

## Appendix 1: Planting Trees for Forest Restoration

by Nancy Stein, Landscape Designer & Phoenix Project Coordinator

GIVEN TIME AND PATIENCE ON THE PART OF PEOPLE, the bishop pine and most other native plants will regenerate. There are situations, however, where property owners may chose to plant trees. Some areas of the fire burned so hot that seed was consumed. Construction damage to the post-burn soils will mean the destruction of more seed and root, and there will be privacy issues that cannot wait 10 to 30 years for the forest to recover. This essay is intended to give some guidelines for choosing the right tree and planting it in the right place. Considerations will include eventual height, distance from structures, fire safety, and drought tolerance. Trees are listed here in order of choice.

### NATIVES

**LIVE OAK:** Probably the best choice is the coast live oak tree (*Quercus agrifolia*). Its name is derived from the Celtic and means "fine tree," and one can hardly find a more beautiful native tree. It grew abundantly in the pre-fire forest and is fairly fast growing if plan red as a 15-gallon size young tree. It will tolerate wind and is very adaptable to either streamside water or drought. Perhaps most importantly, it is very fire resistant. It can be "windowed" to create views and to allow light to pass through the foliage. Live oaks hybridize easily; whenever possible, therefore, it is best to use trees that have come from seed grown close to where they are being planted.

**REDWOOD:** (*Sequoia sempervirens*) Although not native to the Point Reyes peninsula, redwoods are native to Marin - and fast-growing but less pyrophytic than other conifers. Native to slopes and canyons near the sea, they are fog lovers and will adapt well to growing on Inverness Ridge, as long as they are not exposed to direct sea blasts. Plant them on hillsides where springs have surfaced after the fire. They will also be valuable for stabilizing drainages and, in the long term, reducing the likelihood of landsliding. Redwoods' thick bark and non-resinous wood make them quite fire-resistant. Three months after the fire, many trees that were severely burned are resprouting along the entire trunk.

**DOUGLAS FIR:** A native tree, the Douglas fir does not burn as easily as pines because it holds more moisture in its leaves. The structure of the fir also collect more moisture, and this fact makes it very competitive over pines and oaks. At the southern end of Inverness Ridge, firs have crowded out most other trees. Douglas firs are also shallow-rooted, so they are not the best choice for stabilizing landslide-prone areas.

**BUCKEYE** (*Aesculus*): Buckeyes are deciduous and are renowned for their beautiful flowers and twisted gray bark. They are native to streamsides and may require some water on Inverness Ridge. They do reach considerable size. Although there were probably few on the ridge before the fire, they are native to Point Reyes and would probably adapt to growing on the ridge. Since the buckeye is a deciduous tree, it is not the best choice for visual screening.

**BIG LEAF MAPLE** (*Acer macrophyllum*): This deciduous tree, native to stream banks, turns yellow in fall.

### PYROPHYTES

**CONIFERS** (spruce, pine): All conifers ignite easily and burn very hot. Old specimens create many embers and flying brands, which makes them a very poor choice for growing near a structure. The Marin County Fire Department recommends that they be planted outside the defensible space zone. It's very important that you consider your neighbors' defensible space zone as well, even if it encroaches on your land. Choose an evergreen tree from the list above if you are planting within the defensible space zone. All conifers should be planted away from structures and roads. In cases where they must be planted or maintained (for example, where a bishop pine survived the fire), keep them trimmed of all dead wood, and eliminate all ladder fuels.

**BISHOP PINE** (*Pinus muricata*): It is expected that there will be many small sprouts of bishop pine in the Vision burn zone within a few years. If you are encouraging an area to return to bishop pine forest, select out the best specimens as they grow up. Each tree should have space around it so it does not have to compete for light and nutrients. Firs grow faster and are able to absorb more water than pines, so if a pine forest is your aim, be sure to keep the firs somewhat in check. Bishop pines have two leaves in their needle cluster. Since there were Monterey pine on the pre-fire ridge, an effort should be made to distinguish the bishop from the Monterey, and the Monteys removed.

**MONTEREY PINE** (*Pinus radiata*): Not recommended. These pines are much faster growing than the native bishop and are very poorly suited to growing in our area. They do not handle wind well. This translates into an expensive yearly maintenance effort to keep these trees from becoming a hazard. They do, unfortunately, very much resemble bishop pines, and since there were some growing before the fire, there will be seedlings. Monteys have three leaves in their needle clusters. We recommend that they be removed from all areas as soon as they can be identified.

**SPRUCE** (*Picea*): Although spruces are not native to this area, there were some fully mature specimens at the top of Drakes View Drive. They adapt well to soil and drought conditions. They are pyrophytic and should be treated in the same way as the bishop pine.

**ACACIA: Not recommended.** Very pyrophytic as well as invasive.

**ABIES: Not recommended.** The deer eat this variety of fir.

**TAN OAK** (*Lithocarpus densiflora*): Tan oaks were also in abundance in the pre-fire ecology of the ridge.

The species produces a tannin in its leaves that makes it difficult for other plants to grow underneath it. Tan oaks are more pyrophytic than live oaks.

## OTHER TREES

Chinquapin and madrone are valuable natives but hard to find as nursery stock.

**GIANT CHINQUAPIN** (*Castanopsis chrysophylla*): Identified by its "chestnut" covered with sharp quills.

Grows well with coast redwood.

**IRONWOOD** (*Lyonothamnus*): Has peeling red bark and bright green, fernlike foliage. Native to Catalina Islands, well adapted to growing on the ridge.

**MADRONE** (*Arbutus*): Grows well in dry areas with oaks and firs. Twisted red wood, with peeling bark, white flowers, and crimson berries.

