

CALIFORNIA FOREST STEWARDSHIP PROGRAM

Forestland Steward

WINTER 2017

Don't Give Up!

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Photo courtesy Stafford Lab



Forestland Steward

Forestland Steward is a joint project of the CA Dept of Forestry and Fire Protection (CAL FIRE), Placer County Resource Conservation District, UC Cooperative Extension, and USDA Forest Service to provide information on the stewardship of private forestlands in California.

CA Forest Stewardship Program

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The ideas contained in this newsletter are meant as general information and opinion, not management prescription.

Consult a Registered Professional Forester or a qualified technical advisor (see page 10) for management advice specific to your needs.



Reforestation: it's worth the effort

Disasters happen. Millions of trees in California have been killed by bark beetles, millions more by wildfire. If your forest is one of those, you know that planning for recovery can be overwhelming. What should you do and where do you start? And how can you afford the costs of restoring your forest? It's easy to throw up your hands and give up.

But don't despair, help is available. You not only don't have to do this alone, there may be cost-share assistance to help pay for your efforts (page 5).

In this issue

In this issue we make the case for regenerating your forest after a disaster. It's a good investment for your property, good for the ecosystem, good for the public that relies on ecosystem services, and there are experts to guide you through and cost-share funds to make it affordable.

Regenerating a forest takes a lot of work and thought. There are decisions to be made, starting with your vision for your forest, all the way through translating that vision into decisions that define the species, spacing, and other steps for a successful planting.

But the work doesn't end there. Your seedlings are vulnerable to a wide array of threats. You need to be vigilant to protect your growing seedlings.

You don't have to do this alone!

That's really really important because nobody expects you to be an expert. Regenerating a forest is a complex, technical, and long-term undertaking. Thankfully, there are many qualified forest specialists who are eager to help.

Registered Professional Foresters (RPFs) are jacks-of-all-trades, trained in many aspects of forest management. Your RPF knows a lot about the technical and practical aspects of regenerating a forest, including site prep, how to determine density, ordering, planting, and the like.

You're the boss

However, it's important to remember that you, the landowner, supply the vision and make the ultimate decisions (page 3). Your goals and objectives drive your regeneration project.

Therefore, the more you can identify what you want your forest to look like and your goals for the land, the better chance you have of getting the forest you desire. If you provide a clear realistic vision, your RPF can help you achieve it.

In addition, the more you understand how forests function, the better partner you will be with your RPF—asking the right questions, suggesting options, making informed decisions.

That's where *Forestland Steward* can come in. We have developed a huge library of information about forests, forest management, and other forest-related topics. Go to <http://calfire.ca.gov/foreststeward/newsletter> and look through our past articles. Yes, some are dated, but even those will provide you with a slice of history and knowledge of how things have changed in the last 20 years.

We aim to provoke new ideas

We also try to stimulate you with provocative new ideas, viewpoints, and questions to provide food for thought and help expand your understanding of topics related to forestry. In this issue, we include a discussion of assisted migration (page 9), a potential option for helping trees adapt to climate change.

Climate change is causing enormous new challenges to forest ecosystems and forest landowners. Not only does climate change exacerbate existing threats, such as drought, wildfire, and insect damage, but also results in a higher level of uncertainty about the future.

New information and new ideas will give you tools to make the best decisions possible. Adaptive management (page 9) provides a framework to fit this information into your forest management.



Considerations for a successful planting

Regenerating your forest takes a lot of work, it's expensive, and it requires a long-term commitment. Why bother?

Why should you reforest your land?

Forests regenerate naturally, so why should you put in the time, energy, and money to reforest?

First of all, although it's true that forests will usually regenerate eventually, they may not do so in the time frame you desire. Brush and grasses quickly establish when given the opportunity, and can outcompete trees for decades. You may find that what was once a forest remains a brush field for the rest of your life. In addition, natural regeneration may not result in the species or type of forest you were hoping for.

In the case of a large or intense fire, cones and seeds may have burned up over a large area leaving little potential for natural reseeding. Again, if your time scale is a human lifetime, you may want to speed things up.

Trees aren't the only concern. Forests provide a lot of ecosystem services, including healthy soil, air, water quality and quantity, wildlife habitat, and other ecological, social, and economic benefits. It's important to restore these forest functions as quickly as possible.

Finally, the longer you wait to regenerate your forest the more competing vegetation will establish, often increasing the fire hazard. It can also make future reforestation more expensive, require more intensive treatments, and decrease survival. Do it now.

Opportunities to create the forest you want

When you decide to reforest your land, you get to make decisions that will determine the future of your forest.

Your Forest Management Plan should define your vision for the forest and your goals. If you haven't created a management plan yet, it's the first step in the process of regeneration (*see page 7*).

Your management plan is the blueprint for your project. For example, if you want to create habitat for wildlife, you will need to plant the tree species that provide food, shelter, and other necessary features for the animal species you want to encourage. On the other hand, if your goal is resilience, you will want to focus on diversity of species and structure. Defining your goals and determining how to meet them will take some time and thought.



Photo courtesy Susie Kocher

Decisions, decisions

You will need to make lots of decisions before you have your seedlings in hand. Before you can even order seedlings you need to decide which species you want to plant, what type of planting stock to order, the spacing of your plantings, and where to get your seedlings.

