

Whitney, Karita

From: Valdez, Jose (Louie)
Sent: Saturday, March 09, 2019 10:29 PM
To: Whitney, Karita
Subject: FW: Tree Protection Ordinance
Attachments: BOS letter 3-9-2019.pdf

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From: Jake Ruygt <jruygt@comcast.net>
Date: Saturday, Mar 09, 2019, 21:17
To: Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>
Subject: Tree Protection Ordinance

Mr. Valdez,

I would like to submit the following additional comments to the Board of Supervisors.

Thank You,

Jake Ruygt

California Native Plant Society

March 2019

To: Napa County Board of Supervisors
c/o Jose Luis Valdez, Clerk of the Board
1195 Third Street, Suite 310
Napa, CA 94559
707-253-4380
Email: Jose.Valdez@countyofnapa.org

I have attended recent meetings related to the Forest Protection Ordinance and listened to the many comments presented and there are a few themes that have been repeated by a number of presenters opposing the ordinance. I would like to comment briefly on these. I have previously submitted more specific comments on behalf of the California Native Plant Society regarding the details of the proposed ordinance and hope that you will find the comments constructive.

There are no proven problems so there is no need to fix anything: There are currently 43,500+ acres of vineyards and 30,000-35,000 acres in urban/commercial use. The 54,000 acres of oak woodland, grasslands and wetlands in Napa Valley that have been converted to human uses have been forgotten by those that present this argument. While this can never be recovered, it is time to more carefully plan any future development because the losses to date have already decreased the occurrence of Valley Oak Woodland by an estimated 90%, Napa County wetlands by 98% and riparian communities by 25-50% to name but a few.

There is no data to support that there is a problem: This writer has been studying the flora of Napa County for 43 years. The product of the study has been a publishable Flora of Napa County that awaits printing. Many native species that were rated as *abundant* or *common* in 1990-2000 can no longer meet the standards applied and have become *uncommon* or *infrequent*. This is particularly true of herbaceous species that occur in wetlands, valley floor grasslands and woodlands. Further detail and data to support this contention can be provided on request.

This ordinance will destroy the wine industry and small family farmers: It has been made abundantly clear by proponents that the Wine Industry that vineyards are the highest use of the land in Napa County. One speaker presented in behalf of over 700 growers. This indicates that this industry is financially successful and thriving. There are 475 wineries in operation in 2016 with 730 million in value, a 33% gain over the previous year. As noted above, the industry has already converted 10% of the county and 70-75% of all plantable acreage to vineyard. Interests supporting forest conservation are not trying to take these acres out of production. We support this ordinance because there is a strong need to carefully plan and protect a viable proportion of remaining natural landscapes.



Dedicated to the preservation of California native flora



Our forests are not being destroyed, the impacts are insignificant: To date, 15,000 acres have been planted on hillsides in forest, woodland and chaparral communities. This represents 12% of the 15-30% sloped portion of Napa County. Erosion and wildlife losses as well as sensitive plant issues are commonplace and have a cumulative impact.

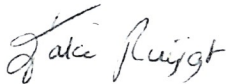
Vineyard owners are the best stewards of the land and oversight is unnecessary: There is no doubt that it is in the best interest of the vineyard owner to protect his soil from erosion and protect the productivity of the farm. This is a commendable ethic but accidents continue to happen and erosion is still excessive in places as has been demonstrated at the meetings. Invasive plants are introduced into native landscapes by farming activities. Management places weed control at a secondary level of importance insofar as there is an impact on vineyard values. Home and agricultural development is often located within natural landscapes and invasive plants are distributed between them with movement of equipment and laborers. These impacts require stronger attention and cooperation within agri-land stewardship programs. Invasive plants play a very large role in habitat degradation.

The people who speak for stricter laws represent special interests. It is the few that speak to the sustainability of the environment which should be the special interest of all residents. There is a small group that speaks up for the environment in contrast to the agricultural industry and they do so voluntarily on behalf of a perceived common interest and certainly for a personal interest of the future of their families. This is a noble cause not to be vilified.

We have too many trees already so why do we need to plant more: This is an unsubstantiated statement that can neither be proven or disproven. Botanists did not collect detailed density records in the early 19th century. The grazing culture of mid-19th century society lasted until the 1970's, when vineyard development began. Heavy grazing during the period suppressed seedling establishment and tree replacement of oaks in our woodlands and perhaps in some forest and chaparral habitats. Removal of grazing has shifted this paradigm. Extensive logging in the late 19th century temporarily reduced tree canopies which responded with perhaps greater density in recovering forests. It is also possible that nitrogen deposition from pollution is leading to greater forest density. Trees absorb carbon, essential to slowing climate change.