**BAY**: Bay trees for the most part seem to be recovering well from the fire. They are available in nurseries.

## LARGE NATIVE SHRUBS

**MYRICA** (*Myrica californica*): This large native shrub is often confused with bay since its leaf structure is so similar. It can be obtained in shrub shape only and is of slow to moderate growth. Good screening at hedge plant, usually deer tolerant.

**CEONOTHUS** (*Ceanothus thyrsiflorus*): A native-growing wild lilac. Since its life span is about 20 years, it is a good choice for growing between trees that will take many years to reach widths that are adequate for screening. As large trees grow to maturity, Ceonothus naturally goes into decline and dies out.

**SILK TASSEL** (*Garrya elliptica*): A native shrub with an interesting flower that reaches about 15 feet. Rather slow growing; may need deer protection

**RED ELDERBERRY** (*Sambucus callicarpa*): A deciduous shrub, common before the fire, whose red berries appear in May and June. Shallow rooted; easily transplanted.

## CONCLUSION

FIRES OF THE MAGNITUDE OF THE 1995 VISION FIRE have a powerful effect on the direction of the forest's character. Seed and cone are destroyed, and the sudden change of forest cover creates severe loss of habitat and soil. Placing our homes in the forest ecosystem increases both the likelihood of fire and its intensity. Besides bettering our own chance of survival, there is the opportunity of lessening the impact we have on the land and its creatures by choosing plants for the area immediately around the house that are not flammable and maintaining them in a way that does not transmit fire rapidly.

Where possible, native plants and trees are the best choice for preserving the forest.

However, in a situation where land has been developed, there can be no question that the planting of a "non-native" plant will have much less impact on the forest than many other aspects of humans' presence, particularly with our present lifestyle. Roads create serious and long-lasting effects on all flora and fauna, our cars create pollution, our septic systems deposit unknown pathogens and fertilizers that have long-lasting and far-reaching effects - all of which far outweighs the choice of a few trees on private property. Land where humans live, especially in numbers, is by its definition, disturbed.

Situations where humans and forest interact call for individual solutions based on a careful and considered view of all that exists there, including the human beings. Many of the native plants that are better fire-resistant choices do not exist as nursery stock, particularly in large sizes that will provide screening. Native environments will not suffer from the introduction of a few exotics if they do not have requirements for water that are extremely different than natives. Plants should not be used that are invasive and not native to the ridge. At the same time, it should be said that natural succession in forests does include some plants, such as the Douglas fir, that do invade and crowd out other trees.

One hundred years ago, the Inverness mesa was a grassland. Since being developed by humans, it has been converted into a healthy and beautiful forest of coast live oak, bay, and redwood along with an occasional specimen exotic. No effort was made to control or discourage what was planted there, and the outcome seems to be mostly native and quite pleasing. Inverness provides US with an example of succession from grassland to forest in which humans have created a diverse forest that both preserves natural processes and protects structures from fire.

## Appendix 2: Fire Resistant Plants for Inverness Park Area

CODE: **boldface** = native species; DR = deer resistant; DT = drought tolerant

*Acer maaopbyllum, palmatum, or circinatum*, - deciduous trees; shade *Achilka*- perennial; DT

*Aesculus californica* - Buckeye; deciduous flowering tree

*Alnus rhombifolia* or *cordata* - Alder, deciduous tree

*Ajuga*- groundcover, shade; DR

*Anemone*- Japanese; shade

***Arbutus menzesii***, *A. unedo*, - evergreen tree; DT

*Armeria* - groundcover, DR DT

*Azalea* - shade

*Bougainvilla*-vine; DR

*Brugmansia* - scented shrub; shade; DR

Callalily-DRDT

*Carpenteria* - shade.