If you have an RPF or a cost-share agreement with CFIP (in which case you will have an RPF), you won't have to make the decisions yourself. In fact, your RPF can do all the major work once you have provided the overall vision and goals in your Forest Management Plan.

But even if you have a RPF or other expert to work with, it behooves you to learn as much as you can about your forest and regeneration. That way you will be able to participate more fully in the

(continued next page)

**Forests
regenerate
naturally, so
why bother to
plant?**

Your job isn't over when the trees are in the ground. Regeneration is a long-term commitment that requires years of oversight.

choices that need to be made and will have a better chance of achieving a satisfactory result.

Wildfire vs. Beetle Kill

There are some basic differences between a forest devastated by wildfire and one devastated by beetles. An obvious difference is that the insect-killed trees are still standing intact, as is the duff and debris on the forest floor. In contrast, a large wildfire sweeps the forest floor, leaving bare mineral soil.

These differences can affect your replanting strategy. You'll need to decide whether to remove trees or plant around them. While trees are less flammable after they lose their needles, they will eventually come down and could feed a catastrophic fire under the right conditions. If you decide to remove trees during site preparation, be sure to leave the largest ones as snags for wildlife.

Site preparation

Site preparation is critical to seedling survival. Depending on the site, you may need to clear out weeds to reduce competition, rip the soil to alleviate compaction, remove trees, or otherwise create the best growing conditions for your seedlings. Be careful to minimize soil disturbance.

Diversification

Given the uncertainty of the effects of climate change, you may want to explore some innovative ideas for choosing the genetic makeup of your seedlings. One approach is to treat your forest as a mutual fund and diversify, with a combination of low, medium, and high risk decisions.

In practical terms that might mean planting mostly seedlings from your current seed zone, but also some percentage of the same native species using seed stock adapted to slightly warmer, drier conditions to support the shifts expected in physiologic growing conditions. Maybe even consider a few seedlings from other populations that have a climate similar to that predicted for your area in the future. When you have different

gene pools on the same site there is opportunity for them to mix, adding to the genetic diversity and potentially increasing the ability to survive in new conditions.

Consider that a seedling well-adapted to survive today might not be in good shape in 50 years as the climate changes. Conversely, a tree that is not well adapted today may thrive in that future climate. You may want to take some risks and experiment to see what happens.

