchasing Seed

Landscape supply stores sell ready-mixed seed. For a wider range of seed, reach out to your local turf supply company that sells to golf courses and sports fields. Turf supply companies will also be able to provide additional technical support in seed mix selection.

- Seed Evaluation

The National Turfgrass Evaluation Program (NTEP)

conducts trials across the country on turfgrass cultivars. Their data is available here: <https://www.ntep.org/tables.htm> and can be used to pick cultivars appropriate for your site. Turfgrass quality (TQ) is the most important data point to look at when choosing cultivars based on the NTEP data. This article provides more information on using NTEP: [Does Selecting the Best Turfgrass Varieties Really Matter?](#), UMass Extension. Alternately, [A-List Turf](#) provides a preselected list of low input, high quality turf without having to wade through all of the NTEP data.

More Information

State Extension Services

Turf Management within the National Park Service from an agronomical perspective is very diverse given the many uses and growing environments. The best source for location-specific turfgrass information will come from state universities and extension services. Extension services can help with turf mix selection, as well as disease management, weed identification and control, maintenance calendars, and the latest research. Refer to the bottom of this page for a list of extension services by state.

Check out these videos for more information:

Which grass should I plant on my lawn? Part 1: [Introduction and Northern US and Canada.](#)

[Northern U.S., Transition Zone, Southern U.S./Mexico](#)

Employee Spotlight



Lee and the *General Sherman Giant Sequoia* tree at Sequoia National Park, by volume the largest known living singlestem tree on earth. (Lee Holt)

Name: Lee Holt

Position: Arborist

Park: Valley Forge N.H.P. and Hopewell Furnace N.H.S.

How long have you worked for the NPS? 11 years

What is your background?

My related background starts at around 16 years old logging with my dad, he taught me how to ID species, importance and significance of mature larger trees in the forest, using chainsaws and equipment used to fell trees and transport them from woods to log yard where we would ship overseas. Ironically, I then became more interested in the preservation and planting of trees so then naturally, landscaping was the next career path I found myself on. Landscaping soon became somewhat boring and unfulfilling due to the "quantity instead of quality" mentality. Thankfully,

I found the NPS, and I took a seasonal position focused on grounds and tree work. I instantly realized it was the perfect setting I needed and fit in to. Soon after, the arborist position was announced and luckily, I was qualified and appreciated enough to get the job! It was literally a dream come true to become a National Park Arborist to have the opportunity to focus on tree care for the NPS and achieve the perfect fit for my career mindset.

What is your favorite part of your job?

I really enjoy meeting and working with people with similar interests on tree projects at my park and other NPS units I have had the pleasure to contribute to.

What project are you working on?

As an instructor, I am currently serving on a pilot NPS climbing workshop to re-introduce training park employees how to climb and perform hazard tree work

What was your favorite experience in the park?

One of my most memorable experiences was getting to work at Sequoia N.P. for 2 weeks doing tree work and getting to eat lunch under the General Sherman.



Lee demonstrates a single rope climb to the Arborist Training Program cohort at the National Conservation Training Center. (NPS)

Tool of the Moment: Spraying Equipment



Backpack sprayers are often used to apply herbicide to control invasive vegetation. (NPS)

Reasons to Use a Sprayer

Spraying rigs accomplish many different goals for the landscape maintenance professional from vegetation management using herbicides to Integrated Pest Management (IPM), and spraying equipment ranges in size from quart-sized handheld pump sprayers to large volume vehicle-mounted tanks, and even aerial spray rigs applied from airplane or helicopter. The correct selection and proper use and care of spray rigs will assist park staff in effectively maintaining their landscapes and biotic resources. This article will focus on the spray setups most commonly used at National Park Service sites.