*Cerastium* - groundcover, DR

***Ceanothus gloriosus*** and Julia Phelps or Dark Star varieties - shrubs; DR

***Cercis occidentalis***- deciduous trees; DR DT

***Cercocarpus***- shrub; DR

*Choysia ternata*-some shade; DR DT

***Cistus*** - perennial; DR DT

*Clematis armandii* - vine; some shade; DR

*Convolvulus* - groundcover

*Erica* (heather) -light shade; DR

*Erigeron karvinskianis*- shrub (may be invasive); DR DT

***Erysimum*** - shrub; DR DT

***Fragaria*** - groundcover DR DT

***Fremontedendron*** -large shrub; DR DT

*Feijoa*-shrub; DRDT

***Garrya***-shrub; DT

***Gaultheria*** (salal) - groundcover; DRDT

*Helichrysum petiolatum* - shrub. "limelight" shade; DR DT,

***Heteromeles*** (rayon) - shrub; DR DT

*Iberis*- groundcover;DR

***Iris douglasii***- perennial; DR

*Jasminium polyanthmum* (pink jasmine) - DT

***Lilium pardilinum*** - DR

***Lithocarpus densiflora***- evergreen tree; DR DT

***Lupinus***- shrub; DR DT

*Kniphofia uvaria* - perennial; DR DT

*Lantana montevidmsis*- perennial; DR

*Lavmder*- perennial; DR

***Mahonia aquifolium*** - Oregon grape; DR DT  
***Mimulus*** - perennial  
***Myrica californica*** -large shrub; DR DT  
*Naium* (Oleander) - shrub; DR  
*Penstemmon* - perennial; DR DT  
*Philadelphus*- DR DT  
***Polystichum***- perennial; DR  
*Pyrocarrha*- shrub; DR  
***Quercus agrifolia*** - evergreen tree; DR DT  
***Rhamnus californica***- shrub; DR  
*Rhamnus alaternus*- hedge; DR  
***Rhododendron occidentale***- deciduous shrub  
***Ribes sanguineum, Ribes viburnifolium*** - deciduous & evergreen shrub  
***Romneya***-shrub; DRDT  
*Salvia* - perennial; many varieties; DR DT  
*Santolina chamaecyparissus*- perennial; DR DT  
*Sanrolina virens* - perennial;" DR DT  
*Schinus molle*- evergreen tree; DT  
*Solanum crispum*-evergreen vine; DRDT  
*Solanum jasminoides* - evergreen vine; DR DT  
*Solanum xanti* - evergreen shrub; DR DT  
*Stachys*- evergreen perennial; DR DT  
Succulents - groundcover; DR  
*Thymus*- groundcover; DR  
*Trachelopernum* - evergreen vine  
***Vaccinium***- evergreen shrub; DR DT  
*WIsreria* - deciduous vine  
*ZantMschia* (*Calla lily*) - perennial; DR  
*Zauschnaia califomica* - perennial; DR DT

***We recommend that the following plants be avoided:***

Eucalyprus - invasive, pyrophyre  
 English ivy, invasive  
 Periwinkle - invasive  
 Juniper - pyrophyre  
 Cypress - pyrophye  
 Monterey pine - pyrophyre



## Appendix 4: A Natural History of the Mount Vision Fire

*by Jules Evens, biologist & EAC board member*

FIRE HAS BEEN HERE A VERY LONG TIME INDEED. The Miwok, who inhabited this place for at least 3,000 years, set fires periodically to open up the forest and scrub, promote vigorous growth, and attract animals. Inverness Ridge has burned a hundred times and will burn a hundred more. The very structure of the bishop pine forest is the result of that fire history, and there is little we can do to forestall its recurrence, try though we will. The perennial advent of fire may be of little comfort to those who lost their homes and precious belongings in a blaze of flames in October 1995, but perhaps the acknowledgment of fire's place in the landscape is integral to our own regeneration of spirit.

Many people who live here have asked: "What has been the impact of this firestorm on the natural environment?" and "What about the animals? Which species were affected and will they ever return?" These questions are as complex as the causes and consequences of the fire itself, and answers and predictions are largely speculative. We can, however, make some sense out of the fate of the plants and animals that were affected, based on our knowledge of their natural history before the burn as well as some subsequent observations.

The fire consumed about 12,400 acres, of which about half was coastal scrub and open woodland, and about a quarter was forest - either Douglas fir, bishop pine, or riparian hardwood. The bulk of the burn was within the Point Reyes National Seashore, and, in total, about 18% of the park was impacted. According to the Burn Area Emergency Rehabilitation (BAER) Plan: "Due to higher than normal fuel loads, extreme fire behavior, and wind patterns during the incident, about 70% of the vegetative cover was removed" within the burn perimeter. The Douglas fir forest (-1500 acres burned) ranges in age from about 30 to 115 years in age; due to past fire suppression, the younger trees have encroached onto areas previously occupied by coastal scrub and grassland. The bishop pine forest (-1000 acres burned), of uniform age with most trees about 60 years old, had developed as the result of past fires. The riparian corridor encompasses about 500 acres within the burn perimeter, occurring as narrow ribbons of habitat along intermittent and perennial watercourses. The riparian - with its associated swales, ponds, and marshes - was a critical refuge for animals during the heart of the firestorm.

The fire area in the Seashore was assessed according to levels of intensity: 70% burned at low intensity, 20% moderate, and 10% high intensity. Post fire estimates of mortality of vegetation in forested habitats found the highest impacts to bishop pine, with 82-94% mortality. Douglas fir experienced 28-46% mortality, and only about 5% of the riparian suffered high mortality. The pines grow on shallow soils that are derived from granite and are inherently drier than the shales that underlie the fir forest and much of the coastal scrub. Bishop pine seeds were scattered across the forest floor after the burn, and if these seeds find "bare mineral seedbed relatively free of competing vegetation" they should germinate vigorously. The riparian corridor, mostly singed along its outer edge, is expected to recover in the first growing season. The Douglas fir forest will take longer, however, and will depend on variables like rainfall and seed crop production (of surviving firs) over the next few years.

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Much of the information in this essay was gleaned from the 300-page report prepared by the "BAER Team" within an incredible 72 hours after containment of the fire. The BAER team is employed by the Department of the Interior as a quick response unit to wildfire events. They arrived on the scene as soon as the Vision Fire was declared "out of control" and began assessment, enlisting the aid of personnel from Point Reyes National Seashore, Tomales Bay State Park and the California State Parks, Marin County Department of Public Works, the Natural Resources Conservation Service, Petaluma District, as well as many local residents with particular knowledge of the natural and historic resources within the burn zone. Copies of the BAER Report are available in public library branches, and one resides in the office of Environmental Action Committee of West Marin.

### ***Plants***

The BAER Plan identifies several species of threatened and endangered plants within the burn area that may suffer population declines. Several of these species (e.g. north coast bird's beak, Marin knotweed) grow in tidal saltmarsh or swales and are not expected to be impacted severely, if at all. Other species restricted to drier habitats may have been damaged; these include fragrant fritillary, San Francisco owl's clover, Marin manzanita, and Mount Vision ceonothus. The fritillary is "bulberiferous" and therefore protected underground during the burn. The known local population of owl's clover occurs entirely within areas of moderate to high burn intensity within the fire zone. Their seeds should have survived, but the 25 acres where owl's clover occurs will be monitored during the spring of 1996. The manzanita and ceonothus are fire-adapted; although they reproduce via seeds, nor by resprouting, they are expected to reestablish themselves.

### ***Animals***

Within the heart of the burn, refuge for animals was scarce, with many individuals crowding into the riparian corridors that wind through the canyon bottoms as well as the few ponds (Muddy Hollow, Glenbrook, Laguna canyons) and their associated wetlands too damp to burn. Even after the fire, species normally found in coyote brush (like wrentits) were flocking through the alders.