We hope that you will see the necessity of regulating future land conversion to better protect forest, woodlands, wetlands, stream corridors, and local biodiversity because so much has already been lost and so much is at stake if thoughtful improvements are not made at a local level.

Thanks You,



Jake Ruygt
Conservation Chair,
CNPS, Napa Valley Chapter
2201 Imola Avenue
Napa, CA 9459

Whitney, Karita

From: Sharp, Leigh
Sent: Friday, March 08, 2019 2:07 PM
To: Whitney, Karita
Cc: Valdez, Jose (Louie); Morgan, Greg
Subject: FW: Atlas Peak opposition to Napa County Watershed and Oak Woodland Protection Initiative of 2018

Importance: High

For Water Quality and Tree Protection Ordinance.

From: Cortez, Nelson <Nelson.Cortez@countyofnapa.org>
Sent: Friday, March 8, 2019 1:45 PM
To: Tran, Minh <Minh.Tran@countyofnapa.org>; Rattigan, Molly <Molly.Rattigan@countyofnapa.org>; Brax, Jeffrey <Jeffrey.Brax@countyofnapa.org>; Sharp, Leigh <Leigh.Sharp@countyofnapa.org>; Franchi, Helene <Helene.Franchi@countyofnapa.org>; Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>
Subject: FW: Atlas Peak opposition to Napa County Watershed and Oak Woodland Protection Initiative of 2018
Importance: High

See below.

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From: Samuel Peters <sampeters_apaa@live.com>
Date: Friday, Mar 08, 2019, 1:43 PM
To: Wagenknecht, Brad <BRAD.WAGENKNECHT@countyofnapa.org>, Gregory, Ryan <Ryan.Gregory@countyofnapa.org>, Dillon, Diane <Diane.DILLON@countyofnapa.org>, Pedroza, Alfredo <Alfredo.Pedroza@countyofnapa.org>, Ramos, Belia <Belia.Ramos@countyofnapa.org>, Cortez, Nelson <Nelson.Cortez@countyofnapa.org>, Tijero, Jesus <Jesus.Tijero@countyofnapa.org>, joellegPC@gmail.com <joellegPC@gmail.com>, anne.cottrell@lucene.com <anne.cottrell@lucene.com>, andrew.mazzotti@countyofnapa.org <andrew.mazzotti@countyofnapa.org>, jeriGillPC@outlook.com <jeriGillPC@outlook.com>, Whitmer, David <Dave.Whitmer@countyofnapa.org>
Subject: Atlas Peak opposition to Napa County Watershed and Oak Woodland Protection Initiative of 2018

Dear Napa County Board of Supervisors and Planning Commission:

In 2017, a few citizens of Napa County ("Proponents") proposed the Napa County Watershed and Oak Woodland Protection Initiative of 2018 ("Initiative"). This Initiative proposes to amend the County's General Plan and Code of Ordinances to curtail future development along streams, wetlands and within oak woodlands.

We, the Board of Directors of the Atlas Peak Appellation Association, have voted in the majority to join Napa Valley Vintners, Napa Valley Grapegrowers, Winegrowers of Napa County and the Farm Bureau's opposition to the Watershed and Oak Woodland Protection Initiative of 2018, wishing to assure agriculture remains viable and sustainable in Napa.

Thank you,

Atlas Peak Appellation Association Board of Directors



Samuel J. Peters
Executive Director
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MAR 05 2019