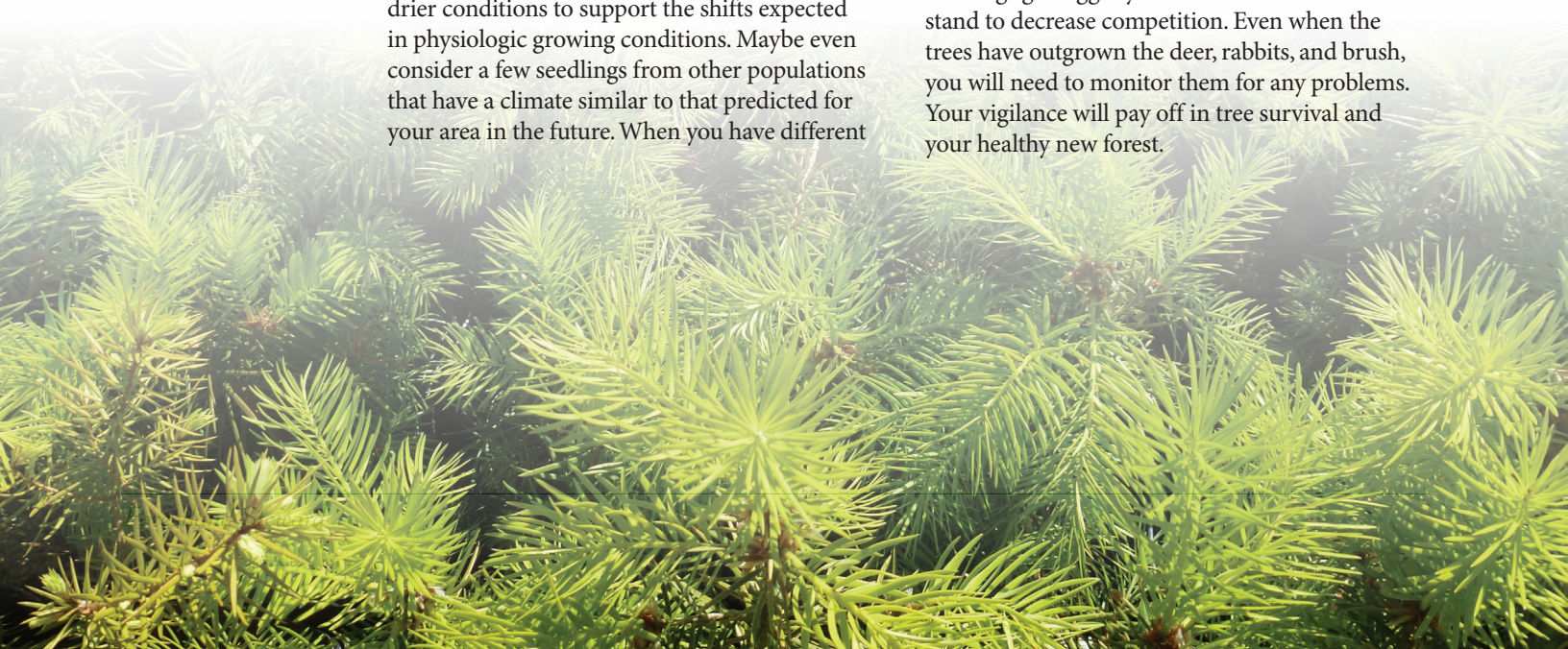
Resilience

One way to try to armor your forest against climate change is to focus on resilience. A resilient forest is one that can recover quickly from disturbance, whether it be wildfire, insect attack, drought, flood, etc. The most resilient forests have a diversity of species, are heterogeneous in structure, and are not overly dense. Since bark beetles are generally species specific, a diverse forest will be less likely to be wiped out in an epidemic. A low density forest is less likely to be destroyed in a catastrophic fire and may be less stressed by drought.

You will also want to consider planting species that regenerate by sprouting, such as oaks, aspen, and redwoods. These trees can start regenerating immediately after a disturbance, whereas conifers take many years before they can begin to reproduce.

Protect your investment

Your job isn't over when the trees are in the ground. Regeneration is a long-term commitment that will require years of oversight. The first few years are the most intense. You need to protect the seedlings from myriad threats: animal damage, competition for moisture and nutrients from brush and grasses, drought, disease. As the seedlings get bigger you will want to thin the stand to decrease competition. Even when the trees have outgrown the deer, rabbits, and brush, you will need to monitor them for any problems. Your vigilance will pay off in tree survival and your healthy new forest.



Have you heard?

Cost-share can make your regeneration project easier on the pocketbook

We're pleased to announce that cost-share assistance can help you reforest your property.

The two major cost-share programs that serve California forest landowners are CFIP (California Forest Improvement Program) and EQIP (Environmental Quality Improvement Program). Currently there is money available in both of these programs.

CFIP

CFIP exists to encourage investment in improving the forest, including fish and wildlife habitat, soil, and water. Funding up to 90% is available to landowners with a minimum of 20 acres and a maximum of 5,000 acres of forestland. Multiple landowners can join together to get CFIP funding.

One great benefit of CFIP is that it connects you with a Registered Professional Forester (RPF) if you don't already have one. Your RPF can help you create a Forest Management Plan to guide your forest management decisions, and help with all the technical aspects of regenerating your forest, including finding appropriate seeds, organizing planting, and much more.

Activities eligible for CFIP cost-share include management planning, RPF supervision, site preparation, planting, precommercial thinning, pruning, release, and other conservation practices such as forest road repair and upgrading if it protects, maintains, or enhances fish/wildlife habitat.

To apply for CFIP, contact your local CAL FIRE Forestry Assistance Specialist (FAS), Unit Forester, or your RPF. These specialists can help prepare your application package and get you started on the road to a restored forest. See http://calfire.ca.gov/resource_mgt/resource_mgt_forestryassistance_cfip for information and downloadable forms.

CFIP is administered by CAL FIRE (California Department of Forestry and Fire Protection). http://calfire.ca.gov/resource_mgt/resource_mgt_forestryassistance_cfip

EQIP

EQIP provides financial and technical assistance to address natural resource concerns and deliver environmental benefits, e.g., improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation, and improved wildlife habitat.

EQIP contracts provide 50–75% of the costs of approved activities and can extend for a maximum of 10 years. The landowner receives a standard rate based on regional estimates of expected costs.

An EQIP contract for reforestation is considered a long-term obligation that

includes maintenance to protect the seedlings in the ground. You must remove competing vegetation, protect against animal depredation, and thin when appropriate.

The best way to get started with EQIP is to call your local NRCS office (*see office locator at right*) and make an appointment with the conservationist for advice and possibly a site visit.

The NRCS Conservationist or Technical Service Provider, or your RPF, can assist with the EQIP application. After submission, your application is ranked and scored. The contracts are competitive and awarded four times a year based on local resource priorities. Due to current high demand, the process has been taking about 2 months to complete. More information can be found at <https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/newsroom/features/?cid=stelprdb1193811>.

If you receive a contract, you will have a specified amount of time to implement the practices. After the work is finished, inspected, and approved, you'll receive the rate of compensation.

EQIP is a federal program administered by the NRCS (Natural Resources Conservation Service). Learn more at <https://www.nrcs.usda.gov/wps/portal/nrcs/main/ca/programs/financial/eqip/>

Note: CFIP does not allow you to apply the cost share of both programs to the same practice on your property.

The two major cost-share programs that serve California forest landowners are **CFIP (California Forest Improvement Program) and EQIP (Environmental Quality Improvement Program)**

Resources and contacts

2017 CFIP User's Guide

http://calfire.ca.gov/resource_mgt/downloads/CFIP/CFIP%20User's%20Guide%202017.pdf

Contact a FAS

(Forestry Assistance Specialist)

http://calfire.ca.gov/resource_mgt/downloads/ForestAdvisorList.pdf

Contact your local NRCS office

<http://offices.sc.egov.usda.gov/locator/app?state=ca>

California Cooperative Forest Management Plan

(good for CFIP or EQIP) http://calfire.ca.gov/resource_mgt/downloads/CFIP/Rev_CaliforniaCooperativeForestManagement_070512_SGS.pdf

You may be able to receive assistance to work with neighbors or other landowners on larger-scale projects that benefit the watershed as a whole. Talk to your local RCD or NRCS representative to find out if there are local projects you can join.