Surprisingly some animals survived even the high intensity burn areas. Shortly after the fire Gary Fellers and other Park Service naturalists discovered numbers of slender salamanders in their usual haunts. The timing of the fire was serendipitous for salamanders, which were in the right place at the right time. Because the fire occurred before the onset of the winter rains, these amphibians were still aestivating (resting during summer conditions) underground. For some reptiles and amphibians, the fire must have roared over without raising their core temperature more than a degree.

Luckily this fire did not happen during the nesting season when most birds are far more territorial than they are in autumn. The timing of the fire was also fortunate for most neotropical migrants; most of them - warblers, thrushes, grosbeaks, swallows - tend to leave on their migratory track by the end of September, not returning until March or April. Flocking birds that winter here - nuthatches, kinglets, chickadees - probably were able to move out in time.

Rich Stallcup found numerous deer tracks near Drakes Beach at a spot where escaping deer apparently swam across the mouth of Drakes Estero to the safe territory to the north. Survival by individuals of these large mobile species was largely a matter of luck - being in the right place at the right time.

But certainly, many animals lost their lives. The highest mortality was suffered by those with the least mobility; sedentary rodents like mountain beavers, woodrats, and deer mice; birds who are poor fliers like quail, wrens, and towhees. Some carcasses of larger mammals - deer, foxes, bobcats - were found in the ashes, but at least some of these were able to find routes of escape. Less fortunate were burrowing mammals. They tend to burrow not as deeply as salamanders and construct their tunnel systems for ventilation and multiple routes of access and egress. Perhaps most severely impacted was the Point Reyes mountain beaver, a rare and primitive rodent that was fairly common within the burn area. The Point Reyes subspecies is known only to occur in the western Marin County, mostly within the Seashore and restricted in its distribution to relatively damp loamy soils in close proximity to a perennial water source. The isolated and restricted distribution of this subspecies qualifies it as a candidate for endangered status. Two days after the fire I walked-up a canyon in the heart of the burn, where skeletons of coyote bush limbs, twisted and awry, were silhouetted against the sky. The ground crunched underfoot the surface of the soil baked to a crisp patina by the oils of incinerated plants of the soft chaparral. I stop at a once ferny hillside next to a creek that used to house a colony of mountain beavers; their oval burrows are visible beneath the blackened burls of ferns. The beavers must have been asphyxiated as the smoke ventilated through their burrow systems. For those who may have survived, there are no fronds left for forage. The fire incinerated about 40% of the habitat of this species and "could lead to its immediate listing as an endangered species."1

Appendix: Natural History

Surely the heat and smoke proved fatal to many individual animals that did not die directly in the flames. Rangers reported carcasses of animals found in the middle of Limantour Road - woodrats, brush rabbits, and skunks. They likely found the road a fire-free refuge within the inferno, then succumbed to the smoke or the heat. One wonders, also, just what impact the loss of habitat and associated food will have on the breeding success of the survivors, at least in the first year after the fire. Reduced reproductive success is anticipated for those species that forage primarily in the coastal scrub and prairie habitats. If there is no habitat left for a brush rabbit, there will be no prey for the gray fox or the bobcat. Without woodrats, any spotted owls that may have escaped the flames will be without their preferred prey. Without a toyon and huckleberry season, there will be no fruit for thrushes and robins. With few field voles left in once seed wealthy grasslands, the kestrel and kite will have less food to carry to the nest.

Some species may actually benefit from the burn. For example, the Myrtle's silverspot butterfly, a rare local species that breeds on outer Point Reyes: may wander into the burn as its primary foraging plants (thistles, gum plant, buckwheat, and coyote mine) colonize the barren hillsides once covered in coyote brush. The regeneration of plants, already underway, should be accompanied by a superabundance of insects and seeds, if not this spring, then in the near future. The decaying wood of the forest and shrub will also generate its own ecology driven by the gluttony of decomposers. Bark beetles and wood borers will become abundant and thereby provide a bonanza for woodpeckers and other wood-probing species. We should expect healthy populations of flickers and pileated, hairy, and downy woodpeckers. Flycatchers may cash in on a plethora of aerial insects emerging from the pulpy windfall. As always, jays will thrive.

But perhaps the truest prediction we can make is that the effects of the fire will be multifarious. For example, surely large numbers of bars, sequestered under bark or within park buildings, were consumed by the flames. At the same time, the number of snags left standing, and the insects they will generate, provide future habitat for future colonies. The loss of understory thickets will exclude large numbers of wrens and woodrats for a few years, but species that thrive on the planers that colonize disturbed areas - butterflies, goldfinches, and siskins - will likely proliferate. Like all events in nature, there are those who benefit and those who suffer, but over the long view, all niches will be filled.

***Anecdotes***

Some anecdotes from the fire are worth telling. Here's a brief collection.

Naturalist Rich Stallcup found a covey of quail foraging in Muddy Hollow shortly after the fire. He noticed they were mostly adults, suggesting that juveniles, perhaps, suffered higher mortality. Some of the males had their top knots singed off.

At the top of Inverness Ridge, we walked along the Bayview Trail, through the highest intensity area of the burn. The soil was still smoldering as we collected soil samples for analysis. Standing in the silent forest, I was surprised to hear a sharp "chip." Nearby, within ten feet, a chipmunk balanced on a charry limb, chattering and rail flicking. We guessed he had been attracted by our voices, a sign of life in a silent forest. Where had he survived the firestorm?