Parts of a Typical Spray Rig

Regardless of the type of spraying setup, spraying rigs have many of the same basic components. First is the tank itself, which is usually a clear or opaque plastic vessel, that should have marks in gallons, ounces, or quarts on the outside indicating approximate fluid volumes inside to help the applicator mix the right volume of water or solution with the right amount



Handheld sprayers are one type of spraying equipment, best for small, targeted applications. (NPS)

of product. The next critical component is the spray pump. These can be manually actuated levers on the outside of backpack or hand-held sprayers that in turn pressurize a smaller tank inside the spray tank. Larger spray rigs might have pressure gauges, but backpack-sized sprayers rarely do, instead relying on the applicator to gauge when to add pressure by actuating the lever. Larger, more professional spray rigs will often contain a device inside the spray tank that helps agitate the fluid to keep the product from settling out. Some higher-end backpack sprayers might have this, but agitators are more often seen on larger vehicle-mounted tanks.

Selecting the Right Sprayer

» Using Dedicated Sprayers for Specific Purposes:

Never use a tank that has contained herbicide to spray pesticide on plants that you intend to keep, as any herbicide residue may negatively affect the desired plant or even kill it. Best practice is to have dedicated sprayers for each task that are clearly labeled.



The spray nozzle regulates droplet size and distribution. (NPS)

» Handheld Sprayer (up to 1 gallon)

- Pros: very small and easy to use, good for singular application for one plant or spot treatment
- Cons: limited capacity, nozzle adjustment may be limited

» Backpack Sprayer (3-4 gallons)

- Pros: mobile, nimble (can access remote vegetation), self-contained (goes where worker goes)
- Cons: limited capacity, must be worn by a worker, contamination potential high if it leaks
- Tip: Mix/fill backpacks in a plastic tray or sled to prevent spillage on the ground if overfilled.

» Tank Sprayer/Rig (15 gallons or more)

- Pros: higher capacity, less direct contact with leakage, often have agitators
- Cons: must be vehicle mounted, vehicle must have access to veg, length of hose limits reach

Basics of Sprayer Use

- ALWAYS FOLLOW PRODUCT LABEL FOR MIXING, USE, AND DISPOSAL
- ALWAYS USE PROPER PPE
- Fill with water only, test tank for leaks, operate spray

wand to ensure no leaks or blocks

- Fill halfway with water, add product(s), top off tank
- Ensure good mixing with stick or agitator
- Do not spray if wind is above 5 mph at object to be treated, and monitor wind for drift throughout spray session
- Place No Entry signage if in public spaces with product being used, target species, and Re-entry interval (how long until safe to enter treated area)
- Calibrate spray nozzle for droplet size
- Cover plant thoroughly based on product label recommendations, usually just enough before dripping occurs
- Triple rinse tanks, run clean water through hose and wand

Spraying Tips and Tricks

While an in-depth discussion of chemical application is beyond the scope of this article, here are a few best practices to achieve the most effective spray treatment

» Mixing and Disposal

The most likely time to experience pesticide spills or accidents is during mixing. When possible, add water and product to the tank on a hard surface or large



Clearly labelling sprayers for distinct uses prevents cross-contamination. (NPS)

shallow tray to catch any spills. Always wear PPE when mixing and always dispose of empty pesticide containers correctly, according to local/state law.

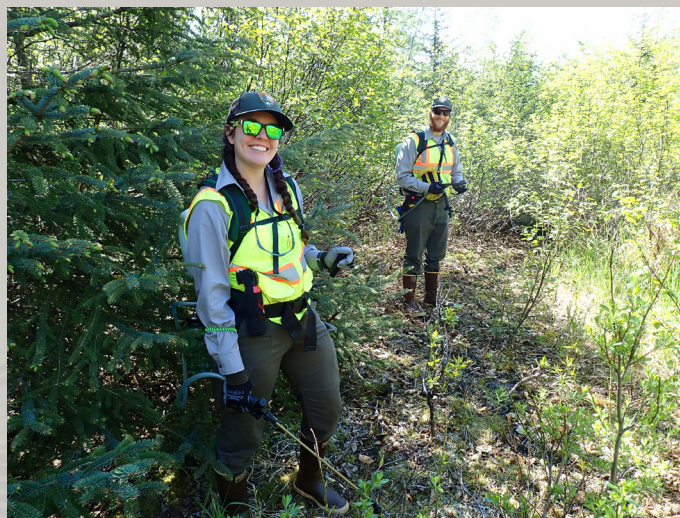
Before adding any product to the tank first fill the tank about half-way with water, pump to pressurize, and test the entire sprayer for leaks and proper function. Adding product to a tank already half full or more with water can prevent foaming or foam overflow out the fill opening. Add product and top off with water (or whatever solution is being used).