Even more resources

Achieving Long-Term Forest Health and Resilience in California, from the Governor's Tree Mortality Task Force. <http://www.fire.ca.gov/treetaskforce/downloads/FHRWG%20White%20Paper.pdf>

Find a listing of all the Pacific Southwest Research Station publications and download those of interest at <http://www.fs.fed.us/psw/publications/gtrs.shtml>

More resources for planting planning

Forest management in mixed-conifer forests

The US Forest Service publication known as GTR-220, or *An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests*, was very well received when it came out in 2009. Written by Malcolm North, Peter Stine, Kevin O'Hara, William Zielinski, and Scott Stephens, this report presents ideas for managing Sierra Nevada forest resources using an ecosystems approach. The authors emphasize increasing heterogeneity, prescribed fire, reducing fragmentation, and focusing on resiliency. http://www.fs.fed.us/psw/publications/documents/psw_gtr220/

In 2012, GTR-220 was supplemented by GTR-237, *Managing Sierra Nevada Forests*, edited by Malcolm North. This collection of articles adds new information, tools, case studies, photos, and helps clarify the original publication's focus on resiliency and heterogeneity. http://www.fs.fed.us/psw/publications/documents/psw_gtr237/

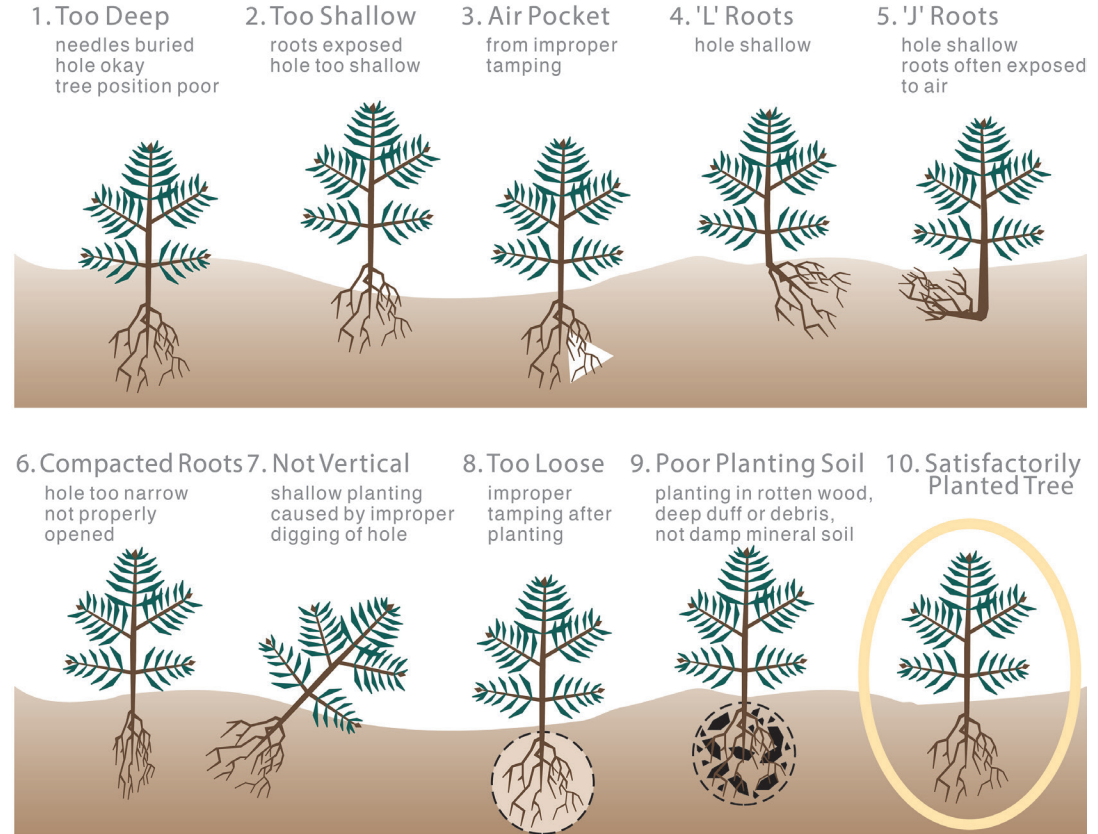
State-of-the-art regeneration manual coming later this year

We are excited to announce that a new comprehensive manual on reforestation in California is expected to be available later this year.

This manual has been a long time coming. The current resource, *Planting California Forest Lands* (http://calfire.ca.gov/resource_mgt/downloads/Planting_California_Forest_Land.pdf), was reprinted in 1978, almost 40 years ago. A contemporary publication, *Reforestation Practices for Conifers in California*, was reprinted in 1975.

A lot has changed in the art and science of reforestation since the 1970s. Our knowledge base has grown immensely. We have new tools, including the incredible power of the internet. We have more sophisticated equipment. The economics of forestry have changed, as have the threats. Finally, forest perspectives and values have changed. We eagerly await this new publication.