Just five days after the fire, the pond at Muddy Hollow hosted about 800 waterfowl, foraging and swimming, apparently oblivious to the devastation of the hillsides surrounding them. Interestingly, after the rains commenced, the waters clouded up with ashy silt and the birds, probably unable to find food in the cloudy water, disappeared. What affect might that silt have on the red-legged frogs and California newts that breed here?

Within the first week, people were reporting green root sprouts around the base of coyote brush, toyon, and elderberry. Within the second week, the first green fronds were reaching our of scorched fern burls.

Mid-March, and five months have passed since the fire. The winter has been generous - rainfall above average. Rich Stallcup and I walk from Limantour down toward Laguna Canyon. Flowers are well into bloom - paintbrush, hairy star tulip, lupine, marsh monkey flower. We find some fritillary on a dry slope, the succulent stem in odd contrast to the parched earth. Three black-railed deer - a female and two grown does - watch us from the hillside. In the riparian thicker, the alders are in full leaf; we see a pair of

Wilson's warblers in an aerial territorial feud. An orange-crowned warbler sings from deep in the thicket. Other signs of life - racoon tracks, a salamander under a rock, fresh woodpecker borings, an owl feather on the trail. Where the bridge crosses the creek, a pair of red-legged frogs stare at us with golden eyes unblinking. On the hillside above, wildflowers - *Castilleja*, *Calacortis*, *Fritillaria* - with names nearly as beautiful as their showy inflorescence, have broken through the charray soil. A hummingbird hovers, at a scarlet paintbrush, sipping its nectar with quiet intensity. The sun, breaking through the cloud cover, flashes of his throat in a fiery crimson blaze. .

### References

- <sup>1</sup> DOI BAER Team, North Zone. 1995. Mount Vision Fire Incident: Burned Area Emergency Rehabilitation (BAER) Plan.
- <sup>2</sup> RE. Martin. 1984. Fire history and post-fire stand dynamics of the Inverness bishop pine at Point Reyes National Seashore. unpubl. rpt. to the National Park Service.
- <sup>3</sup> Stallcup, R 1995. "Fire in birdland" Observer 105, Fall 1995. Point Reyes Bird Observatory
- <sup>4</sup> Thalman, S. B, 1993. The Coast Miwok Indians of the Point Reyes Area. Point Reyes National Seashore Association.

## **Where fire comes from**

*by Jules Evens*

(ADAPTED FROM DAWN OF THE WORLD: MITH AND TALES OF THE MIWOK INDIANS OF CALIFORNIA.)

*In the early days, the only fire anyone knew about was kept by Starwoman, who lived near an elderberry brake to the East, beyond the Great Valley. She kept her bright treasure in a box she had carved from the burl of a buckeye tree.*

*In those clays it was cold and dreary here near the coast. Coyote decided to remedy that situation, so one day he sent little Hummingbird out to steal the fire from Starwoman. Hummingbird flew in a quick straight line right to the elderberry brake and found Starwoman guarding her fire box. He perched in the branches above her camp waiting for an opportunity to steal an ember. Starwoman, dressed in a bark skirt and bunchgrass blouse, was busy straightening up her camp. As Hummingbird watched her movements, he couldn't help but notice a resemblance between Starwoman and Old Man Coyote - maybe it was the hunched shoulders, or the smirkish smile. Hummingbird wasn't sure and didn't spend much thought on the problem; he had a task to complete. Finally, Hummingbird was rewarded for his attention. Starwoman eventually cracked open the box to check on her fire. Just at that moment, Hummingbird darted down from his perch and stole a spark of fire. He tucked it under his throat and flew directly back home. When he arrived at the coast, Coyote was nowhere to be found, so Hummingbird stashed the fire in the buckeye tree.*

*The Hoo'-koo-e'-ko, who used to live along these shores, always went to the buckeye tree when they wanted fire. The dried sticks turned easily to ember after a little rubbing. The Hoo\_koo-e'-ko are no longer here - they have followed the East wind, the path of ghosts, out to the Farallones. But fire is here to stay. Even today you can see the blaze on Hummingbirds throat.*

## Appendix 5: Suggested Resources

THE FOLLOWING IS A PARTIAL LIST OF RESOURCES - telephone numbers of consultants and workers, kinds of materials to use (and, in some cases, where to obtain them) - offered with the intention of helping residents of Inverness Ridge communities in rebuilding and reforestation. We have attempted to provide a comprehensive list, and to include all local resources and providers, but recognize that this directory is incomplete. Our apologies to anyone we may have inadvertently left out.

### **BUILDING MATERIALS**

**Hardishake and Hardisiding:** Mead Clark, Santa Rosa. (800) 952-8627

Pacific States Plywood, San Rafael. (415) 454-5450

Golden State Lumber, San Rafael. (415) 454-2532

**Hardi-shake/HardiPlank:** Non-combustible wood-looking assemblies for roofing or siding.

Company also has wood-looking window framing assemblies.

REMCO 1077 East Shore Highway, Berkeley, CA 9471 . (510) 528-6130. Sales

Representative: John Capazello (415) 708-4713

### **Scotchint Glass by 3M**

**PryroPlastic:** Provides water-proofing and has both an A and B rating depending on the substrate application. Durable, clear fire retardant, not affected by acids or salts. Not UV stable, and will discolor with strong light unless titanium white is used as a paint base or UV stabilizers are added. Listed as non-toxic.

**PryrolPlus:** Intumescent fire retardant coating for use on wood, as well as corrugated paper, aluminum, certain plastics, and portions of upholstery. Approved by the California Fire Marshal; passed a standard flame spread test. Listed as non-toxic. May allow use of natural-color wood as an exterior.