Care of California's Native Oaks

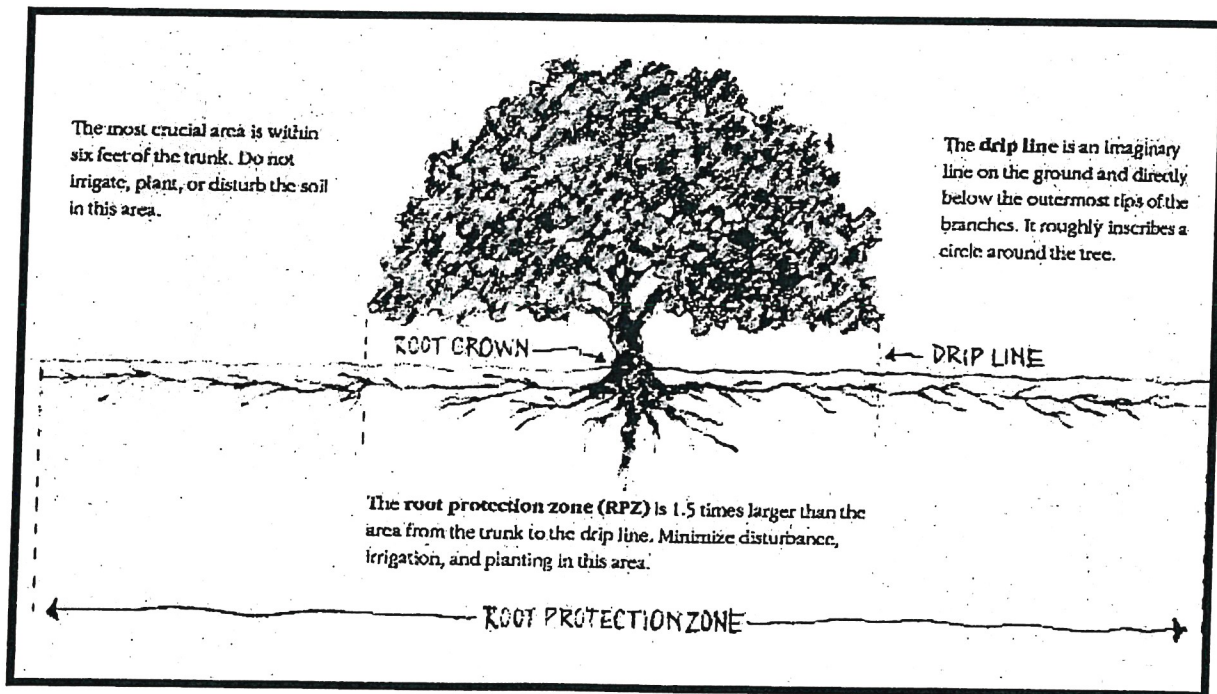
Bulletin of the California Oak Foundation

NAPA COUNTY
EXECUTIVE OFFICE

Native oaks, when young trees, are very tolerant of their environment and make excellent and adaptable landscape assets. The mature native oak is an invaluable part of our environment but does not tolerate many changes once established.

Architects, builders, homeowners, and others should be very careful in fitting their plans with these magnificent giants. Any substantial change in the mature oak's environment can weaken or kill an oak, even a healthy specimen.

A good rule of thumb is to leave the tree's **root protection zone (RPZ)** undisturbed. This area, which is half again as large as the area from the trunk to the dripline, is the most critical to the oak. Many problems for oaks are initiated by disturbing the roots within this zone.



A Word About Roots

Our native oaks have developed survival adaptations to the long, dry summers of most of California. Primary to this survival is the development and characteristics of its root system. When an acorn first sprouts, there is rapid root development and very little growth above ground.

This initial root is a tap root extending deep underground for dependable moisture. In fact, the tree's first few years are focused on establishing a deep sustaining root system. Once this has happened, greater foliage and above-ground growth takes place.

As the oak grows, the tap root is outgrown by an extensive lateral root system that spreads horizontally out from the trunk to and well beyond the dripline, sometimes as much as 90 feet. For

a mature oak, this horizontal root system is the primary supporter of the tree for the rest of its life. It includes the important fine roots, which absorb moisture and nutrients. Most of the root system occurs within the top three feet of soil. In shallower soil the root system is concentrated in an even shallower zone, typically one to two feet below the surface.

As the oak matures, particularly in areas naturally dry in summer, deep-growing vertical roots form off the laterals, usually within ten feet of the trunk. These sinker roots exploit deeper soil moisture and add stability to an increasingly massive tree.

By the time a mature oak has established its elaborate root system – so well designed for its environment and particular site conditions – it has lost the vigor of youth. It is less tolerant of change and can less easily recover to support a fully developed living structure.

To protect a mature oak, pay particular attention to drainage, and avoid filling, trenching, or paving near its root zone.

Fill Around Oaks

Soil and other materials placed on top of the natural soil level, called fill, are usually compacted. They make the soil less permeable, thereby restricting or prohibiting the exchange of gases and movement of water. Excessive moisture trapped by fill can also cause root and crown rot. Because there is no guarantee that fill can be safely added around an oak tree, it is best to avoid tampering with the natural grade, or to leave the natural grade within the root zone alone and use retaining walls.

