

UNIVERSITY OF CALIFORNIA BERKELEY & UNIVERSITY OF CALIFORNIA COÖPERATIVE EXTENTION
PIERCE'S DISEASE VEGETATION TRANSECT DATA



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OVERVIEW:

Pierce's Disease, *Xyella fastidiosa*, is a bacterial infection that parasitizes the water-drawing xylem of grapes and by clogging these conduits, renders the leaves withered and brown, and more often than not, kills the vines (Blua & Morgan 2003). Sharpshooter flies, and spittlebugs, (of the families Cicadellidae and Cercopidae respectively), are considered the leading causes for the spread of this pathogen, transporting the bacteria from the phloem of infected grapes and other host-species to healthy plants (Bisson 2002). Historically effecting only one percent of California's viticultural bounty each year, the bacteria had long been considered a mild disturbance. Yet, in recent years the disease has authored devastation in Southern California where *X. fastidiosa's* co-occurs with one of its most voracious vectors known as the glassy-winged sharpshooter, *Homalodisca vitripennis* (Perring 2001). In 2009, Pierce's Disease accounted for \$13 million in losses in Riverside County's productive Temecula Valley, primarily perpetrated by *H. vitripennis*. Today, with the help of this and other pernicious vectors Pierce's Disease is considered now one of the most pressing threats to grape growing. Though this pest is generally limited to Southern California, its proliferation and damages inflicted are suggestive of the dim future Northern Californian growers may face as an increasingly forgiving climate makes these regions more tolerable to glassy-winged sharpshooters, other related vectors and indeed *X. fastidiosa*, of which all had been formerly checked by frost and cold winter weather (Perring 2001)(Bisson 2002).

Working to assist wineries and grape growers develop best practices and strategies to protect both crops and ecological resources from the devastation of this pestilence research has been conducted on vineyards in Sonoma and Napa Counties to explore the insect vectors responsible for this disease and the relationship between these vectors and the vineyard's they inhabit (Bisson 2002). It has been an in-depth scrutiny of the crime scene and known culprits, but not the accomplices—in this case certain native and non-native plants growing in a shadowy patchwork of undeveloped and natural landscapes, previously unmapped. Whether a reservoir for the disease, or habitat for the insect vector an inventory of this plant life and investigation of the hedgerows, wildland interfaces and stream systems that skirt these agricultural lands will provide a more enriched and complete picture of the disease cycle. The research conducted for this project included a comprehensive survey of the plant life found within 2 meters of a 50 meter survey tape.

Bisson, Linda F. et al. (2002) The present and future of the international wine industry. *Nature* 418, 696-699

Blua, M.F. & Morgan, D.J.W. (2003) Dispersion of *Homalodisca coagulata* (Hemiptera: Cicadellidae), a Vector of *Xylella fastidiosa*, into Vineyards in Southern California. *Journal of Economic Entomology* 96(5): 1369 - 1374

Perring, Thomas M et. al. (2001) Proximity to citrus influences Pierce's disease in Temecula Valley vineyards. *California Agriculture* 55(4):13-18.

METHODS:

Using the insect trap as the origin, a 50m tape will extend away from the vineyard, running in the same direction on which the traps lie. Along this transect plants with stems greater than 1cm in diameter, at their base, within two meters of the transect will be recorded. Measurements will include the number of each species, (based on number of stems counted), and the overall estimated percent cover by that species along the transect. Along this transect ground cover will also be recorded by percent, to include grasses, forbs, bare soil etc.. Percent cover will be divided into five 10x2m sections along the transect. With the exception of noteworthy plants, considered to be associates of the sharpshooter, record of species names will not be made for these grasses or perennials with stems less than 1cm in diameter. To supplement this data, all stems with a diameter at breast height, (DBH), greater than 10cm within the bounds of this transect and within 10m of the transect will be catalogued for estimated DBH, height and species. A qualitative assessment of the overstory cover, based on these measurements will also be included in the data.

This data has been curated in the attached excel sheets as follows:

SHEET 1 provides information on all of the species of stems of a maximum diameter between 1 and 10 cm found within a 2x100 meter area. Both a tally of the number of these stems, (not individuals), and the area covered. The same information is provided for stems greater than 10cm DBH found within a 20x100 meter area. In both instances percent cover of each plant is not relative, each is assessed separately out of 100%, since two plants may occupy the same space horizontally, but not vertically.

SHEET 2 is a corollary to the data in Sheet 1. Here every stem greater than 10cm DBH found in the transect has been broken down into species, estimated DBH and estimated Height. For data sheet 2 the number data points at each plot does not necessary reflect the number of data points recorded in Sheet 1, for stems greater than 10cm DBH. This is because stems are defined and counted at ground level. Example: An Alder, may branch at a height of 1 meter into two separate stems each with a DBH greater than 10cm. In Sheet 1 this tree is marked once in the tally of total number of Alders, but in Sheet two is recorded twice for each individual DBH measured from this tree. (Note: For some plots exact DBH is given, which reflects the previous collection methodology.)

SHEET 3 provides information on all plants with stems less than 1cm maximum diameter as well as ground covers. These plants were assessed in five 2x10meter plots running the length of the transect with the first 2x10 plot running between the origin and 10 meter, the second plot between 10 and 20, the third between 20 and 30 etc. Thus, these subplots are denoted: 0-10, 10-20, 20-30 and so forth. Again percent cover is not relative for plant species but is assessed individually, out of 100%. That said ground cover, since it lacks a vertical component has determined relative to other ground cover. So, while in this data you will likely find figures cover type such as "100% Poaspp., 10% Toxdiv" representing the same 2x10 meter plot, you will find that the abiotic categories, such as: Detritus, Bare Earth, Logs&limbs etc., will almost always sum to 100% since these account for cover types are either the ground surface itself, or are directly flush with that surface.

(Site codes: for sheets 1-3 the first column of each excell sheet will tell to which plot the data corresponds. Site codes match the codes used by the insect plots. So here 49-CB-OL-1 means: Sonoma Co., Constellation Brands, Olsen, Vegetation Plot 1.)

SHEET 4: Appendix for species codes. I am using three letter codes for all species which you can find in long form plus common names in the appendix I am including on excell sheet 4.

This Data is Supplemented by the following:

ILLUSTRATED JOURNAL OF VEGETATION PLOTS: This document provides a detailed description of the general habitat at each site as well as current or historical management or land use, with supplemental Photographs.

PLANT REFERENCE PHOTOGRAPHS: Includes difficult to identify, uncertain, or unidentified species.



ILLUSTRATED JOURNAL OF VEGETATION PLOTS:

49-CB-OL: CONSTELLATION BRANDS OLSEN VINEYARD

A manmade levy stretches along the Russian River with both features running perpendicular to Transects 1 and 2. Neither transect reaches within 30 meters of river. On this Eastern boarder of the property the levy is a long grass covered berm planted with a row of *Quercus agrifolia* at its summit spaced approximately 20 meters apart, and all relatively small in stature. With the exception of these trees there is no woody vegetation for the next 20 to 30 meters spare the *Rubus armeniacus* or *Mimulus aurantiacus* found patchily across the berm's Eastern slope. This phenomenon is largely explained by a large gravel bar formerly mined by Syar Industries, now disturbed only occasionally by some traffic, (trucks and atv) as well as the bicycles of the resident homeless population. The lay of the gravel would also suggest that it was at some point graded. Where riparian vegetation begins, the area is dominated the dense cover of mature deciduous hardwood with open grassy understory.

