

# DEVELOPMENT SERVICES DEPARTMENT

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EL DORADO

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## MEMORANDUM

**TO:** County Planning Commission

**FROM:** Larry Appel, Deputy Director  
Planning Services

**DATE:** August 9, 2007

**SUBJECT:** Additional information for SPR07-0019 (Lungren)

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Staff has worked with the Lungren's consulting botanist to improve the portion of the report that discussed the process by which the oaks would be regenerated onsite. The addendum to the report, dated July 27, 2007 (attached) provides the detail requested by staff. With incorporation of this revised report, staff recommends that your Commission find the oak tree replanting and maintenance plan consistent with General Plan Policy 7.4.2.9.

Attachment: Addendum to Lungren Biological Study, July 27, 2007

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Attachment 2

**ADDENDUM**  
**to**  
**LUNDGREN**  
**BIOLOGICAL RESOURCE STUDY**

July 27, 2007

APN 102-060-35

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**Addendum to: Lundgren Biological Resource Report  
Recommendations for establishing new oaks.**

**July 26, 2007**

This addendum is to clarify the method and plan for the establishment of replacement blue oaks on the Lundgren property at 1100 Old Neuman Road in Rescue, CA.

**Natural blue oak regeneration**

Blue oak is one of the slowest growing oak trees. In many parts of its arid range, mature blue oak trees are less than 9 meters tall, and may require 50 to 100 years to attain a DBH (diameter at breast height) of 10 cm. <sup>1</sup>

Mature *Quercus* (oak) species produce seed crops that vary widely in quantity from year to year. Most acorns land under or near the canopy of the parent tree, although some are planted beyond the canopy by seed-eating animals. No long-term seed banks exist for oaks because acorns do not survive from year to year. Most acorns which escape the squirrels and fall to the ground are soon eaten by deer and 'wild' turkey, common in our area. In nature, blue oak acorns germinate earlier than those of other oak species; and all available energy is initially channeled toward root production, resulting in 73% of the tree's weight existing underground after the first growing season.<sup>2</sup> These seedlings under the parent oak are known as 'advance regeneration'.

The seedlings which constitute this advance regeneration are suppressed by competition from the overstory (parent tree). These little understory seedlings may survive for years, producing a strong root system but little shoot growth. Sometimes the shoots of persistent seedlings may die back to the ground, but new shoots later resprout from the root collar.

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<sup>1</sup> Swiecki, Tedmund J. and Elizabeth Bernhardt. Understanding Blue Oak Regeneration.  
<http://www.phytosphere.com/publications/blueoakf.htm>.

<sup>2</sup> El Dorado County Master Gardeners. No Summer Water for Blue Oak.

Death or removal of overstory canopy (the parent oak) releases these seedlings, which respond with relatively rapid shoot growth, and a pulse of regeneration results.

As is typical of advance regeneration, almost all small blue oak seedlings are beneath or near the edge of blue oak canopy. Besides being the landing zone for most of the acorn crop, conditions under the canopy are favorable for seedling establishment. Oak litter protects acorns from desiccation and provides a favorable seedbed for germination. The moderate shade and elevated soil and nutrient levels beneath the parent tree are of great benefit to the seedlings.

#### **Starting oaks from seedlings.**

Oak trees are started by either directly planting acorns or transplanting small seedlings. The Lundgrens have elected to plant seedlings/saplings, which can be acquired from a variety of nurseries in northern California. In a best case scenario, the Lundgrens would collect acorns from their own property in the fall of this year, and have them grown out by a local nursery. This would provide the ideal genotype for the new oak seedlings. If this is not desirable then they must resort to those that are produced commercially which are generally grown in containers ranging in size from a few cubic inches to 15 gallon pots. If selecting those grown in smaller containers they should be no more than a year old when transplanting, since they can quickly outgrow pots.<sup>3</sup>

There are a number of nurseries to choose from and a list of nurseries producing native California oaks has been provided in the biological resource report. The saplings should be blue oak (*Quercus douglasii*) and native to the west slope of the Sierra foothills, and most ideally to El Dorado County.

#### **Choice of site.**

Artificial methods for establishing blue oak from seed are essentially based on producing such favorable microsites through weed control and protective enclosures. To establish new oaks, saplings or acorns need to be planted into a favorable seed bed. Seedlings, acorns or saplings must have the proper environmental conditions needed for early

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<sup>3</sup> McCreary, Douglas D., How to Grow California Oaks.

growth and survival, including adequate moisture and in some cases shading to prevent their roots drying out during the summer. First, avoid areas with gopher mounds or ground squirrel holes/chambers. Choose a spot that is partially shaded through a part of the day, and that has loose, well-drained soil, and fairly free of weeds. Choose a site where some minimal irrigation is possible. In this particular instance, the site chosen has an overgrowth of an exotic annual grass, poverty brome, and other exotic species, but that issue can be resolved by the pre-planting treatments listed below.