Drainage

Poor drainage is a common cause of oak tree deaths, since adequate drainage is critical to ensure a proper balance of moisture, air, and nutrient to grow and survive. Too much moisture, particularly in the warm months when natural conditions are dry, can smother the roots and encourage the proliferation of crown and root rot fungi.

Another moisture threat to oak roots is presented by barriers such as concrete foundations and footings, streets, and swimming pools downhill of oaks. These structures can dam underground water, causing water to back up into a tree's root zone and drown it.

Trenching

Trenching is an often-overlooked cause of tree death. Trenching usually occurs when underground utilities are installed. Digging a trench for utilities within the RPZ of an oak can sever a significant portion of a tree's roots. Often, several trenches are opened by separate utilities. This multi-trenching is particularly destructive since it impacts a greater portion of the root system.

If utilities must impinge on the root protection zone of a native oak, the trench should be dug by hand, avoiding roots, or utilities bored through the ground at least three feet below the surface.

Paving

Paving can cause the same problems associated with soil compaction. Paving, such as asphalt and concrete, prevents water from soaking into the soil and impedes the exchange of gases between roots, soil, and the atmosphere. In addition, paving usually requires excavation to create a stable base and to allow for depth of paving material. This process compacts the soil and damages roots.

Decking placed on piers is much more compatible with mature oaks than paving.

Care of Established Oaks on Home Grounds

Oaks on home grounds require certain conditions to survive and prosper. Activities of concern to the homeowner are planting near oaks, irrigation and feeding, pruning, installation of home improvements, and disease and insect infestations.

Most native oaks in California evolved and prospered in an environment typified by a cool, moist winter and a hot, dry summer. Under natural conditions, surface soils are wet during the cooler months and become dry by summer. Natural vegetation growing beneath oaks flourishes during the winter and spring and dies by early summer, creating the well-known golden-brown landscape of California's valleys and foothills.

Native oaks, however, remain green because their thick, leathery leaves and other adaptive features reduce their water use. The homeowner should attempt to approximate the natural environment in which these magnificent trees are originally found.

Planting Near Oaks

Only drought-tolerant plants that require no summer water should be planted around old established oaks, and they should be planted no closer than six feet from the base of the tree. Do not plant exotic grasses, ivy, azaleas, rhododendrons, or any other vegetation that needs summer irrigation. Such plants develop thick mats of roots and thus inhibit the exchange of air and water the established oak has grown used to.

There are a number of plants, some of which are native to California, that can be grown beneath oaks. For an extensive listing of compatible plants useful for landscaping around oaks, contact the California Oak Foundation.

In place of plants, other types of ground cover can be used to landscape beneath oaks. When installed properly, cobbles, gravel, and wood chips are good examples of ground covers that do not interfere with the roots' ability to obtain oxygen and appropriate moisture.

Irrigating and Fertilizing

Native oaks usually do not require irrigation as they are well adapted to dry summer conditions. Healthy oaks are even able to survive the excessively dry summers sometimes brought on by California's variable climate. But if an oak has been compromised, as when impervious surfaces have been placed in the RPZ, occasional water may be helpful if done properly.

Oaks should be irrigated only outside of the RPZ. Under no circumstances should the ground near the base of a native oak be allowed to become moist during warm weather periods. Moist, warm soil near the base of a mature oak promotes crown and root rot.

Irrigation, if done, should be by the “deep watering method,” which consists of a slow, all-day soaking only once or twice during the summer dry period. Frequent, shallow watering not only encourages crown and root rot, it also results in the growth of ineffective shallow roots near the surface, a needless waste of the tree’s energy.

If oaks need supplemental watering, it is best to apply the water at times that lengthen the normal rainy season, so the normal dry period in the middle to the end of summer is preserved. For example, additional irrigation would be appropriate in May and September, while leaving the area under the tree dry in July and August.

Mature oaks usually need little or no supplemental fertilization. Light fertilization may be appropriate in landscaped situations to replace nutrients supplied by leaves and other litter that normally accumulates under an oak in its native environment. If leaves are allowed to remain under trees, they eventually break down and supply nutrients.

Fertilization should only be done if growth is poor. Fertilizers should be applied to the entire RPZ, ideally in late winter or early spring. Trees that have recently undergone severe pruning or root damage should not be fertilized for at least six months.

Often, when an oak tree shows yellowing leaves, one thinks it lacks nutrients. Generally, this is not the case. More likely, the tree is suffering from root or crown rot. When an oak appears unhealthy, consult a certified arborist to determine the cause.