Whereas Transect 1 and 2 run East, toward the Russian River, Transect 3 runs South toward Dry Creek. The confluence of these two streams would appear to be just beyond the Southeast corner of Olsen Vineyard. Along this transect the levy running parallel to Dry Creek offering a vertical slope of about 10 meters, reinforced by concrete and horse fencing. For the next 20 meters the only vegetation is grass and *Rubus ursinus* and *R. armeniacus*, which hug closely to the base of the levy. The grass is criss-crossed by a variety of well-worn paths and Equestrian trails. Many of these paths offer the only way in to an otherwise impenetrable mat of *Vitus spp.* which have grown up over the first trees and shrubs encountered as one approaches the riparian vegetation--stocked with primarily *Salix spp.* and *Alnus rhombifolia*. These paths lead to homeless encampments where copious amount of litter and refuse can be found. Unlike in Transect 1 and 2, here the transect dead-ends within a few feet of Dry Creek. The riparian vegetation, again primarily, *Salix* is dense and weedy, and there is little understory, possibly the product of seasonal flooding which has caked many of the boles in mud.

49-VF-R12: VINO FARMS, GARRISON RANCH 12

The edge of the vineyard lies about 70 to 90 meters from the Russian River. Between the vineyard and the River lies the following natural and man-made features. First a dirt road about 10 to 15 meters wide. Along the Southern side of this road runs a 6 foot high fence. Immediately along this fence on the same side as the road there is evidence of mowing, though the turf is generally worn down to clay from vehicle and foot traffic. Along and above the fence, trees predominantly walnut, have been limbed, and several large oaks fell, with roughly a chord of wood stacked as unsplit rounds. And the limbs in neat slash piles on the South side of the fence. Owing to the limbing and recent repair of the fence, the southern side of the fence, while otherwise inaccessible is well trodden within the first few meters, as well as being strewn with a variety of refuse, car batteries, beer bottles, masson-ware, cloth, pipe, muffles all thrown over the fence. Beyond this area dense riparian forest commences. This are is dominated by a dense overstory of girthy, fast growing *Juglan hindsii*, beneath which a near comparable number of slender *Acer negundo* are taking root. While the forest edge is a bald spot with few desecated *Conium maculatum*, this quickly turns to 4 feet high briar of *R. armeniacus* occasioned only be vinca and deer trails to break up the monotony. The bramble continues the duration of the transect, letting up only at the river's edge, some 20-30 meters past the 50 meter mark, where the coalition of blackberry, box elder and walnut, yield to clumps of willow, (*Salix laevigata* and *Salix lasiolepsis*).

Much like Vino Farm's Ranch 12, and only some few miles up down stream, these transects also begin at a deer fence, separated from the vineyard by a maintenance Road. While here there is also signs that a boarder has been maintained with mowing, dominant white oak, walnut and cottonwood, have all grown their branches out over the roadway and even out over the first few vineyard rows . The transect which stretches 50 meters shy of a mass of sand and willow that marks the edge of the Russian, runs through a dense wasteland defined almost exclusively by equal parts and equally bothersome, *R. armeniacus*, *Hedera helix* and shoulder high *Urtica dioica*, as well as *Vinca major* and *V. californica*. Standing above all this loom mature *J. hindsii*, *A. negundo*, and *Populus fremontii* of unprecedented diameter. Of a dense, but patchy distribution *Poaceae species.*, *V. major* and *Rosa californica* reign. Many of the stems are shrouded in ivy and outside of the scope of the plots in *Toxicodendron diversilobum* as well; thick around as an ax handle. At about 45 meters from the fence, these weeds give way to *Arundo donax*, and *Salix* before the understory becomes entirely lost to sandbar and the matted sticks and duff amassed in long little heaps from last winter's high water.

49-SA: SAINI, STANDPIPE RANCH

Plots run West toward very much wet Dry Creek. While the vineyard is separated from the riparian vegetation and stream, no more than 30 meters away by little more than a maintenance road, this dense vegetation lies 8 feet below the elevation of the roadbed and vineyard. Here a levy has been constructed largely of Pontiacs dating to the 1930's and 1940's. Hit particularly hard by Pierce's Disease Saini has a long history of management both with spray and manual removal of invasives and known hosts for this disease and its associated insect vectors. Mowing and some limbing of trees adjacent to the road, as well as insect sticky-traps and tape along the perimeter of the riparian zones have all been employed, with limited success. (Indeed the Saini family expressed that shortly they may not be able to farm this land if the disease continues to persist in their crops.

Vegetation crowded with tall slender Alder, which, with the exception of a few willow along dry creek are the only tree to be found. Beneath this grove on sandy swales lie invasive blackberry, an assortment of grasses and herbaceous weeds and vinca. In general the understory is rather open. Closer to the road some *Sambucus mexicana* have also sprouted, and along with the blackberry make for a loose thicket.

Dry Creek Observations:

Transect 1: A sandy basin, relatively shallow though reaching a maximum depth of 2.5ft nearest the western bank and about 20 meters wide. Western bank rises at a steep 45degree angle mostly bare sandy-loam with limited detritus and a comb-over of dry grass. Eastern bank a more gradual incline, sandy and a tangle of blackberry, shrouding the true contour of the shore. Neither bank suggest signs of undercut , but erosion is evident. Western slope within 5 meters of stream dominated by white alder and ash, before converting to grass and ultimately vineyard. Eastern slope perhaps 20 meters of forest. Stream is clear, lacking turbidity and moving at about 3m/second.

Transect 2: About 20 meters wide and no deeper that 1 foot, with riffles caused by underlying rocks and stones of a much larger size than observed at Transect 1, which betray the true speed with which the water tears down this gully. Western bank shows some sign of undercut, and the riparian vegetation is very lacking, with a steep slope of 40degrees dominated by *Salix* and *Alnus* extending into that same open agricultural land previously described, after 20 meters. Further down stream, however, the bank truns into a tumble of grape and blackberry vine, rolled into one. The Eastern shore is dominated by willow, some sedge and *Rubus*. Young *Fraxinus latifolia* give way to clumps of alder by 15 meters of relatively flat ground. Here the banks are also sandy and at times clay, by with no sign of undercut or raw exposure that would be indicative of erosion.

49-RD-SC: RUDD, STOREY CREEK VINEYARD

The riparian vegetation tightly frames a narrow swath of a dry creek bed at the base of a steep brae rising to the Northwest. Grasslands and vineyard on either side with oak, willow and briar the dominant unmanaged vegetation. Storey Creek itself is only about 2 meters wide with a basin of fine gravel and coarse sand now dry. Considerable signs of bank erosion on the Northwest slope with deep undercut and much exposed parent material and clay such that there is upwards of 15 feet of vertical exposed earth. The Southeast bank shows less evidence of erosion but also unstable and crumbling. Past attempts at armoring the stream are apparent with wire-bound concrete blocks, now all but gone or in utter disrepair clinging to the oxbow bend in the creek found between the two portions of stream transected by the vegetation plots. Vegetation on either bank that can be described as riparian, using the most liberal definition, (as much is simply untamed and unmowed weeds), extends no further from that wash than 3.5 meters. A few meters South of Transect 1 a large bridge and access road cut across the stream and beyond the riparian vegetation found along the Southeast bank is a large turnout, loosely graveled but heavily compacted and lacking much plant life, save a few hardy forbs. The vineyard, which lies no closer than 20 meters from the stream is separated by a neatly mowed slope with a few planted white oak, and a fence consisting of stakes and yellow sticky-trap tape.