Common Planting Problems



From Rose and Haase, 2006. *Guide to Reforestation in Oregon*. FRL Research Contribution 31, OSU College of Forestry, Corvallis. <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/7854/RC31.pdf?sequence=1>

Options for ordering seedlings

Until recently, finding seedlings has been a challenge for small landowners. This is changing, as forest nurseries have become increasingly willing to work with small landowners to grow the seedlings they need, even small orders.

In addition, the El Dorado RCD entered into a partnership with the US Forest Service Placerville Nursery to sell seedlings to the public. The RCD acts as a broker to purchase seedlings from the Nursery and sell them directly to forest landowners.

CAL FIRE is also a partner in this effort to help landowners get the seedlings they need. CAL FIRE maintains the State Seedbank, a repository of seeds from forest species and seed zones throughout the state. The Seedbank will send appropriate seed to qualified nurseries to grow forest seedlings.

Acquiring seed can still be problematic. Cone crops are unpredictable, and finding seed from the required seed zones and elevations is an ongoing challenge. CAL FIRE is working collaboratively with the US Forest Service to collect and trade seed.

There is a lot involved in ordering seedlings (see page 8). You must decide which species to order, the type of planting stock, and how many of each. This is determined by your planting density and acreage, plus the quality of your site.

The good news is that your RPF can take care of everything from submitting your order to procuring seed.

Note that it will take 1–2 years before your seedlings are ready to plant. Be sure to get your order in before Dec. 1 (Oct. 1 for sugar pine) to get your seedlings in production the next year (page 8).

This year, CAL FIRE is trying something new. Responding to the need to help landowners get a jumpstart on this process, they have ordered approximately 130,000 seedlings for the main seed zones affected by beetle mortality. These seedlings will be available for landowners to purchase and plant out in the 2017/2018 fall and winter periods. For more information, contact *Stewart.McMorrow@fire.ca.gov*.

Forest Nurseries

El Dorado RCD

(530) 295-5633

Mark.Egbert@ca.usda.gov

<http://www.eldoradorcd.org/nodes/info/reforestation.htm>

CalForest Nurseries

P.O. Box 719, Etna, CA 96027

1838 Eastside Road, Etna, CA 96027

(530) 467-5211

contact@growpro-inc.com

Fowler Nurseries, Inc.

525 Fowler Road

Newcastle, California 95658

1-800-675-6075

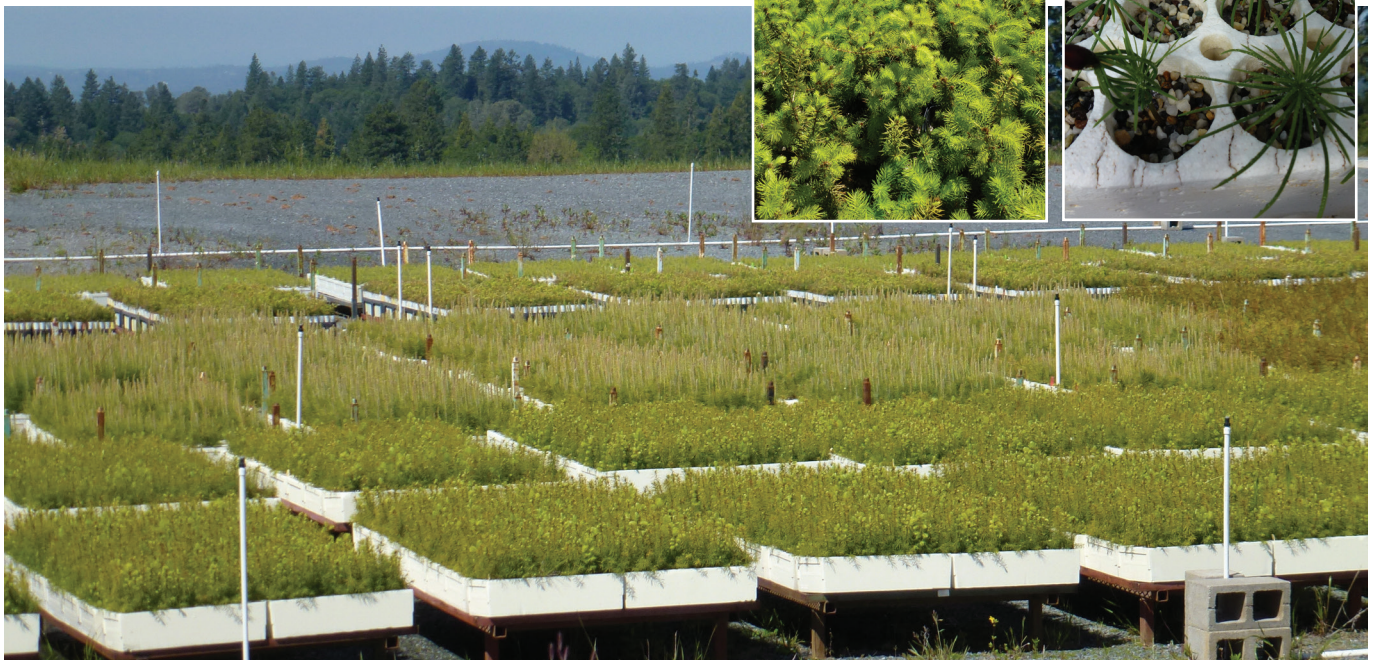
(916) 645-8191

Intermountain Nursery

30443 N. Auberry Rd.

Prather, CA 93651-9600

559-855-3113



El Dorado RCD Reforestation

Mark Egbert,
District Manager

(530) 295-5633

Mark.Egbert@
ca.usda.gov

<http://www.eldoradorcd.org/nodes/info/reforestation.htm>

Details:

- Orders accepted no later than October 1 of each year for sugar pine, and no later than December 1 for all other species.
- Order by mail using the Order Form or by phone at (530) 295-5630.
- Cancellations accepted up to January 1st of each year.
- 40% deposit required at time of order.
- Minimum order is 200 trees/ species.
- Seedlings are available for pick-up or delivery prior to May 15th depending on weather conditions.
- Pick-up is available at the USDA Nursery in Placerville free of charge.
- Shipping is \$50.00/box and \$100.00/bag.

Steps to ordering seed from El Dorado RCD (similar steps involved with any nursery)

#1. Contact El Dorado Resource

Conservation District (RCD). They can advise you on choice of species and planting stock, costs, and timing. If you are working with an RPF, they should make this contact for you.

#2. Identify the area to be planted. This may be an area that was formerly forested, an area occupied by brush, or a partially forested area where increased stocking is desirable. In selecting the area to plant there are important considerations and questions to ask:

- Is the site suitable for planting?
- Are there conditions on the site that will make planting difficult?
- Is there a need to clear existing vegetation?
- Is the site steep and/or rocky?
- What elevation and aspect is the site?
- Is the site easily accessible?

All of these conditions will affect the choice of species and planting stock. Any seedlings provided by the RCD will be specifically adapted to the seed zone in which your site is located.

It is helpful to provide a topographic map with the order form delineating the area to be planted. An RCD staffperson or RPF can help you prepare the map. If you plan on applying for cost-share funding a map will be required, as will the services of a professional forester.

#3. Quantify the number and types of seedlings needed. This will depend on seedling spacing and the number of acres to be planted. The State Forest Practice Rules stipulate 300 trees/acre after harvest on site classes I, II or III and 150 trees/acre on site classes IV and V. This equates to spacing of 12 feet by 12 feet for 300 trees/acre or 17 feet by 17 feet for 150 trees/acre. This is a good rule of thumb for desired survival but consult with the RCD or your RPF to determine the count for your specific site.

Stock type depends on planting site conditions to a great extent. Higher levels of survival will be achieved with plugs (container stock) than with bareroot stock. Two-year old bareroot stock tends to survive better than 1-year old bareroot stock. On particularly harsh sites, larger container stock may be warranted.

#4. Complete the order form and submit it to the District. Staff will review your order and contact you with any questions. Order forms that include sugar pine must be submitted by October 1 for spring planting. Orders for other species must be submitted by December 1.

#5. The RCD will check the availability of seed from suitable seed zone(s). Staff will contact the CAL FIRE seedbank and Placerville Nursery to determine if the quantity of seed required is currently in storage and available. If that is the case, then the process moves on. If not, the District may contact you to discuss potential options such as choosing a different species.

#6. The RCD will obtain seed and arrange for it to be delivered and sown at the Placerville Nursery.

#7. The RCD will contact you when your seedlings are available. If you plan on picking them up at the nursery, a mutually convenient time for the District and you will be arranged. If you want to have the seedlings delivered instead, the District will arrange delivery at additional cost.

#8. Plant your seedlings. Either arrange for the planting or do the planting yourself. There are numerous things that affect the success of a planting project. The District or a professional forester can advise you on the planting process. The most important thing is to ensure that seedlings are kept in the condition in which they departed the nursery. Allowing seedlings to sit too long, dry out, or be exposed to harsh conditions can jeopardize the success of your project.

#9. Stand back and assess your work. This includes monitoring your forest and taking actions to increase chances of survival as needed. Survival depends on post-planting environmental stresses such as drought, animal depredation, and competition from grasses or shrubs. With the best available planting stock and good planting practices you will maximize the chances for good survival.

Exploring the idea of assisted migration

There's a lot of talk about assisted migration these days. What is it, why is it a hot topic, and what are the pros and cons?

Known by a number of names, including assisted colonization, managed relocation, and translocation, assisted migration is simply the process of moving species to new locations outside their normal range. While both plant and animal species have long been carried around the globe by humans, assisted migration is a new concept focused specifically on protecting species from the expected effects of climate change.

At issue is the concern that in some places and for some species the rate of climate change is predicted to exceed their ability to adapt or migrate, which could lead to loss of populations. Forest tree species are particularly vulnerable.

Trees are long-lived organisms so they don't evolve quickly. They are rooted in the ground so they can't just pick up and move if conditions become unfavorable.

Trees migrate in a different way. Their seeds disperse to find suitable new sites on which to establish. As temperatures increase, a seed may find suitable growing conditions at higher elevations but no longer at lower ones, causing the species' range to move upwards in elevation or northward. Range expansion or contraction occurs naturally at a relatively slow rate but that might not be enough to save some species.