Pruning

Excessive pruning or thinning of limbs may expose interior branches to sun damage, may stimulate the tree to produce succulent new growth that is subject to mildew, and, in some cases, may cause a decline in vigor or may kill a tree. *Only dead, weakened, diseased, or dangerous branches should be removed.* Necessary pruning should be done during the winter dormant period for deciduous species and during July and August for evergreen species. Recent research has shown that tree paint, wound dressings, and sealing compounds do more harm than good.

Pruning should be performed by a certified arborist according to the pruning standards of the Western Chapter of the International Society of Arboriculture.

Home Improvement

The installation of home improvements should be done with caution when oaks are located nearby. Trenching severs roots, and impervious surfaces placed over roots may result in the death of the oak. A swimming pool placed downhill of oaks can act as a dam and cause an oak to drown in saturated soil.

Great caution should be taken and a certified arborist consulted before proceeding with improvements that impact on the root protection zone of any valued native oak.

Diseases

When growing under natural conditions, native California oaks are relatively tolerant of most diseases. However, they are subject to several problems when disturbed or hampered by frequent summer watering.

The two oak diseases most often encountered in irrigating settings are crown rot and oak root fungus. Both attack trees weakened by disturbance or improper care.

Crown Rot

This is one of the most common and serious diseases of oaks in home plantings. Infected trees decline slowly over a period of years. The disease, caused by a microscopic fungus, is made worse by saturated soil and poor soil aeration.

Symptoms of this disease are a general decrease in tree vigor, twig die-back and wilting, abnormally yellow leaves, and formation of lesions on the bark accompanied by oozing of dark-colored fluid.

In most cases people notice crown rot too late for successful treatment. However, if the disease is caught in the early stages a tree can be saved. Comprehensive treatment is best left to a qualified expert. The following measures usually benefit the tree:

- 1) Remove lawn and other plants that require summer irrigation from within the RPZ.
- 2) Remove soil and all other debris that has accumulated against the trunk.
- 3) Do not water within the RPZ during the summer except under unusual conditions when advised by a certified arborist.
- 4) Improve drainage around the tree, and make sure all water drains away from the trunk.

Oak Root Fungus

This oak fungus, also known as *Armillaria* root rot, is found in the root systems of most oaks in California. Our oaks experience little damage from this fungus under natural, dry summer conditions. However, when oaks are watered in the summer or weakened by other impacts, the tree can suffer damage from the fungus.

Symptoms shown by an infected oak include die-back of branches and yellowing and thinning of foliage. The fungus itself may appear as a white, fan-like growth with rhizomorphs and mushrooms.

Prevention of damaging conditions is the only sure action that can be taken against this disease. Avoid summer irrigation near oaks. Prevent mechanical damage to major roots or root crown. As with crown rot and other tree diseases, it is recommended that a certified arborist be consulted.

Mistletoe

This parasitic plant grows on the branches of many oaks and can cause structural weaknesses that make branches more vulnerable to breakage. Its sticky seeds are spread from one tree to another by birds. The seeds germinate under favorable conditions, and rootlike structures find their way through the bark, ultimately becoming attached to the oak and tapping into the water-and-mineral-conducting tissues of the tree.

Small infestations can be controlled by removing the mistletoe and cutting back the oak's bark around the spot where the mistletoe stem entered the oak branch. Major infestations are difficult to control, however, and an arborist specializing in oaks should be consulted.

Other diseases

The health and vigor of oaks can also be compromised by a number of other afflictions that are not discussed here. Since 1980, for example, die-back and decline, particularly among the coast live oak (*Quercus agrifolia*), has been observed in widespread areas of California. Several fungi may be involved in this condition, and treatments are still experimental. Seek professional advice whenever you notice serious, unexplained decline in your oaks.

INSECTS

Innumerable insects find their livelihoods in the branches and leaves of oaks, usually without much consequence to the healthy tree. The oak gall, for example, is a harmless swelling of leaves and twigs in reaction to enzymes released where a wasp lays its eggs. Some galls are large and round, others resemble small wads of fuzz, stars, or tops; one, which looks like a tiny seed, falls from leaves in the late summer and occasionally jumps into the air like a Mexican jumping bean.

Some infestations, however, can cause serious damage. Insects such as pit scales (which appear as pinhead-sized scales on the bark of twigs), oak moth and other leaf-eaters can weaken oaks, making them susceptible to disease.