49-FC-HB: FRED CORSON VINEYARD, HOUSE BLOCK

A mixed evergreen (conifer/broad-leaf) forest of a subdivision with an average slope of 38 degrees and an Eastern exposure. Acquired in 1995 a history of viticulture on site has been recorded prior to current development, however, at the time of purchase the 3 acres now host to Pinot Noir was entirely overgrown forest, and all surrounding 12 acres were equally dense with thickets of young Douglas-fir shoots and much overburden. Surrounding acres heavily managed DFPZ, due to on site homestead, (an operation largely constituting a low thin and the clearing of a pad for residential use and vineyard). In addition Redwood and Douglas fir have been limbed or removed entirely to expose viewshed. Concerted effort with both chemical and manual method to remove, (successfully), wild and renegade grape, wild rose and thimbleberry. Based on size of stems and residual stumps the site was logged previously in the 1940's, such that most of the forest is second growth stumpsucker redwood, as well as advantageous Douglas-fir. Residual skid roads, make for areas of great compaction and break up the otherwise smooth contour of the slope. Coast liveoak, Oregon myrtlewood, Pacific madrone fill in beneath this dense canopy. (Allegedly, these trees, particularly the myrtlewood have filled in the gap left by tan-oak which was all but wiped out by *Phytophthora* during the last 5 to 10 years. Invasive scotch broom and star thistle have also been extricated, though they persist in close proximity along a deer fence on an adjacent parcel, on the property's Southern boundary. Though wild grape, rose and thimbleberry was uprooted from the forested land some ornamentals and garden varieties can be found in the yard between the house and vineyard block. Grapes in the Southwest corner of the block most recently succumbed to PD.

49-MA-BB: MASSONI, BENNY ON BAILHACHE

This transect runs through someone's backyard as well as junk pile. Overall, this landscape is highly developed with few plants that are unplanted or native. Yard is largely populated by the already recorded fruit tree species as well as squash tomatoes, tomatillos, corn, honeydew and other melons as well as sunflower and ornamental grapes. All very flavorful, and saved a week of grocery shopping. Loquat, geranium, English daisy, mint, tarragon, basil parsley, prickly pear, carrots, bell pepper, onions, garlic, California poppy, Shasta daisy, artichoke and

chickens. Transect, which ran parallel to the vineyard runs the length of a paved driveway which in addition to a chicken-wire fence separates the yard from the vines.

49-GA-CH: GALLO, CHIOTTI BLOCK

Situated on the alluvial plain of Dry Creek, the abutted undeveloped landscaped rises steeply at an angle of 45 degree. With a Southwestern aspect, the vegetation is characteristically dry and sparse, dominated by *Ericaceae*, (manzanita and madrone), Toyon, blue, live, and to a lesser extent other oaks, as well as Digger Pine, which commands the ridgeline. In general there is little topsoil, mainly sharp rocks and clay, but this cracked and sore hillside is concealed by myriad dried leaves in places half a foot deep, which lay undecomposed. Vegetation commences almost as soon as the vineyard stops, with a narrow dirt cat path demarking where the one ends and the other begins. This road becomes a driveway lined with various fruit trees, olives and Oregon crabapple. There has been no management of the wooded slope, but a high fence has been constructed about 25 meters from the road to keep boar out. On either side of the fence the ground is well trodden and it seems that the construction was rather recent.

49-LW-B: LAZY W RANCH

A small vineyard encircled by dense deciduous hardwoods, predominantly box-elder and native walnut. Plots lie on a gentle slope that leads to the densely vegetated banks of the Russian river, some 20 meters beyond the end-point of the transect tape. Probably because of seasonal flooding, more so than overstory density, there is little plant life beneath the trees, where dusty piles of branches and small uprooted trees dominated and forward this hypothesis. This entire wooded area is fenced off, as is all adjacent properties, with a dirt road running beside. Close to plot 1 another road running perpendicular from the first travels toward the river, and trails set by mountain bikes and hikers also criss-cross the stand. On the other side of the property, (where there is no transect), further from the river a different ecosystem can be found. Here the canopy is a patchy quilt of *Q. lobate*, *Q. garryana*, *Q. agrifolia*, *F. latifolia*, *U. californica*, with planted *S. sempervirens*, *P. radiata* and *Prunus cerasifera*. With an open and much developed understory, beneath these trees, *Baccharis pilularis*, *Toxicodendron diversilobum*, *Lonicera hispidula*, *Rubus ursinus* and *armeriacus*, various *Vitus species*, *Conium maculatum* and an assortment of non-native grasses abound.

49-NS-MA: JIM NEWSOME, DRY CREEK MALBEC BLOCK

Transects run through densely wooded riparian vegetation, across Dry Creek, which lies only 20 meters from the vineyard and access road that runs the vineyard perimeter. At the road's edge is a length of struggling conifer, Douglas-fir and redwood, creating dense mass and offering no view of the river, (except where they have not been planted). Otherwise this barricade is broken only by occasional willow or cottonwood whose branches penetrate the evergreen wall, from lower on the slope. From the road the land dips some 3 meters over the first 10 meters of the transects before either leveling off or being interrupted by sandy swales. Behind the needled vale, an unplanted volume of deciduous riparian hardwoods dominate, in particular white alder and various willow species. Beneath which tangles of grape, blackberry, vinca, and the young seedlings of box-elder and walnut make their claims, amidst the sand and woody debris cast from the creek during the last winter. The water, flowing as a result of a release from an upstream dam, is bitterly cold, clear as an old masson-jar and flowing at about 2ft/second. At the

first transect the Eastern bank is a sandy loam with much sign of undercut, whereas the Western bank is also sandy but with a more gentle rise from the river and less evidence of erosion. There is little algae in the stream, and the bed is composed of gravel of 2-3 inches in diameter, polished round. Here the river is 28 meters wide and from the Eastern shore to about $\frac{3}{4}$ of the way across, waist deep. At the crossing of the second transect the stream is much the same only that there has been much less human disturbance here and as a result the bramble has grown in thick along the sandy banks, hiding or hindering any erosion, as previously encountered. Here the river is as much as 3 feet deep, but only near the middle $\frac{1}{4}$ of the creek. In general it is less than 1 foot deep, and 16 feet wide, with much larger cobble comprising the stream bed than elsewhere encountered. For the third transect the Eastern bank again showed signs of undercut and erosion, likely owing to steep topography, with the land dropping 2-3 feet to meet the stream. That said, the Western shore is buffered by 5-6 feet of river rock and sand gradually rising to form an alder clad berm, and as a result was rather well vegetated and stable.

49-GK: GOODKIN, CABERNET SAUVIGNON BLOCK

Here the stream and surrounding vegetation is little different than at the Newsome property, probably since the plots at each are no more than 40 meters from one another. Again, a road and row of redwood and douglas-fir serve as a boundary between the vineyard and undeveloped land beside the Creek. Yet, copious amounts of briar and runaway grape on a lattice of thick dead grape vine snake below the lowest sprays of the evergreens, creeping out towards the vineyard block. Further South this unwitting wick is cut short by a large white house, with Victorian ornamentation, though obvious contemporary construction. Unlike Newsome, Goodkin is situated somewhat further from the creek, such that, from the origin, the transect never quite spans the width of the creek. Blackberry, scrawny forbs and vinca carpet the understory of a nearly pure stand of Alder, which arise from folds of sand and round, river cobble, (previously described at Newsome.) On each side of a narrow channel, (12 meters), a steep, but sturdy banks, showing signs of little or no erosion frame the much riffled stream. On the western embankment depauperate spools of blackberry and grape, and stone clutched alder roots hold the earth in place. On the Eastern shore a broad, 10 meter, spill-way of rock forms a textured expanse, gradually receding to the clear water, a maximum depth of 3.5 feet.