Fire and Thermal Protection Engineers, Inc. P.O. Box 568, Petersburg, Indiana 47567. (812) 354-8166. fax (812) 354-2547

**F.R. 101:** Clear fire retardant that is applied to wood, carpet, paper, corrugated cardboard, and fabrics (except nylon). Has consistency of water, applied via spray (even a hand-held spray bottle). Provides a Class A fire retardancy, and is approved by the California Fire Marshal. Passed standard flame spread tests. Needs to be covered with a waterproofing agent when used as an exterior treatment. May allow use of natural-color wood as an exterior. Listed as non-toxic.

SOURCE: New Age Technologies, Inc., P.O. Box 1079, Bristol, PA 19007. (215) 788-3223. fax (215) 788-3365 . orders (800) 801-7074

**SEED:** Le Ballister's . (707) 526-6733

Lamer Seeds. (415) 868-9407 Harmony

Farm Supply. (707) 823-9125 Albright

Seed Company. (800) 423-8112 Pacific

Coast Seed. (510) 463-1188 Ramsey Seed.

(800) 325-4621

### **RESOURCE PEOPLE**

#### **Landscape Designers & contractors**

Gray, Karen..... 663-9449

Gradjansky, Peter

Heron, Marsha..... 663-1312

Livingston, Penny

Stein, Nancy .....663-8851

#### **Arborists:**

Alexander Treecare .. . . . 868-0428

Bauer, Matt. . . . . 663-8013

Kent, Tom. . . . . 669-1604

Pacific Slope. . . . . 868-0380

Whitney, Nick.....663-1572

**Gardeners:**

Aranjo, Christina .....663-1934  
 Octobre, Jimmy .....663-1662  
 Paton, Roberr.....663-8324  
 Shine, Nancy.....669-7442  
 Storch, Suzanne.....663-9338  
 Sue Taylor.....663-5411  
 Whitney, Elan.....663-1572

Milling trees into lumber: Since the fire, various local milling operations have appeared. Bishop pine and Douglas fir can be milled on site and there is also some eucalyptus, cypress and other wood available.

Dave Downing .....663-1642  
 Nick Whitney. ....663-1572  
 Merle Reuser. . . . (707) 538-8841  
 SCott Hunter. . . . .662-2472  
 Mark Miller. . . . .663-9533

**Nurseries:**

Cottage Garden Growers, Peraluma .. (707) 778-8025  
 Darlings, Penngrove. . . . . (707) 664-0350  
 Flower Power, Point Reyes Station. . . . . 663-8221  
 Greenpoint, Novara. . . . . 892-2442  
 Las Baulines, Bolinas. . . . . 868-0808  
 Mosrly Natives, Tamales. . . . .(707) 878-2009  
 Natural Gardener, San Anselmo.....456-5060  
 O'Donnells, Fairfax. . . . . 453-0372  
 Sloar, Kentfield..... 454-0262  
 Novara .....897-2169  
 Sunnyside, San Anselmo. . . . . 453-2701  
 Urban Tree Farm, Fulron. . . . . (707) 544-4446  
 West End, San Rafael. . . . . 454-4175  
 Yardbirds, San Rafael..... 457-5880

**Landscape Supplies (rock, mulch, topsoil, etc.):**

American Soil Products..... 456-1381  
 Harmony Farm, Graran ..... (707) 823-9125  
 GrabNGrow.....(707)575-7275  
 MarinLandscapeMaterial ..... 897-1337  
 Shamrock ..... 456-2552  
 RichReadimix.....663-1038  
 Toby'sFeedBarn ..... 663-1223  
 Sprinkler Irrigation Specialisrs. . . . . 897-1171  
 Watersavers Irrigacion . . . . . 454-6581

**Maintenance:**

Arnold, Brian.....663-8306  
 Aucoin, John .....663-1591  
 Gutierrez, Hector.....663-1471  
 Gutierrez, Ismeal .....663-9035  
 Gutierrez, Sergio.... (707) 778-3721  
 Padilla, Felipe.....(707) 765-6977

**Building Contractors:**

Arndt,Pat.....663-1365  
 Arndt,Robert .....663-1181  
 Arrow (Bill Bailey).....669-7573  
 Carlson, Richard.....663-9428  
 Cove Construction  
     (Bob Cain).....453-0515  
 Davis,Ben.....669-1201  
 Gadow, Bob .....663-1240  
 Graveson, Tlffi.....669-7235  
 Hollern, Pat.....663-8729  
 Korhummel, Paul.....663-9148  
 Levis,A.J.....663-8636  
 Livingsron, Marshall.....669-1133  
 Long, Jeff..... (707) 769-0675  
 Mann, Jeff.....663-8332  
 Matthews,Jack .....669-1249  
 Moore,Tony .....663-1105  
 Nelson's Woodworks . . . . . 663-8192  
 Plant, Richard.....669-1345  
 PD associates .....663-1233  
 Pollard, Doug.....663-9231  
 Ritter,John.....669-1632  
 Rodoni, Dennis. . . . . 663-9223  
 Smith, Barry.....663-8025  
 Telford, Jeffrey. . . . (pager) 679-2037  
 Wallace, Wendy.....663-1063  
 White,TR .....663-1550  
 Wingare, Seth.....663-8216

## Appendix 6: About the Phoenix Team

PRESENTED HERE ARE INTRODUCTIONS TO THE FOUR EXPERTS who made up the Phoenix Team of Environmental Action Committee of West Marin.