Whenever an insect infestation causes substantial leaf loss, changes in leaf color, twig die-back, sticky or sooty foliage and branches, or other significant changes in appearance, intervention may be required. Consult a certified arborist for assistance.

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California Oak Foundation

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Edited by Sharon G. Johnson and Sarah S. Gustafson

The California Oak Foundation is dedicated to the conservation and perpetuation of California's native oak woodlands. The California Oak Foundation educates the general public and decision-makers about the importance of oak woodlands to California's wildlife habitat, watersheds, and quality of life through its newsletters, website, bulletins, books, symposia, and workshops.

Founded in 1988, the California Oak Foundation is a non-profit 501(c)(3) corporation that relies on memberships and donations to continue its work. Join us today and invest in the future of California's oak heritage.

Home & Garden

The zoo beneath our feet: We're only beginning to understand soil's hidden world

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MAR 05 2019

By Adrian Higgins

August 9, 2017

NAPA COUNTY
EXECUTIVE OFFICE

The gardener has a long, touchy-feely relationship with the soil. As every good cultivator knows, you assess the earth by holding it. Is it dark and crumbly, is there an earthworm or beetle in there, is it moist, and when you smell it, are you getting that pleasant earthy aroma?

All these signs are reassuring, and have been through the ages, but they are mere indicators of something much greater and infinitely mysterious: a hidden universe beneath our feet.

This cosmos is only now revealing itself as a result of scientific discoveries based on better microscopic imaging and DNA analysis. There is much still to learn, but it boils down to this: Plants nurture a whole world of creatures in the soil that in return feed and protect the plants, including and especially trees. It is a subterranean community that includes worms, insects, mites, other arthropods you've never heard of, amoebas, and fellow protozoa. The dominant organisms are bacteria and fungi. All these players work together, sometimes by eating one another.

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The awareness of this biosphere should change the way gardeners think about cultivating plants and heighten everyone's understanding of the natural world. In other words, don't ever call it "dirt" again.

The sheer vitality of it is mind-bending: A teaspoon of good loam may contain a billion bacteria, yards of fungal strands, several thousand protozoas and a few dozen nematodes, according to Jeff Lowenfels, a garden writer based in Anchorage and co-author of "Teaming With Microbes."

Lowenfels says it's also time for gardeners to adopt practices that nurture the soil biosphere. To say he thinks deeply about this subterranean world is an understatement. In addition to "Teaming With Microbes," he has written "Teaming With Nutrients." His latest title is "Teaming With Fungi," which dwells on the type of fungi that directly associate with plant roots. They are known as mycorrhizal fungi, and he's a big fan of adding them to his plants when they are installed, either as a spray or in powdered form available from the garden center. "It works. My tomato plants are bigger than the control, they've got more fruit on them, the plants are so healthy," he told me. "My carrots are unbelievable this year."

Some gardeners turn to compost tea to build soil microbes. This is made by aerating sugars, compost and humic acids in non-chlorinated water and then spraying the brew on plants and soil. Others are not convinced that this is needed, though everyone agrees that the way to foster the soil food web is to top-dress growing beds and lawns with organic matter such as shredded leaves or finished compost.

James Nardi, a biologist at the University of Illinois in Urbana, offers this advice: "Work with your fellow non-human gardeners. I never use synthetic fertilizers, and I never use pesticides." Nardi's 2007 book, "Life in the Soil," remains an excellent introduction to the subject.

In the fall, he mixes horse manure with fallen leaves, shreds the mixture and applies it as a mulch to his growing beds. "In the spring, I have this lovely, spongy soil," he said. Lowenfels shreds autumn leaves on his lawn and lets the biosphere use them over the winter.

The organic gardener's mantra has never seemed more appropriate. Feed the soil, not the plant.

The players

• **Earthworms:** Earthworms (and other worms) play an important role in the hidden biosphere. Most worm species in the garden were imported by Old World settlers, and some worms in certain regions have caused a problem by processing organic matter too efficiently. The latest culprit is a creature called the Japanese crazy worm (*Amyntas agrestis*), which multiplies like, er, crazy and damages the soil structure through mass feeding. It is long established in parts of the Southeast but has spread recently to Wisconsin and Illinois, where it is causing problems.

But the European earthworms familiar to most gardeners are helpful.

Worms provide critical assistance to smaller organisms by breaking down and incorporating leaves into the soil, so all may eat. Worm castings are rich in nutrients, including calcium, nitrogen, phosphorus and potassium.