28-DC-A1: DR. CRANE, BECKSTOFFER VINEYARDS

Riparian vegetation begins no closer than 20 meters from the vineyard. Between the nearest grape and the plot origin there can be found a broad, paved road frequented by Harold Smith & Sons Construction as well as a large gravel turnout Also to be found: backhoe attachments, parked cars and an installation of, avant garde concrete art, which probably serves some sort of utilitarian purpose in the construction business but seemed equally worthy of the MOMA. Behind these concrete monoliths a fence which, in addition to a dirt road, encircles the vineyard. Moving away from the vineyard/plot origin, on the other side of the paved road begins a thicket of *Baccharis salicifolia*, and *Salix exigua*, with a smattering of *Q. agrifolia*, and *S. laevigata* poking out of this bramble. In some areas, the shrubbery has been cleared and replaced with irregularly mowed grass with small plantings of *Rosa californica*, *Sorbus californica*, and *Q. lobata*, all thoroughly parched and wilted but enshrined in little wreaths of gorilla hair mulch, as if to compensate for the neglect. Past this hackneyed landscaping endeavor would run a seasonal creek, carved 2 feet deep and about 4 meters wide. Dry now, all that remains of the springtime flow are the flat rounded stones of the creek bed and a thick mat of greying, sun-stressed algae, dry and in every way like a moth-munched wool blanket. With each bank so overgrown with *Baccharis*, *S. exigua*, grape vine, Armenian blackberry, Elm-leaved blackberry*, Virginia creeper and every other imaginable vine found in the area, it is difficult to sort out the

exact shape of the bank or its condition. The transects continuing across this drainage, approached a great mound of earth, perhaps some sort of levy, on which in the low spots oak, walnut and buckeye persist. Beyond this area the transect ended in a mowed lot, scattered with fire-sprinklers, or in a gravel pad, filled with parked cars, construction equipment and materials, the property of Smith and Sons.

**ELM-LEAVED BLACKBERRY: Rubus ulmifolius var. anoplothysus found in abundance on site, but not represented in any of the transects.*

28-RJ-CH: ROBERT JORDAN

Other than the near proximity of transect 2 to a reservoir, and a Sunset-magazine-modern home situated amidst the vines the only vegetation in any direction for as far as the eye can see is grapes. A venerated Kansas, with pretensions, here the endless monotony of corn is substituted by endless Chardonnay. Each transect then, is situated along the drainage ditches that shoulder two cross roads through the rows. Transect 1 ran South-North the length of a mowed ditch, East of one of the dusty access roads. Defined by dry grass, and a few desperate forbs, a small pile of gnarled grape vine, pulverized through a chipper can now be found lying in a pile. Transect 2 ran East-West, (parallel to the line of insect traps), nested between a cyclone-fence fortified reservoir and a road part-paved and part dirt. This strip of land no wider than four meters is a grassy swath deadened from parked vehicles and the b-n-b's and grape crates stored on site. While several walnut can be found growing further up the road, at this plot the largest bole is a power-pole.

28-VF-12: VINO FARMS, BIG RANCH ROAD RANCH, BLOCK 12

Situated along the snaking of the Napa River flood plains, this vineyard block lies within an oxbow, such that stands on the dirt road that parcels the vineyard block squarely in two, it is possible that in walking North, East or South, from that point, one would encounter the same stream. At its widest the block is 150m when moving in a Northeast direction. It is along this axis of 40 degrees, perpendicular to the vine rows, that the transects run. Transect 1 and 3 travels Southwest (220) degree and Transect 2 travels Northeast. On either side of this thin ribbon of the Napa, dusty roads closely follow, and in every direction the landscape has been converted to vineyard, or subdivision on the nearby Big Ranch Road. At transect 1 and 3 dense vegetation tightly adheres to the steep, narrow, streamside. *Salix*, elderberry and walnut dominated, and a sparse but vigorous understory of Vinca, Horsetail, and falseglove hug the steep Southern slope. Spindly snowberry, poison oak and blackberry define the less severe, and more expansive Northern bank. Though a thick bramble, at Transect 1 this vegetation has been cleanly weed-wacked, sculpting a tidy 3 foot wide path from the plot origin, all the way to the creek, perhaps on account of the nest-box found along this transect.

Here, the river cuts a deep gorge of 15 to 20 ft. Largely dry and comprised of a mixture of sand and gravel the stream is no wider than 8 meters, with harsh scoured banks or dense briar. Where standing water can be found, it is in deep round pools, like oversized potholes, and under the shade of the willow it is surprisingly clear and free of algae. Both transects 1 and 3 emerge from the willow on a wide road of rich, dark bottom soil, and freshly ploughed vineyard rows. Though closely tended, with the vines young and the water and light they receive more than ample, soft-chickweed, white morning glory and an inordinate number of horsetail have taken root around the base of these slender vines. Many of the willow that line this road have been cut back severely, or removed entirely, with haphazard piles of slash remaining.

At transect 2, the stream's basin is far broader, with this particular point in the flow apparently intermittent or abandoned by a changing whim of the river's direction. Now simply a broad trough, at the lowest point, where

season seepage might stagnate, rush, blackberry and sedge persist. Further from this swale, beside the vineyard, shrubby live oak compete with snowberry and poison oak beneath a few arching valley oak. The roads, the vineyards and signs of mowing aside, there is much to suggest that attempts have been made to manage this jungle. There is fresh evidence of herbicide use on blackberry and other forbs at Transect 2.

49-CB-RO: CONSTELLATION BRANDS, RIVER OAK

Beginning at the top of a levy some 10-15 meters from the vineyard, separated by a mowed swath of grass striped by the tires of trucks and tractors, an impenetrable hedge of giant reed emerges running the entire Northeastern edge of the Bock. To the Southwest, nearest the out-buildings and offices, Lytton's Ditch a narrowly vegetated channel bisects the property. Whereas a long history of management along Lytton's Ditch, and in all other direction more vineyard or neatly manicured landscapes can be seen, the Northeast corner of the property edges the Russian River, at a point where its normally deep tapered form seems to espalier into thin branches across a vast tract of swales, sandbars, and wintertime islets. Even after walking 150 meters past the plot origin, situated at the periphery of this everglade, the main stem of the Russian never appeared. All told in areal photos this wild expanse is shown to rival the vineyard block itself, in proportion. Past the initial 5 meters of reeds growing an inch in diameter and less than an inch apart, the silhouette of a copse of dwarfing walnut, shadow out most of the ungainly understory, with only low growing blackberry and vinca, as the landscape bunches up creating mounds and troughs, which at some point might have held water, but now show neither evidence of flow, nor evidence of any discrimination in flora. Soon the landscape flattens and the pure stand of walnut becomes sparse and interspersed with dying cottonwood and shrubby willow. Well lit and open, even in the shade of the occasional clumping of trees an understory of wilting mugwort and 6 foot tall poison hemlock, brittle and hollow predominate. Currant, blackberry and California Rose make awkward appearances in the footprints of fallen snags and where the soil is too rocky with river cobble for the hemlock to gain a footing. Beyond 50 meters *Salix* clustered spillways and the yellowed canes of hemlock persist seemingly indefinitely.

49-MA-FL: MASSONI, FOREMAN LANE

Though the two transects run within 30 meters of each other, with a ragged canopy, the underlying vegetation varied greatly between the two. While Transect 2 maintained a dense overstory of Red willow and Oregon Ash, Transect 1 had only a few scattered walnut and low growing willow. As a result at transect 2 the understory though at the onset a thicket of grape vine, blackberry and misshapen willow branches, became a verdant incline of tall green grass, nettle and snowberry, the latter curiously cotton-candied in cobwebs. Maybe watered by a spring or the high water table of Dry Creek, the edge of the transect was in a dense grove of willow whose branches made a interlocking mess, like jack-straws. Transect 1, however was far less tame. A steep slope of blackberry, poison oak and shrubby live oak, lead down to a terrace of reeds bordered by tall mugwort, whose stalks heavy with flowers were held up only by the fact that there was no space to bend or fall. Like the mugwort the reeds grew, tall, thick and close together, such that nothing else grew in this 20 meter stand, and it was entirely impenetrable. Even a machete would have been no use as there would have been no way to swing it. Stems were between 1 and 2 inches thick and separated by no more than a centimeter. Trecking around this landmark, through a springy vegetative bedding of grape, blackberry and mugwort, the reeds were cut short in their northern advance only by an abrupt cliff over which cascaded a jungle-gym of short willow, trellising hearty vines of grape. The willow persisted in their disfigured dissent, to a tributary of Dry Creek, which in its present state might have easily been mistaken for a gravel road. In general there is little evidence of intrusion into this vegetation. Some wooded grapes stakes and a few old cars lay abandoned. Otherwise there has been some shearing of the willow and live oak that skirt the dirt road that divides Dry Creek from the vineyard block.