**Laurel Collins** is a consulting geomorphologist. She received her undergraduate degree in 1981 from the Department of Geology and Geophysics at the University of California at Berkeley. She has worked on numerous research projects with the U.S. Department of Justice, U.S. Geological Survey, U.S. Forest Service, California Department of Forestry, Lawrence Berkeley National Laboratory, and U.C. Berkeley. Laurel has also served as District Geologist for the East Bay Regional Parks, during which time she mapped landslides along the urban/wildland interface and developed policy for fuelbreak and landslide management. Some of her local research publications concerning hillside and fluvial processes include the effects of the 1982 storm in the Santa Cruz Mountains and San Lorenzo River; hydrology and geomorphology of tidal marshes in the San Francisco Estuary; managing geological hazards in the Regional Parks; and assessing runoff, erosion, and effectiveness of erosion control after the Oakland Hills Firestorm. As part of the research funded by the Marin Community Foundation through Environmental Action Committee of West Marin, Laurel is presently studying the effect of fire on stream flow and hillside erosion in portions of Inverness and the Point Reyes National Seashore.

**Tom Gaman** is a California registered forester who lives in Inverness. He holds degrees in forestry from the University of California at Berkeley and Yale University. His business, East- West Forestry Associates, is under contract with the U.S. Forest Service Remote Sensing Lab, monitoring the vegetation, wildlife habitat, and forest fuels accumulation on National Forest lands. In addition, Tom has been involved for 20 years in management and assessment of urban forests and of private lands, developing Geographic Information System databases. He is a member of the California Urban Forests Advisory Council (which advises California Department of Forestry) and is an active volunteer working with local youth and Mexican exchange students through Partners of the Americas.

**Ray Moritz** is an urban forester and fire ecologist. He studied biological science at the University of Chicago and forestry at the University of Minnesota, where his undergraduate program was in silviculture (forest culture) / ecology. Ray's graduate program was in forest ecology with a specialization in fire ecology. His academic research produced the vegetation management program for 33,000 acres of declining pine and boreal forest where fire exclusion had resulted in the forest's failure to reproduce itself. Ray has lived and worked in West Marin for 16 years, developing extensive expertise in the pine, fir and hardwood forests of the Inverness Ridge. He was a consultant on the Marin Municipal Water District / MCOSD "Mount Tamalpais Area Vegetation Management Plan."

**Carol Rice** is proprietor of Wildland Resource Management, a consulting firm specializing in fire protection in the wildland/urban interface, and Ms. Rice has been involved in this arena for 18 years. Projects in which she has played a major role include baseline studies of the Mount Tamalpais area and a subsequent vegetation and fire management plan; a regional vegetation management plan for the East Bay Hills; a planning guide for San Mateo County's wildland/urban interface; and several fire hazard reduction programs. She conducts varied investigations of fire behavior and effects, is a frequent lecturer on these subjects, and has written over 35 technical reports and publications (including a chapter on fire ecology in the State Fire Marshal's textbook). Ms. Rice holds a bachelor of science in forestry and a master of science in fire science and management, both from the department of forestry and resource management at the University of California at Berkeley. She is a present or past officer of professional organizations including Fire Working Groups for the National Society of American Foresters.

### Appendix 7 :: Sample Data Form

■ THIS IS THE TWO-SIDED FORM used in the field by members of the Phoenix Team while assessing neighborhood units in the Vision Fire zone of Inverness Ridge.

Neighborhood No: \_\_\_\_\_

R.U. #'s: \_\_\_\_\_

Addresses: \_\_\_\_\_

SITE FEATURES:

1. Aspect: \_\_\_\_\_ 2. Slope: \_\_\_\_\_

2. Topographic Features: \_\_\_\_\_  
\_\_\_\_\_

3. Burned  Crowning Fire   
Intensity: L M H E  
Fuel Consumption: L M H E

VEGETATION FEATURES:

Overstory:

4. Prior Forest Type: \_\_\_\_\_

5. % Cover:  Sparse (0 - 25%)  
 Poor (26 - 40%)  
 Normal (41 - 60%)  
 Good (61 - 100%)

6. Height: \_\_\_\_\_

7. % Mortality (Crown): \_\_\_\_\_

8. Regeneration Type: \_\_\_\_\_

9. Future Successional Trend: \_\_\_\_\_  
\_\_\_\_\_

10. Management recommendations:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Understory:

11. Prior Understory Type: \_\_\_\_\_

12. Prior Cover:  Sparse (0 - 25%)  
 Poor (26 - 40%)  
 Normal (41 - 60%)  
 Good (61 - 100%)

13. % Mortality (Crown): \_\_\_\_\_

14. % Resprout Species: \_\_\_\_\_, \_\_\_\_\_

15. Exotics Problem: \_\_\_\_\_

16. Existing Treatments:  
 Seeded  Mulched  Removed  
 Other: \_\_\_\_\_

17. Development Density: L M H

18. Encroachment: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

19. Management recommendations:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

20. Fuel Type:

Prior: \_\_\_\_\_ Rating: \_\_\_\_\_  
 1996: \_\_\_\_\_ Rating: \_\_\_\_\_  
 03 yrs: \_\_\_\_\_ Rating: \_\_\_\_\_  
 10 yrs: \_\_\_\_\_ Rating: \_\_\_\_\_  
 30 yrs: \_\_\_\_\_ Rating: \_\_\_\_\_

4 to 10 yrs: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

21. Access: Road: \_\_\_\_\_ Drive: \_\_\_\_\_

22. Fire Flow / Water Availability: \_\_\_\_\_

23. Topographic Location: \_\_\_\_\_  
\_\_\_\_\_

24. Critical Fire Features: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

27. Road Mitigation (Fire Apparatus Clear Zone): \_\_\_\_\_

1996: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

25. Defensible Space: \_\_\_\_\_ X \_\_\_\_\_ X \_\_\_\_\_

26. Defensible Space Fire Hazard Mitigation:

1996 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

1 to 3 yrs: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

4 to 10 yrs: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

1 to 03 yrs: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

28. Wildland / Watershed Mitigation:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## Appendix 8 :: Hazard and Fuel Rating Scales

■ THESE ARE THE SCALES USED BY MARIN COUNTY FIRE DEPARTMENT and the Phoenix Team in rating fire hazard in a given forest/fuel type. The type of plant community and steepness of slope are among the factors entered into these assessments. On this page, under Hazard Points, a value of 1-9 is possible in each of five categories (which include three fuel modification zones). The sum of these five values equals the total fire hazard rating assigned, for instance, to forest types and Neighborhood Units in this report. It also indicates how much area around structures is needed for defensible space, as shown under Hazard Scale below. On page 83, the 1-9 point rating system for fuel types used by Marin County Fire Department is explained.