The most famous observer of earthworms, Charles Darwin, estimated that they could add as much as 40 tons of casts per acre annually.

• **Insects:** Thousands of insects (and spiders) live in a patch of soil. Some are considered pests by humans — Japanese beetle grubs, termites and weevils, for example — but others are beloved or at least beguiling and include the larvae of lightning bugs and cicadas. Dung beetles convert animal waste into humus, a service we take for granted. Ants are the most abundant soil insect. Although some species are pests or nurture pests such as aphids, ants with their highly organized colonies are essential members of the soil biosphere. They assist in the conversion of litter to humus, move and mix large quantities of soil, and spread the seed of bulbs and other desirable plants.

• **Other arthropods:** The more conspicuous of these include millipedes and centipedes, as well as woodlice. Millipedes feed on plant debris and microbes; centipedes eat other arthropods. Woodlice, or sowbugs, are crustaceans that like soft plant debris and make quick work of green plant material and newly fallen leaves.

One of the most abundant, but barely visible, arthropods in the soil are springtails. They are named for a tail-like structure that allows them to jump when threatened. As many as a billion or more can live in an acre of soil. Depending on species, they cycle plant debris or feed on fungi, algae or other springtails.

Mites are generally regarded by gardeners as pests, and some are — sucking sap from plants and spreading disease. But the soil houses an immense community of non-pest species that are essential to the cycle of life. Half the known species of mites live in the soil, where they feed on decaying plant litter. Nardi writes that they “set the stage for smaller decomposers like bacteria and fungi to free most of the energy and nutrients stored in those leaves.”

Some mites are predatory and attack nematodes and other small creatures.

• **Nematodes:** Nematodes are tiny wormlike creatures that have traditionally been viewed in agriculture as serious pests that harm plants by feeding on their roots. More recently, the view of nematodes has become more nuanced because some species are now commonly used (and purchased) as predators of garden pests such as slugs, vine weevils and white grubs, to name a few. In truth, the world of nematodes is much greater and can only be imagined. Experts believe there may be close to a million species, of which only a fraction have been described scientifically.

Some nematodes eat soil bacteria and fungi, while others prefer to consume other soil arthropods and protozoa. Their value to the garden is in converting nitrogen into a form that plants can use.

Protozoa: Protozoa are microscopic creatures that live in vast numbers in the film of water between soil particles. The most well known is the amoeba, but these microbes come in several forms, including species that move with a single flagellum or with hairlike cilia.

They are the major predator of bacteria, and in consuming them they release nitrogen and other nutrients to plants.

Protozoa, in turn, are eaten by nematodes and other small arthropods.

2/15/2019 The zoo beneath our feet: We're only beginning to understand soil's hidden world. The Washington Post

- **Bacteria:** Historically, bacteria have been associated with germs. Some of the nastiest human diseases — anthrax, typhoid, tuberculosis and syphilis, for example — are the result of bacterial infections. But we have come to know too that our guts are full of beneficial bacteria and essential to our health.

The soil is the same way — the bad actors are outnumbered and usually outwitted by the good ones. Healthy soil is loaded with bacteria, and because they're not very mobile, they tend to hang out in vast numbers on and around the roots of plants, a zone known as the rhizosphere. There can be as much as 100 times more bacteria around plant roots than elsewhere in the soil, and with good reason. The plants feed them carbon sugars. The microbes give back nitrogen.

- **Fungi:** Fungi break down organic matter, which is why you will see mycelium strands in compost piles and under leaf litter. Two basic forms of fungi form a symbiotic relationship with plants. One exists in proximity to root tips and associates with hardwood trees and conifers. The other penetrates the cell wall of the roots and is found in plants of the domestic landscape — flowers, shrubs, grasses and vegetables.

The fungi grow tiny, fragile strands called hyphae. They are a tenth the thickness of human hair, but there are so many of them that they form a vast network, effectively extending the reach and efficiency of plant roots. In her book "The Soil Will Save Us," science writer Kristin Ohlson says there can be as much as 320 miles of hyphae in a cubic foot of soil. At least 80 percent of the plants on Earth connect to these fungal partners.

"Gardeners need to know this stuff," Lowenfels said. "A thinking gardener is a better gardener."