A deep wrinkle in an otherwise flat narrow valley, Mark West Creek forms the Southern boundary to the vineyard block, (however both sides of the creek are owned and managed by VINO Farms.) Populated by myrtlewood, and ash predominantly, (in the immediate vicinity of the transects), elsewhere box elder, Oregon white oak and valley oak, can be found in equal abundance. Though a meager stream, with little visible vegetation from the dirt road, which defines the edge of the riparian vegetation, the narrowness of this ravine is made up for by its depth, such that the tallest red willows along the basin are hardly visible from the vineyard. Various invasives have found their way into this break, with hops, churning in the waves of blackberry and grape that pile up against the road, and acacia pushing up through the myrtlewood overstory. Though, there are a fair number of large diameter boles, many are clumped close together, or reiterated, as in the case of the myrtlewood, and most grow either at the top, or the very bottom of the slope, making for a rather open understory. As a results the North and South slopes are riddled by vines, gangly roses, snowberry and slender stalks of poison oak.

Mark West Creek is only about eight or nine meters wide of stagnant water, brown and turbid, glazed in a marbled mat-finished sheen thick enough to hold the rising bubbled from beneath, and populated by no more than water-striders, worms and mosquitos. The Northern shore, a flat muddy expanse with intermittent sand and inlets framed in mud-washed logs and limbs of sizable diameter, is scattered with the white remains of some small clam-like shellfish. On this flat algae, hearty grasses and sedge provided a verdant respite to this otherwise decomposed sepia landscape. The Southern shore presents a more shear slope, and where the wooly tangle of blackberry and grape ends, three to four feet of undercut raw earth emerge from the stream. Though technically a stream, in all regards this oozing seep far more closely resembles a slough or ailing estuary than a creek.

28-CL-2W: CLIFF LEDE: TWIN PEAKS RANCH, BLOCK 2W

The transects ran up the western aspect of a grassy, 30degree slope of a rounded hillock, that rises an abrupt 60 meters from the surrounding Napa Valley near a vast, flat stretch between Yountville and the Silverado Trail. Covered in a park like scattering of mature blue, valley and live oak, the grass that surrounds is mowed up to the property-line and barbed-wire fence that halves this great mound. About a quarter of the way up the hill a gravel driveway, with a concrete retaining-wall on the uphill side and leading to a set of study doors of an underground wine cellar, (or bunker???). Outside, on a cement pad a large refrigeration unit grows. All the bottom of the hill a broad ditch distinguishable from the grassy hill less by depression or sign of past flow than by the heavily armored banks. To the West of this ditch a gravel road and beside this the vineyard itself.

28-CDV-A5: CLOS DU VAL

Running for about a mile along the Silverado Trail, the vineyards persistence is interrupted only by the lone farm-house sublet unit of Andrea and Eric Anderson. Sitting on about a half-acre, the perimeter of their winter home is hidden by a high wooden fence, which holds the vineyards at arm's length. In addition to the fence, on each side of the property a road can be found. To the West, the Silverado trail separated only by a thicket of oleander and a narrow gully of red and white papaverum sp. To the north a dirt road, onto which Calimyrna figs spew from the other side of the fence. To the West and South an asphalt paved road meanders around the house toward a neighboring winery. Other than grapes there is very little vegetative variety found beyond the confines of the fence other than a row of roses and butterfly-brush severely pruned to the ground, some lambs ear, a middle-aged valley oak closely hugging the narrow divide between the dirt road and the asphalt, and the towering snag of what might have been a Monterey pine.

Inside the property can be found a yard with tidy plantings and copious green grass. On the western face, a drive way enters from the Silverado Trail, with a copes of struggling redwoods all of stunted stature and dwarfed by a slender liquidamber growing in the center of the yard. Up against the house, and near a pump house small clusters of water birch. Both buried septic lines and water pump, plus tank, seem unwisely situated here. Viney nadina and other domestic shrubs ring the house. In the back of the house, more water birch, a stout alder in the far South east corner, (shading one of the two fruitful figs), and a few gravensteins in halved wine cask, while rope wisteria drips blooming boughs down over a broad veranda.

49-GA-R13: GALLO, DEL RIO

A seasonal water way at best, a twisting crease in the landscape, it is distinguishable as a riparian habitat only by the dense knotted screen of willow. The entire area is separated from the vineyards on either side by wide tracts of unmowed grass, still green at the time of the survey, (though already August), and lain flat in places where a tractor had been. A barbed wire fence also hems the willow, containing not only the wild vegetation within, but small herd of goat. A graveled road runs parallel to the first transect, just outside about 6 meters from the tape, and removing all vegetation in its path since there is no creek to ford or place a bridge over, a narrow culvert suffices. That said, while there are few signs of a discernable stream bed in most places, other than a few crusty depressions, the soil remains moist and ferns and other vegetation can be found, though this may be the product of an irrigation release valve which occasionally gurgles water into goat pen. At transect 1, most of the vegetation has been removed, thoroughly pulverized or devoured by the goats as recorded in the willows twisted limbs and scarred bark. Only noxious and thorny weeds, too hearty or unsavory for the creatures, persist. At transect 2 however, the vegetation has been much less disturbed, if at all, by the goats. Ingrown willow, almost exclusively *Lasiolepis*, make traversing the 40 meters a 30minute ordeal. Beneath and within the willow, (which have made every best effort to occupy all available space), rose, poison oak and blackberry ramble and creep in great abundance. Again, even while more isolated from the disturbance of man or goat, the watercourse seems indeterminate in direction, though some cattail can be found nearby. The last 10 meters of the transect exit into vineyard, which as previously described is characteristically unmowed.

49-GA-T34: GALLO MACMURRAY RANCH

MacMurray Ranch lies at the narrow end of a valley, with block T-34 nestled between the steep gorge of Porter Creek, and a dense conifer, mix hardwood forest found on an even steeper slope. Transect 1 ran from an asphalt drive that followed the vineyard edge down to Porter Creek, and back up the ravine to a enclosed pasture. Much of this vegetation was tall, lanky Red willow, growing from the road side to the pasture. Myrtlewood, could be seen as well is solid numbers along the roadside and alder and elderberry could also be found in disheveled patches beside the slender stream. The Southern bank was a gentle slope down from the road, with invasive mint, blackberry and mugwort filling in the lighted pockets of an otherwise vacant understory, carpeted in laurel leaves. The other bank was a 45 degree slope of silty, crumbly clay, though showing little sign of recent erosion. The bank climbed through about 10 meters of briar before emerging on a tight stand of slim box elder and willow, with an spongy low groundcover of decaying wood and and low growing blackberry. Beyond this stand the pasture, of horse-trampled grass and pernicious and brightly colored weeds, and thistle. While, there appeared to be little evidence of human activity in this ravine, a small number of abandoned irrigation pipes and evidence of trees transplanted, sometime in the last 20 years could be found. Also, some undergoing study of the Porter Creek watershed for the sake of restorative work appeared to be underway just upstream of the transect.