A species' range is limited by a number of factors: its tolerance to climatic and soil conditions, geographical or topographical constraints, competitive and/or symbiotic relationships with other species, pathogens, and other organisms.

Conventional wisdom states that trees are best adapted to the communities and conditions from which they originate. This is the basis of the seed zone map, which identifies areas in California where it is safe to move seeds in the belief seeds adapted to the current conditions will have the best survival. But this may no longer be the case. There is discussion about moving from a seed zone system to a climate-based system to ensure that seed sources are planted in the places best adapted to the climate of the site.

This is already happening on a small scale as some foresters are considering relaxing the rules for seed zones and even moving genetic material.

However, major concerns remain with assisted migration. Moving a species out of its coevolved

community into a new habitat may cause serious problems.

First of all, translocated trees may not do well in the new environment; there is a big risk that they will be maladapted to conditions there. Ecosystems are complex and highly interconnected. For example, some trees depend on symbiotic mycorrhizal fungi and may not do well if separated from their fungal community.

Secondly, when we move a species to a new ecosystem we risk disrupting that community, which is also highly interconnected.

Assisted migration is one strategy that might help species survive the changing climate, but it is imperative that it be used cautiously and thoughtfully to avoid unexpected consequences.

If you choose to hedge your bets by planting seedlings from outside the seed zone it's very important to monitor the seedlings closely. Look at survival and health, measure growth and compare it to local plants, and monitor impacts to the ecosystem.

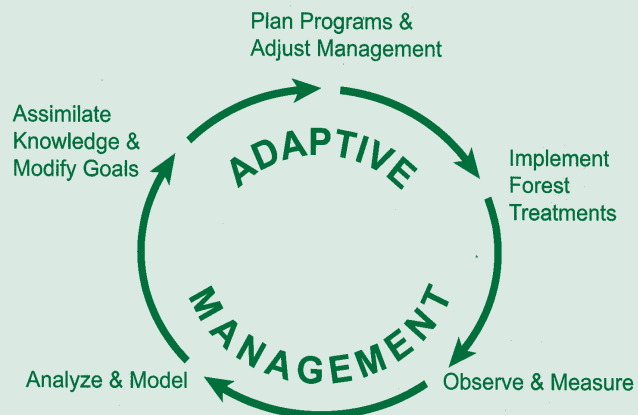
Scientific method and adaptive management will be key to any assisted migration strategy.

Assisted migration is an adaptive strategy to protect species from the expected effects of climate change.

Living with uncertainty

We live in uncertain times, but that doesn't mean you can't make management decisions. It does mean, however, that you should monitor the results of your decisions and be ready to make adjustments whenever necessary.

That's the idea behind adaptive management, an iterative process that allows decisionmaking, but uses those decisions to gain information, which then informs the next decision. Adaptive management requires close observation, the willingness to be flexible, and the ability to respond quickly with adjustments when warranted.



Resources Regeneration resources and more

Articles on Assisted Migration

Assisted Migration: Introduction to a Multi-faceted Concept.

<http://www.torreyguardians.org/assisted-migration-review-2011.pdf>

Preparing for Climate Change: Forestry and Assisted Migration
http://www.fs.fed.us/rm/pubs_other/rmrs_2013_williams_m002.pdf

Forestland Steward issues at <http://calfire.ca.gov/foreststeward/newsletter>

Over the years we have provided a number of excellent articles and issues that will help you plan your forest regeneration project.

Winter 2006–Winter 2007: Forest Management Series. This 4-part series is an excellent place to start to understand the issues and practices for sound forest management.

Fall 2006 (Part III of the Forest Management series above): Steps to growing a new forest.

Fall 2008: Recovery after fire

Summer 2009: Regenerating oaks

Summer 2010: Make your forest hospitable to wildlife

Summer 2011: The science and art of silviculture

Winter 2013: Forest Regeneration

Spring 2015: Restoration: A gift to the future

UC Cooperative Extension created a series of short publications that can help you with

many aspects of forest management. Download the entire series at <http://anrcatalog.ucanr.edu/Details.aspx?itemNo=8323>.

You will be especially interested in **#7 Forest Regeneration** (<http://anrcatalog.ucanr.edu/Details.aspx?itemNo=8237>), **#5 Tree Growth and Competition** (<http://anrcatalog.ucanr.edu/Details.aspx?itemNo=8235>), and **#18 Stewardship Objectives and Planning** (<http://anrcatalog.ucanr.edu/pdf/8248.pdf>).

Reforestation and Afforestation Practices for California

UC Cooperative Extension has created a series of webinar presentations that cover a wide range of topics about restoration and afforestation (planting in areas that were not previously forested). The entire 9-session series, complete with powerpoint presentations and YouTube videos, is available at <http://ucanr.edu/sites/forestry/Webinars/Reforestation/>.

Technical Assistance

Many agencies are available to provide technical assistance, referrals, information, education, land management plan assistance, and advice.