» Nozzle Selection

Spray wands can usually accommodate a range of spray nozzles depending on the application need. Nozzles come in fan or cone-shaped spray patterns and are usually adjustable from a fine mist to larger droplet sizes as needed. Many products suggest wetting the target plant just to the point of runoff, and adjusting nozzles to the best mist/droplet size can conserve product in the backpack and make each tank last longer. Droplet size should also be adjusted if wind is present as finer mists will drift away from the target plant easier than denser droplets. Adjustments may need to be made on the fly during a spraying session to achieve the ideal droplet density.

» Wind Speed

Pesticide applicators should be aware of wind speeds while spraying to minimize drift away from target plants. Do not spray in winds over 5 mph and use a wind meter (such as a Kestrel) to measure wind speed where the spray is intended to go: at ground level for grasses and weeds, and above that for most trees and shrubs. Wind speed can vary considerably even a few feet above grade!



Many jobs with the National Park Service require a pesticide applicator certification. (NPS)

» PPE (Personal Protective Equipment)

Every product label will describe the required PPE for that product. To avoid pesticide exposure always wear glasses or goggles, chemical-resistant gloves, and N95 masks at minimum. If cartridge respirators must be worn, a fit test is required in the NPS before using respirators (consult your park safety officer for fit test information). Consider wearing impermeable oversuits like Tyvek-brand if necessary, and footwear should be rubber chemical-resistant boots. Avoid leather boots or sneakers as both will absorb spray that contains pesticide chemicals.

» Pesticide Applicator Certification

Every state has its own process for educating and certifying pesticide applicators, and it is highly recommended that anyone who is responsible for applying pesticide in any capacity consider becoming certified. Certification is not necessarily required as regulations often require just one person to have the license, and others can work under that person's supervision. However, the knowledge gained from the certification process will make an applicator much safer for themselves, others, and the resources being treated. It is well worth the time to become a qualified/certified applicator.

- Link to NRSS Chemical Control sharepoint: [Chemical Control](#)
- Link to PWR IPM sharepoint info: [Training and Certification](#)
- State by state certifications: [Pesticide Safety Education Programs | US EPA](#)

Announcements & Publications



The Arborist Training Program cohort learning rigging skills from Lee Holt. (NPS)

Upcoming Training Opportunities

Enhancing Collaboration Amongst Urban Forest Stakeholders

New England ISA

May 6, 12pm CST, virtual

Urban Forestry Today: Invasive Insect and Disease Update

New England ISA

May 8, 12-2pm EST, virtual, \$25

Teaching Fundamentals of Plant Propagation

American Society for Horticultural Science

May 8, 2:30pm EST, virtual

Tree Planting and Care

Midwestern ISA

May 9, 12-1pm, virtual

The Tree Collectors: Tales of Arboreal Obsession

Southern California Horticultural Society

May 9, 7:30-9:00pm, in-person and virtual, \$15

Diversity of Canada's Street Tree Populations

PNW ISA

May 20, 12pm PST, virtual, \$15

Historic Landscapes Community Townhall

American Public Gardens Association

May 22, 3-4pm EST, virtual

History of Heritage Roses

Longwood Gardens

June 12, 12-1pm, virtual, \$12

Arbor Chat: Emerald Ash Borer

PNW ISA

June 17, 12pm PST, virtual

Tree Risk Assessment Renewal

Mid-Atlantic ISA

June 27, 8am-2:30pm EST, virtual