### **Timing.**

Plant seedlings between December and February. The soil should be saturated by winter rains at that time. Do not plant seedlings if the soil is frozen, though that is an unlikely prospect at the proposed site in Rescue. Planting in the fall lets the little oaks take advantage of the wet season and the cooler temperatures, and no irrigation will be required. Though a window of three months is given here, remember that the earlier they are placed in the ground, the earlier they start to grow.

### **Methods.**

Make sure the hole is prepared deep enough so that the roots don't bend up but are allowed to reach straight down. To promote deep root development, auguring the soil about 2 feet down prior to planting is advised. This is doubly necessary if you are planting in hard compacted ground. Filling the hole with water overnight prior to planting will be a great advantage to the seedling. Make the hole twice as deep as needed, and twice the diameter of the pot in which the seedling is. After the hole is ready, put back in some of the soil mixed with compost or potting soil. Prior to placing the seedling, you can place a fertilizer tablet a few inches below and to the side of the bottom of the root to provide early nutrients to the developing plant. No further fertilizing is needed. When planting seedlings, there is a risk of transplant shock and root injury. Care must be taken when moving seedlings from pots, to keep the soil from falling off the roots. If they are slightly moist at the time, the potting soil will adhere to the roots. Place the seedling down so it is the same depth that was in the pot, and fill in around the root ball with the remaining mix of soil and potting soil. Tamp the soil down

slightly to remove air pockets. Water to settle the soil, and to eliminate any remaining air pockets. If the soil is wet from winter rains, you should not need to water more unless it is unusually warm and dry in December through February, then water your oak seedlings. Have the protection cage ready to install as soon as the seedling is into the ground, fasten the prepared cage around it. Waiting until the next day invites deer predation. (see Prevention of Herbivory, below).

### **Seedling Maintenance and Protection.**

Seedlings, saplings or acorns should be protected from herbivores (plant eaters) and other damaging agents (including fire, mowers and herbicides).<sup>4</sup> Another critical factor affecting young oak seedlings is competing vegetation. Adjacent plants, especially grasses, can use up so much of the available soil moisture that little is left for the seedlings. Annual grasses on site have fine and abundant roots which rapidly remove the soil water from the top few inches of soil where the tiny oak seedlings are starting. High densities of these exotic annual grasses can cause blue oaks to fail to grow, and wither and die by the second year. I recommend that a 2-3 feet radius circle around the planting spots be kept free of other vegetation. This can be done by mulching, hand weeding, hoeing, scalping, or by spraying a contact herbicide, well prior (six months) to planting. This area can be kept free of weeds by the use of plastic (see below). Otherwise, hand weeding around your oaks for several years is necessary.

### **Mulching.**

Mulching around seedlings is the best way to conserve moisture and keep down weeds. The very best mulch is free and on site. Simply move some of the rotted leaves found under the large oaks nearby and place it around the seedlings. Water that well. There are many commercial mulches on the market. But there are also many everyday items that work as mulch. Lawn clippings, shredded office paper, straw, hay, arborist's chippings, pine, fir or redwood bark, and even plastic. Plastic tarps cut from 10 mil. weight black plastic can be used for mulching, and these will prevent sprouting of almost all weeds.

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<sup>4</sup> A Guide to Growing California Oaks.

They also will hold in the moisture to keep irrigation at a minimum. Such plastic is simply cut into squares approximately six feet on a side (36 square feet) and a hole is cut in the middle for the tree/sapling/seedling. Plastic used in this manner should be staked down at the corners. The use of plastic may dramatically increase your interval between watering. A caution about the use of plastic, the hole should be big enough (8-10) inches in diameter, to avoid retaining moisture at the seedling root collar. Moisture and high humidity around the root collar may create an opportunity for an infestation of powdery mildew, or attack by a variety of soil fungi. Powdery mildew is a group of fungi that causes a white, flour-like growth on the surface of the leaves, and is also common on roses, and many other ornamental plants.<sup>5</sup> It is favored by warm, high humidity (damp) conditions. However, this mildew rarely kills healthy trees. Even small seedlings that have all of their leaves severely infected usually survive and recover. Powdery mildew makes it more difficult for the affected leaves to photosynthesize and produce food, and if severe enough, it can also result in the leaves distorting, curling, dying and falling to the ground. But most affected trees will simply grow a new crop of leaves later in the summer or the following spring.