Extending from the strip of closely cropped grass to be found extending for about 10 meters beyond the vineyard, Transect 2 traveled South toward a densely wooded hillside. Between the transect origin and the abrupt slope three things could be found. First: 20 meters of invasive blackberry reaching 7 feet high, and competing with no other life. This bramble ran East-West for about 60 meters. Second behind the blackberry and at times partitioning the blackberry a row of big-leaf maple and dense fairing rings of redwood reaching 100 feet high. Third, following this row of maple, a low split rail fence and asphalt paved road about 10 meters wide. Set against the bank, the road beds width made for an L-cut into the back accentuating the already steep slope. The Slope with varied between 90 degrees where cut and 60 degrees rose well beyond the 20 remaining meters dedicated to the rise. For the most part, the hillside was at a distance dominated by sturdy doug-fir rivaling the redwoods in height and diameter. However, these trees began in great number close to where the transect ended, so much of what was encountered was maple and myrtlewood, which had laid shallow, thick roots into the bank. The understory here was more of what one would expect to find in a proper forest, with much duff, wind-clipped branches, and understory plants like dogwood and hazelnut, lady fern, sword fern and starflower.

28-EV-2&3: EVANS' VINEYARD

Situated in a gentle Valley, Evans is rooted in half in the rolling Napa hills and half on the flat rocky ground beside the rugged Soda Creek Canyon, necessitating separate discussion of 28-EV-2 and 28-EV-3.

Regarding the two transects located at 28-EV-2, at 200-250 meters from the Creek, the vegetation was sparse, populated by grass and a few drying star-thistle. A scattered tableaux of blue oak and curious bronze sculptures of colossal pan-flute-playing Giacometti-gaunt jackrabbits, commanded the otherwise humble, bucolic scene. Separated from the vineyard by a road, yellow and dusty, the transects moved North along the crest of a parched hill. At about 25 meters the transects passed onto another property where the long blades of grass, though still golden, were closely cropped and a large white Victorian could be seen. With the exception of this house, a few hardy natives planted around the driveway and the clipped yard, the vegetation on this side of the fence was little different. Close to the origin of transect 28-EV-2-4 was a collection of 5 concrete water tanks, nearest the hill's summit. The tanks were overgrown in ornamental grape and engulfed in grove of olive.

28-EV-3, Transects 1, 2 and 3 lay beside Soda Creek Road, from which the vineyard was separated by an scraggly row of live oak growing along a barbed wire fence. Behind this fence a berm or rock and cobble removed from the formerly stone studded soils of the vineyard. Beyond these piles a dirt road and then the vine rows. Transect 1, which was nearest the gated entrance to the property originated in a dense stand of about a half dozen oak and myrtlewood. Though outside the scope of the transect, the gate was framed in elaborate plantings of Papaverum, buck cascara, olive, manzanita, roses and some other domestic shrubbery and ornamental grasses. Within 10 meters the transect had emerged onto the Road and in another 10 meters entered a long driveway to one of the houses found in this neighborhood. The private property was bounded by Chinese Privet tree, blue oak, Coast live oak, Doug-fir, redwood and English Ivy. Transect 2 and 3 made greater progress toward Soda Creek. On the far side of the Road Transect 2 emerged on a flat of grass occupied only by a small goat pen. The overgrazed parcel was largely matted down grass, baled hay and a few native trees, digger pine, blue oak and a Century Plant, and its range was interrupted only by the harsh ravine of Soda Creek. Transect 3, upon crossing the Road made an immediate plunge into this deep severe canyon.

Soda Creek Canyon:

A robust drainable, it is an exaggerated and rugged wash, bone dry but with large and rounded cobble and boulders seldom smaller than bowling balls, thrown together amidst terraced veins of pummeled volcanic spit. The Eastern bank, (nearest the roadside), is a vertical stone face of 8 to 10 meters. Earthen red, weathered and torn at like a brick wall, the canyon is at time like a narrow alleyway. However, more often than not the opposing bank is

less sever, and in the creeks approach to the area surveyed in Transects 2 and 3 a wide flood plain of clay and mire plastered over underlying river rock, can be found. This Western shore is hugged exclusively by buckeye, and their leafless white limbs make a dappled grassy expanse that extends across the flat western shore for 30 meters, before giving way to pasture.

28-CN-D: COHN VINEYARD:

Set close against a hillside, (30degree slope, facing northeast), the transects run perpendicular to an asphalt road along the vineyard. On either side of the road spaced about 3 meters apart, a long row of pollarded ornamental cherry, which run for about 150 meters North before encountering a larger road shared by Inglenook, and about 30 meters South before encountering a stately farmhouse. To the east a dirt access-road running parallel to the pavement and bordered by grape vines. To the west, about 2 meters of mowed grass, followed by a ha-ha and another terrace of mowed grass, which bleeds away to forest. The forest is a mix of impressive Douglas fir, casting tall shadows over bigleaf maple and live oak bellow. Snowberry, poison oak, and honeysuckle vines push up through a bedding of fir needles. Through this stately grove Transect 2 cuts up the bank uninterrupted for 40 meters before emerging on a second vineyard block at the top of the hill. Further North, the fir become less dominant, and are replaced by the pale snags of Monterey Pine. Here, a myriad of oaks, as well and myrtlewood and madrone reign. Transect 1 Run through this stand within a few meters of a dirt road that divides the forest from the same vineyard block encountered in Transect 2. Evidently, this vineyard block makes a like a mitten around this peninsular shaped woods. At 33 meters the tape leaves the understory of the oak entering upon the vineyard.

28-SW: SPOTTSWOODE ESTATE:

Spottswode is in its entirety centered in the middle of suburban St Helena. All transects are impeded not by residential property lines so much as the absence of vegetation at all. For Transect 1 only a single species was found with a stem greater in diameter than 1cm, a planted English walnut, which comprised an uneven row of such tree, (and a few domestic varieties), that accompanied the long ranch-rail fence that held back the city blocks on each side. Beneath the walnut a few tufts of grass, and walnut husks, crushed under the tires of the trucks that traveled the dirt road that lined the vineyard block. On the other side of the fence, Hudson Street, a wide yet sleepy thoroughfare, with many gaudy painted Victorians by its side. Directly in line of the transect, the porticused stoop of a Plantation-style upstart, whose front door would likely sit no more than 25 meters from the origin. A conservatively manicured yard, the plantings included a semicircle of Kelly green grass, planted with tree-of-heaven, ornamental cherry, loquat, domestic rose, lavender and less significant shrubbery. Reaching up over the house from the back yard a grand valley oaks arching arms could be seen.

Transect 2 ran entirely the midsection of a vineyard access road. To one side of the bare, dusty road the vineyard, and to the other side a private residence, perhaps rental unit of Spottswode. In any case the careful planting, fences and lack of curtains, made snooping about the grounds only possible with much discretion. The landscaping that surrounded these small bungalows was as follows: 2 decently large Liquidamber, three small olives, an Elm, possible honey-locust, a few dehydrated redwoods and a cohort of shrubby live oak. Rising from a groundcover of bare earth, mulch or bark-chips, English Ivy, lambs ear, yarrow, naked ladies, squash and pumpkin, domestic rose, and other domestics of the Rosacea clan could be found. Transect continues for 50 meters before dead-ending at Hudson Street.