### HAZARD MATRIX

Hazard Points	1	2	3	4	5	6	7	8	9
ASPECT	NE	NW	SE	SW					
SLOPE %	"Level"	3 - 10		11 - 20		21 - 30		31 Plus	
FUEL 0 - 30 FT	Domestic garden	Fire-resistant hardwood	Short grass & savanna	Tall grass & savanna	Brush	Short needle conifer	Chaparral	Pyrophytic hardwoods & Pine	Conifer with undergrowth
FUEL 31 - 50 FT	Fire-resistant hardwood	Short grass & savanna	Tall grass & savanna	Brush	Short needle conifer	Chaparral	Pyrophytic hardwoods & Pine	Conifer with undergrowth	
FUEL 51 - 100 FT	Tall grass & savanna	Brush	Short needle conifer	Chaparral	Pyrophytic hardwoods & Pine	Conifer with undergrowth			

### Hazard Scale

1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23	24 25 25+
30 X 30 X 30 FT	30 X 30 X 50 FT	30 X 50 X 100 FT	50 X 50 X 100+

## FUEL TYPE AND FIRE MODELS

Type	NFDRS <sup>1</sup>	NFFL <sup>2</sup>	Description	Fire Behavior
Domestic Garden <b>1</b>	Not defined	Not defined	Highly maintained and often irrigated. No dry grass Plants have adequate moisture and in good condition Shrubs and trees are separated, thinned and deadwooded Vertical and horizontal fuel continuities interrupted	Low intensity and rate of spread Exposures are easily defended with minimal resources; one engine company. Typically provides 'defensible space'
Fire Resistant Hardwood <b>2</b>	R	9	Mainly deciduous hardwoods Includes streamside types Minor component of conifers or pyrophytic hardwoods	Fire mainly in litter layer; slow rates of spread May torch out trees in spots where dead and down material is heavy (branding and spotting)
Short Grass <b>3</b>	A	1	Annual grasses and herbs dominate Brush and tree reproduction less than one third of area Quantity and continuity varies greatly from year to year	Rapid spread when cured but low intensity Slow rates of spread when still green Affected greatly by wind and slope
Savanna <b>3 or 4</b>	C	2	Open, sparse stands of hardwoods / conifers with grass and herbs as the predominant ground fuels Brush, shrubs and trees cover less than two thirds area Assign to fuel type that carries the fire type 3, or 4	Rate spread affected by wind and slope Behavior reflects the fuel that carries the fire Some torching out of trees (branding and spotting)
Tall Grass <b>4</b>	L	3	Grass greater than knee high. Heavier loading than type 3 Shrubs and trees less than one third area	Rapid spread due to wind and slope Highest intensity of grass types Can be very dangerous to suppression crews
Brush <b>5</b>	F	5	Brush sparse or less than 4 ft tall Young closed stands of mixed, hard chaparral included Also less flammable shrubs, "soft chaparral" Less deadwood than type 7, light litter layer	Moderate rate of spread and intensity Grass component may increase rate of spread Strong winds can greatly exacerbate fire behavior and frustrate suppression efforts
Short Needle Conifer <b>6</b>	H	6	Closed canopy of high crown, healthy trees May have minor hardwood component Litter is compact; needles, leaves and some twigs	Slow burning surface fires with short flame lengths Occasional torching in heavy fuel concentrations Infrequent crown fires, hard to suppress
Chaparral Brush >4ft <b>7</b>	B	4	Dense, tall brush more than 4 ft tall and typically more than thirty years old California mixed, hard chaparral Secondary crown layer of dead material May have deep litter layer	High to extreme rate of spread in strong winds High to very high intensity May be very difficult to suppress Deep fire front
Pyrophytic Hardwood <b>8</b>	O	7	Composed of highly flammable, broadleaf species Foliage is flammable when green and very flammable when water-stressed Understory is heavy brush, reproduction, or litter	Crowning and branding / spotting common; rapid spread Extreme intensity May have extreme flame length Very difficult to suppress
Pine <b>8</b>	U	8	Mature closed canopy with compacted litter layer; some small branchwood Grass and shrubs are precluded by dense shade Low branches are shaded out	With moderate fire weather, slow-moderate ground fires easily extinguished Dangerous in high to extreme fire weather Infrequent crown fires (very hard to suppress)
Conifer with Undergrowth <b>9</b>	G	10	Conifers and mixed evergreens with heavy brush, young trees or heavy accumulation of dead material Douglas fir type which has invaded and topped brush or other trees Common in old, urban conifer types	Extremely hard to suppress Extreme to explosive intensity in high fire weather Branding / spotting is major component of spread
Urban Complex (not a specific fuel type)	Not defined	Not defined	Flammable structures mixed with heavy flammable forest with dense understories Fuels highly variable and interrupted by linear non-flammable surfaces Structures a major fuel component	Controllable in moderate to high fire weather Extreme behavior in high to extreme fire weather Exhibits extreme rates of spread and intensities Fire may linger at structures and tie-up suppression efforts as the landscape fire progresses