California Stewardship Helpline

1-800-738-TREE; ncsaf@mcn.org

California Dept of Forestry & Fire Protection

Stewardship Forester
Stewart McMorrow, Stewart.McMorrow@fire.ca.gov

CAL FIRE Forestry Assistance Specialists (FAS)

(find the FAS for your county at calfire.ca.gov/resource_mgt/downloads/ForestAdvisorList.pdf)

Guy Anderson/Topher Henderson (Fresno, Imperial, Inyo, Kern, Kings, Los Angeles, Madera, Mariposa, Merced, Mono, Monterey, Orange, Riverside, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Tulare, Tuolumne, Ventura) 559-243-4109

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Calendar

March 7-8

Northern California Prescribed Fire Council Annual Meeting

Location: Lucchesi Park Community Center, Petaluma, CA

Information: <http://www.norcalrxfirecouncil.org/events.html>

Notes: On March 8, there will be a field tour of prescribed fire projects in Point Reyes.

March 7-8

Board of Forestry Meeting

Location: Resources Building, Sacramento, CA

Information: bofdata.fire.ca.gov/

March 10-11

Annual CLFA Workshop, Conference & Meeting: Challenges for the RPF in 2017 (California's tree mortality crisis, exemptions, marijuana and vineyard conversions, and biomass facilities/options update)

Location: Lion's Gate Hotel, McClellan, CA

Brochure & Registration: <http://www.clfa.org/workshops-continuing-education>

March 22

Mariposa County Reforestation Workshop

Location: Mariposa County Supervisors office, 5100 Bullion St.

Contact: Guy Anderson, guy.anderson@fire.ca.gov

April 7

Tuolumne County Reforestation Workshop

Location: 18440 Striker Ct, Tuolumne Rd, Sonora

Contact: Stewart McMorrow, stewart.mcmorrow@fire.ca.gov

April 11-12

Board of Forestry Meeting

Location: Resources Building, Sacramento, CA

Information: bofdata.fire.ca.gov/

April 28-29

Forest Landowners of California Annual Meeting/General Membership Meeting: The Impact of Fire and Climate Change on Water Quality and Availability

Location: Hotel at Black Oak Casino Resort, 19400 Tuolumne Rd N, Tuolumne, CA

Website: <http://www.forestlandowners.org/calendar/calendar-events/flc-annual-meeting-and-general-membership-meeting/?eID=88>

Coming soon!

Reforestation workshops are being planned for bark beetle mortality areas. Contact Stewart McMorrow for details: stewart.mcmorrow@fire.ca.gov.

Board of Forestry and Fire Protection 2017 Schedule

The California Board of Forestry and Fire Protection's mission is "to lead California in developing policies and programs that serve the public interest in environmental, economically, and socially sustainable management of forest and rangelands, and a fire protection system that protects and serves the people of the state." The Board meets almost every month to discuss forestry issues and make decisions. The public can attend the meetings. Lots of information at <http://bofdata.fire.ca.gov>.

March 7-8	Resources Building, Sacramento
April 11-12	Resources Building, Sacramento
May 9-11	TBA
June 13-14	Resources Building, Sacramento
July 18-20	TBA
August 22-23	Resources Building, Sacramento
September 26-28	TBA
October	No Meeting
November 7-8	Resources Building, Sacramento
December 5-6	Resources Building, Sacramento

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Forest management in uncertain times

Remember the definition of silviculture: “The *art and science* of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis”?

At a time when *science* has not yet caught up to a full understanding of what climate change means to California forests, the *art* of silviculture becomes even more important. Forest managers may want to focus on their art and take some risks—based on experience, observation, and sound intuition, of course—to try new approaches.

These could include simple management steps such as increasing the spacing in stands where water availability is expected to be limited, which could help decrease competition and increase survival. Or adding new species to the mix when planting.

Seed zones are another concept that could be revisited. Until recently, conventional wisdom mandated planting stock only from the same seed zone. This made sense because seeds adapted to the site probably had the best chance of survival.

But what if the future is not like the present? In that case, stock from the immediate area might not be the best fit for future climate conditions. The problem is, we don’t know what those future conditions will be.

Some land managers are now hedging their bets by planting a mix of genetic types. While the majority of planting material may continue to be from the traditional seed zone, a percentage is taken from adjacent seed zones, or areas with conditions that are more like those anticipated.

Note: any experimentation should be done cautiously. The *art* of growing a forest requires knowledge and wisdom.

Some forest management ideas for an uncertain century

- Increase landscape diversity—consider large-scale resilience, size of management units, and connectivity.
- Maintain biological diversity—experiment with species and genotype mixes. Identify species, populations, and communities that are sensitive to increased fire and develop conservation plans for them.
- Plan for post-disturbance management—treat fire and other disturbances as normal processes. Incorporate fire management into planning.
- Maintain and improve the resilience of watersheds and aquatic ecosystems by implementing practices that protect, maintain, and restore watershed processes and services.
- Implement early detection and rapid response post-fire—monitor conditions; eliminate/control exotic species.
- Manage for realistic outcomes—identify key thresholds and prioritize projects with a high probability of success; abandon hopeless causes; consider alternatives that might be undesirable in an unchanging climate.
- Incorporate climate change into restoration—avoid trying to replicate historical conditions, but continue to learn lessons from historical variation.
- Anticipate big surprises—there may be megadroughts, larger fires, species extirpations, loss of resilience, and system collapses.

—reprinted from *Forestland Steward*, Summer 2012