28-SLV-FAY: STAGS LEAF VINEYARD

Transects 1 and 2 run perpendicular to a gravel road and nameless drainage. The shoulder of the Road at Transect 1 is a broad grassy tract, flat and mowed, with a few planted oak. Further North, the road swallows this unwitting meadow in gravel, tire treads, and the outbuildings for the vineyards operations. On the other side of the brook are guest houses swathed in a grove of redwoods, with an equally neatly manicured understory. All but a few large oak and the vegetation growing in the stream would appear to be planted or managed in some way. The stream, which here is no wider than 2 meters, runs a straight channel, forced in its direction by a gauntlet of concrete slabs which armor each side. In spaces between the slabs dogwood, alder and a few small forbs have established themselves. The creek itself is dry and the basin sandy and ribbed with blackberry vines. Transect two runs in the middle of the traffic and outbuildings previously mentions. Also crossing the creek at a point far deeper and wider, (though equally contrived with shear wall of concrete and riprap), within 5 meters distance of the tape, two bridges can be found. On the far side of the stream another, lesser road can also be seen. Beyond this road a landscaped berm dotted with ornamental grasses and domestic shrubbery. Meandering the top of this berm a path of crushed blond gravel, and beside the path a large man-made lake, the watered died teal-blue. At the origin, a few hold-outs remain, stout valley oak driven to the stream side by propane tanks and rusty gas-burners. In the basin a few willow cling to life. Transect 3 travels in the opposite direction along the fence-lined, oak-studded meridian that divided two dirt roads and the vineyards on each side of these roads. The oaks are all of a massive size, primarily valley and live oak. Beneath battling it out amidst tall dry stems of grass a multitude of live oak seedlings.

28-FO-513: CONSTELLATION BRANDS, FRANCISCAN OAKVILLE ESTATE

A vast area occupying the broad American canyon, Franciscan Oakville Estates hugs the banks of the Napa River. Though either side of the river is entrenched with grape vines, and the landscape leading down to the river is a gradual slope of rich fertile soil, an unprecedented 30 to 150 meters of riparian area has been maintained on each shore. The vegetation has however been recently disturbed with the western bank in particular leveled of all vegetation down to and including the Napa river. Numerous areas of bare earth within 100 meters of the stream can be found, and at the site of the First Transect which ultimately terminates in on this exposed soil, no more a few lone walnut trees and slash can be found. The denuded landscape had been sculpted and built upon by graders and dump-trucks, and the flow tortured into a less channeled flow, and stagnated with recently implemented plug-n'-ponds, and swales. The operation, which would seem to aim to restore this landscape, leaving the earth as raw and as disturbed as a freshly plowed field, is mitigated by a few irrigation pipe running from the vineyard to water clumped shoots of recently planted willow stakes. While the Western bank suggest what is to come, the far Eastern bank, (outside the scope of this survey), may be indicative of what was. Patchily forested in myrtlewood, walnut and live oak, at the river's edge this gentle rise is laced in tall red willow. Perhaps owing to the banks' gentle slopes or the efforts to will the stream into a less forceful flow, little signs of erosion or undercut can be spotted where the riparian vegetation has not been disturbed. The Stream is about 15 meters wide, and the stream bed earthen, maybe as a result of the work. The water is relatively stagnant but clear, however occupied by copious amounts of invasive yellow primrose, algae and a fry. The stream is at a most, 1 foot deep.

28-RM-WCH-3: CONSTELLATION BRANDS ROBERTA MONDAVI, AT WAPPO HILL

A large operation, this particular vineyard block is a small isthmus of vines wedged between the steep range and oak woodlands of Wappo Hill and the Napa River. Here, the tame Napa River has eroded a deep muddy canyon through the flat bottom land. On either side of the river a crown of white oak, live oak, walnut and willow, for all dense shade these trees provide and even denser snare of head-high blackberry, snowberry, poison hemlock and grape abound beneath making access to the stream a grueling ordeal. At the first transect the stream is wide, at least 15 meters, and stagnant. With low turbidity there is enough clarity to see the bottom, a depth of 1.5-2 feet, populated by some fledgling salmonoid. The banks and basin are a muddy silt, at times with strands of clay or gravel, and all very much eroded with steep crumbling slope of 80degrees and rising 10 feet, stitched together by tree roots, and briar. Further up-stream a large expansive sand bar bottlenecks the flow to a few feet, a trickle no deeper than several inches. Where the second transect crosses the river is no wider than seven meters. The Eastern bank a continuation of this sand bar and equivalent in width to the flow itself. The sand bar, is comprised of aggregate no large than 3 inches in diameter, though much is the size of pea gravel. The Western slope is a steeper earthen bank frothing in briar, willow and sedge. The third transect, can be found to the North of this sandbar, and like Transect 1 spans a shallow stagnant pool of about 10 -20 meters, very shallow and muddy, and with steep chocolate brown banks on either side, undercut and exposed.

28-TF-CH-2: TREFETHEN WINERY

Trefethen, another vast winegrowing estate, lies just off of Highway 128 with property boundaries being Oak Knoll Avenue to the South and Dry Creek, a tributary of the Napa River, to the North. Squarely in the middle of this property can be found Plot 1 which lies on about 5-10 acres of field. Recently hayed, no live grass remains and no green plant above ankle height either. A relative even distribution of forbs, such as groundsel, white morning glories and wild radish. Hay was baled and ready for transport. The Northern Corner of this spread lies at the crossroads of two maintenance roads. On the other side of these roads vineyard. To the south and east the grass also gives way to vineyard. In all direction, nothing breaches the horizon of grape vines, except for the bales of hay and a massive valley oak about 40 meters east of the Origin. Transect 2 crosses the narrow wash of dry creek, which has sliced a 5-10 feet deep gulch through the flat grape rows. The sparse riparian vegetation lies largely in the dry stream basin and in largely willow. Above on the same plain as the vineyard oak walnut and escaped honey-locust border. The vineyard is separated from these trees by about 15 meters of mowed grass, or rows of mature English walnut. The Transect Origin, which can be found at the end of a long dirt road is flanked by a risen earthen levy of a great reservoir. On the other side of the creek another vineyard, of another winery. Here the stream is hidden from view by a long row of redwoods. The transect pierces this curtain at 40 meters. Beyond this point nothing but a dirt road and a sea of Syrah.

28-JP-RR: JOSEPH PHELPS

Separated by a sow barn and a few acres of cultivated land, host to a variety of cultivars of pumpkin, the riparian vegetation commences some 30-40 feet from the vineyard. With a few great oak, walnut and cottonwood, the dispersed stands of hardwoods left a great open understory that grew 6 feet high with the sun-dried stems of hemlock. While vinca, and grass could be found in the shade of the trees, briar, snowberry and grape seeped across the landscape toward the Napa River, disguising the many ruts and ditches that lay in their path. In places, where

the transects ran thickets of bush narrow-leaf willow, or a primeval jungle of Tree-of-heaven poked holes through the brambles blanket. Regarding the Napa River, at its widest the stream is 10 meters and embraced by rocky willow-cover shoals of rounded flat rocks, rarely the size of a half-dollar. Algae is everywhere and where there is not a drying woolen mats of the stuff stretched thin over the stream bed, occasional larger cobble and intermittent puddles of an ever evaporating, stagnant soup can be found. Evenly littering this wash thousands of glittering rhinestones, of dead snail shells, each no larger than a pebble. Both banks rise gradually from the river, and the far shore is stocked with blackberry and cattail. There is little sign of erosion or disturbance.

28-RD-24: RUDD ESTATE

A hot exposed south facing slope, rising at about 20degrees, there is little in the way of lush vegetation beneath a corkscrew twisted cover of bending live oak and madrone. Predominantly the understory is barren, with the exception yellowing grass, dry leaves and red earth, which paints the large rounded boulders that have be birther from the loose soils. Where shattered these great stones reveal themselves to be a slate grey and blue, and sedimentary. The multitude of rocks have found a place as part of a high stone fence, some 30 meters from the dirt road, that separates this oak woodland from the vineyard and encircles the block. The earth, the stones, the enduring vegetation and digger pine, call to mind a serpentine community, however no serpentine can be found. (Later research did reveal that the geology was Andesitic to Basaltic.) Between the stone fence and the vineyard road, there is little in the way of management. However, on the opposing side of the fence, there has been considerable manual clearing of weedy olives, and catty-corner to this property the entire hillside has been razed of all oak with only knee-high stumps persisting. Along the dirt road that runs the margin of the vineyard block great browning bundles of grape vine shoots lay end-to-end.