### **Prevention of herbivory.**

Animal damage can severely limit the growth and survival of oak seedlings and saplings. Livestock, deer, and rodents all have the potential to limit or eliminate oak reproduction, but the relative importance of each herbivore varies by location. I saw no livestock on the Lundgren property, however, deer are present. Deer browse almost any native plant that is watered, whether palatable or not, especially during the summer when fawns are present and are sampling everything that may be edible. Deer browsing will substantially reduce your success with planted oak trees. Cages to prevent deer browsing can be constructed of lightweight, inexpensive materials, one inch diameter wire mesh poultry netting (chicken wire) is ideal. These cages can be supported by a length of metal or wood stake on one side. Cages should be at least 18 inches in diameter and at least 4 feet tall.

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<sup>5</sup> McCreary, Douglas. Integrated hardwood Range Management Program at UC Berkeley.

### **Protection from rodents.**

Gophers, ground squirrels, and voles can kill juvenile oaks by chewing roots and girdling stems. Rodent populations vary across the landscape and can fluctuate from year to year due to habitat conditions, predators, and pathogens. In some situations, acceptable levels of protection from rodents can be achieved simply by avoiding sites with high rodent activity (visible gopher mounds or ground squirrel holes). There are numerous traps or poison remedies on the market for the control of gophers, ground squirrels and voles, if the homeowner deems it necessary.<sup>6</sup> If gophers seem to be in evidence in the planting area, the use of underground fencing is advisable. It is more labor intensive, as a wire cage has to be placed below the surface of the earth down to a depth of about two feet. Such a barrier should be of the same diameter as the upper protective cage. For ground squirrels, the simple expedient of covering the deer cage with the same type of wire (poultry netting) can keep ground squirrels from accessing your sapling trees.

### **Irrigation.**

Under favorable conditions, no grazing, weed control and limited water, blue oak seedlings and saplings can grow rapidly. However, under the moisture-limited conditions found over most of the blue oak range, saplings are tenacious rather than fast-growing. In xeric (dry) sites receiving full sun, blue oak seedlings typically succumb to drought within the first year or two. Several studies have shown that it has historically taken at least 10 to 30 years for blue oak stems to grow from ground level to a height of about 140 cm, an average of only 5 to 14 cm of height growth per year. The rate of sapling height growth is strongly affected by soil moisture. For seedlings or sapling oaks, summer and fall in the foothills can be very hot, dry and detrimental to the survival of seedling oaks. I recommend the setup of a drip watering system, which is fairly dependable and inexpensive. There are many different timers available, which allow multiple watering times. A timer can be used and set for alternate day watering for the first two summers. The third summer twice a week should be ample. It is possible also to water when one

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<sup>6</sup> McCreary, Douglas. A Guide to Growing California Oaks.

simply observes that the ground seems too dry. The length of time for watering should allow for deep irrigating, down to the depth of the roots. Oak trees have a long reaching taproot, which will rapidly go deep into the earth as much as one foot for just one acorn. By the time that acorn is one year old the root may go as deep as 2-3 feet. Irrigate long enough to allow the moisture to reach the tree roots. Irrigation should be tapered off gradually for the next 4 years, and no watering is required after oaks reach 5 years, as they should not require any additional water than that which nature provides.

The Lundgrens have some beautiful and majestic blue oaks near the area selected for seedling oaks. Care should be taken not to interfere or influence these large oaks during the irrigation of the seedlings. Excess irrigation is the leading killer of established blue oak in the landscape. This species is well adapted to receive only 15-30" of rain per year with little of it coming during the summer. The root system of a mature blue oak is extensive, growing through fractured rock to a depth of 80 feet or more to locate groundwater reserves. When irrigation is provided in the summer it activates a large array of soil borne fungi which attacks the roots and root collar of the tree. Place the little trees in such a manner that irrigation does not reach the trunks of the larger trees.

#### **Monitoring of Seedlings.**

Early after planting the seedlings should be monitored at least one day a week to ascertain that all is well with them. If there is mortality because of transplant shock it will show up soon, and small trees can be replaced right away. In the spring when the watering begins, monitoring to check on the system is necessary. Often drip system emitters will plug up, or blow out. These kinds of little problems can be easily adjusted. After the owner is satisfied that the system is dependable, then monitoring can be spaced out over a longer period of time.

#### **Master Gardeners**

El Dorado County is lucky to have such a good organization as the Master Gardeners. They are expert advisors in all matters pertaining to horticulture and cultivation of native and ornamental plants. Their service is free. They can be reached at 530-621-5512, or through the El Dorado County Department of Agriculture, 530-621-5520.