28-IN-BCF-2 INGLENOOK

Nestled against the east-facing slope of a small hill that protrudes into the valley into which Inglenook is nooked lies Bridge Block, Cab Franc. Transect 1 runs West up this short wooded hillside, dominated by blue oak, digger pine, and prodigious amounts of pale stringy olive trees whose collective argentine appearance casts the butte in a faded glow. At the base of the hill a dirt road beside the grapes, and a small area of mowed grass. The Vineyard rows are neat and plowed, and while some briar can be found on the slope, the vineyard had made efforts to eradicate the blackberry by hand, particularly where it has crept into the blocks. Pushing past an initial stand of oak, the forest becomes quickly consumed by olives, and where as the steep rocky bank beneath the shade of live oak and blue oak is auburn with fallen leaves, beneath the olives, more olives, too many to count. At the top of the rise, a dusty road which leads on to another property. Peaking over this canopy several forking digger pine, as well three graceful Monterey Cyprus, likely escaped. Plot 2, can be found beside a reinforced brook, which runs a straight path, constricted by clean stone walls on either side. Here, where olive and giant reed once grew shaggy, the vineyard has removed much of the vegetative havoc, restoring the clean stone lines of the channel. Where vegetation remains in abundance is in the far Southwest corner of the block, past a bridge, where the stone walls are replaced by rip-rap or nothing at all. Here transect two travels from a lawn occupied by a great solitary oak, into the dry drainage. On the Western shore the steep bank which falls 5 meters is shrouded in reeds, and blackberry spinning out of soft rich earth constitutes the bank. The stream basin is about 4 meters wide layered in rocky gravel, and silt fines. The Eastern bank is just as steep and shows much sign of erosion with the exposed roots of willow, African sumac and Silver-dollar eucalyptus reaching down into the basin. Past this tree line a parking lot and the pressing-plant for Inglenook.



TOP: Bucolic landscape along Westside Road, Sonoma County

MIDDLE: Vino Farms, Ranch 7, near Forestville

BOTTOM: Gallo, Chiotti. Hardwood and Digger pine on the slopes of the Dry Creek Valley, near Warm Springs Dam



TOP LEFT & MIDDLE: The Steep forested slope of MacMurray's Plot 2.

TOP RIGHT: MacMurray. Example of grassy shoulder's and vegetation found growing amidst the vine rows.

BOTTOM LEFT: Lush grove of big-leaf maple, and a paved road that hugged the edge of MacMurray

BOTTOM RIGHT: Goodkin. A line of planted conifer. Once a common strategy to combat Pierce's Disease.





TOP: Mount St. Helena, near Calistoga

BOTTOM: Looking West from the Silverado Trail near Oakville Cross Road.



TOP: the Russian River Valley, looking East toward Mount St. Helena. Here the topography is defined by meandering streams, vegetated by walnut, box-elder and oak woodlands.

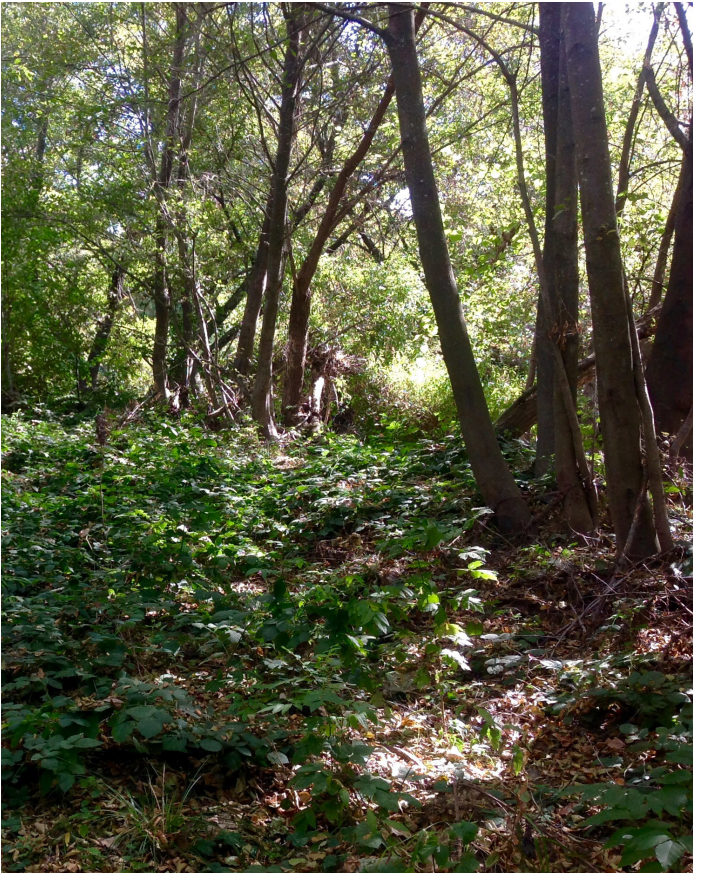
BOTTOM LEFT: Giant Reeds at River Oak, Alexander Valley. Such thickets were found throughout the survey.

BOTTOM RIGHT: Foreman Lane. Tangles of grape, reeds, blackberry and mugwort were common among the open riparian understories encountered along the Russian River.



TOP LEFT: Rudd Estate, (Sonoma). Escaped domestic or planted vegetation, such as artichoke, lemon-balm and prickly pear were well integrated into these disturbed environments.
TOP RIGHT: Del Rio. Dense patches of Salix lasiolepis, while offering little shade has a tendency to fully occupy a drainage, crowding out other plant life.

MIDDLE: Trefethen, American Canyon, Napa Valley, is exemplifies the flat expanse of farmland, here broken-up only by a block of grass.
BOTTOM: VINO Farm's Ranch 12. A dense grove of box elder, alder and walnut, make for an understory of dense, low growing briar.





*TOP RIGHT: MacMurray's wall of blackberry.
TOP LEFT: a jungle of vines at Olsen Vineyard.*

*MIDDLE: Toyon and live-oak and hearty shrub
emerge from the red soils of Rudd's Napa property.
BOTTOM: Sanai. A dense stand of alder that
typifies the riparian overstory along Dry Creek*





See next page or descriptions.



Previous page:

TOP: A restored portion of the Napa River at Franciscan Oakville Estate.

MIDDLE LEFT: Russian River during the Mill Fire in late September.

MIDDLE RIGHT: Dry Creek at Goodkin.

BOTTOM LEFT: A dry stretch of the Napa River at Joseph Phelps.

BOTTOM RIGHT: Dry Creek at Newsome.



This Page:

TOP: Stagnant flow of Mark West Creek, Vino Farms, Wohler Ranch 30.

MIDDLE: Steep ravine at MacMurray

BOTTOM: Turbid water at Wohler Ranch.





TOP: Ingelnook Estate. Note the planted eucalyptus and redwood that surrounds the main building.

MIDDLE & BOTTOM LEFT: Curious sculpture garden interspersed amidst open rangeland and copes of blue oak.

MIDDLE RIGHT: Well groomed vineyard rows at Gallo Chioti. At many vineyards this space was not so well maintained. In some instances this space was overgrown with tall grass, white morning glory and other small forbs or even horsetails. Herbicide or plow typically used to denuded these strips.





Unknow Goat Thorn: first found at Del Rio



Persicaria hydropiper



Aristolochia californica



Euphorbia spathulata



Arctostaphylos canescens



Baccharis glutinosa



Parthenocissus quinquefolia



Quercus robur