@adrian_higgins on Twitter

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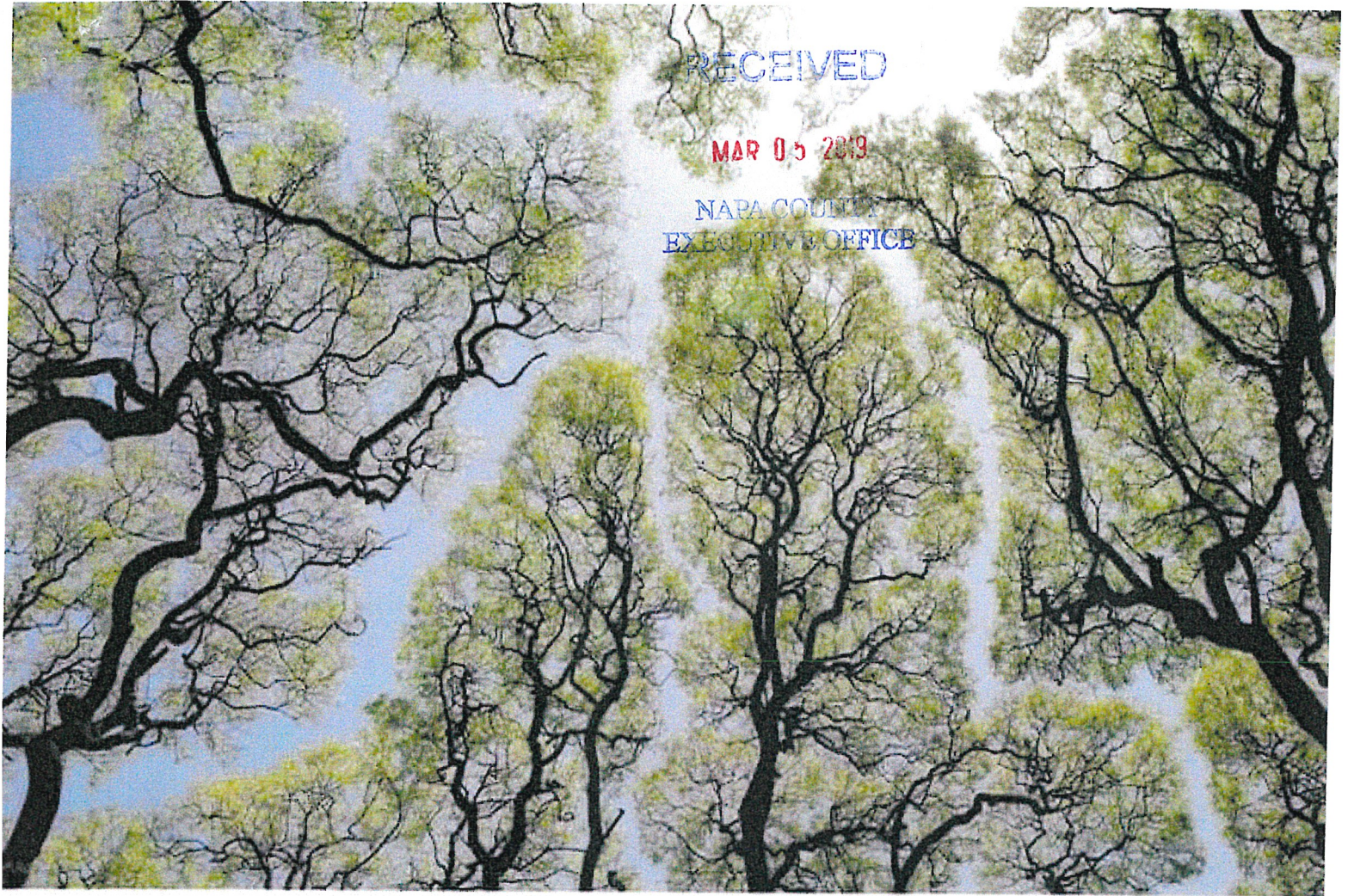
Adrian Higgins

Adrian Higgins has been writing about gardening, landscape design and related environmental topics since the late 1980s. He joined The Washington Post in 1994. He is the author of several books, including the "Washington Post Garden Book" and "Mantlepiece, a Pleasure Garden." Follow 

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Whitney, Karita

From: Whitney, Karita
Sent: Monday, March 04, 2019 1:05 PM
To: Anderson, Laura; Booher, Mary; Morrison, David; Bordona, Brian; Fuller, Lashun; Thepkaisone, Cesselea; Bledsoe, Teresa
Subject: Water Quality and Tree Protection Ordinance Correspondence

Below please find correspondence received concerning the Water Quality and Tree Protection Ordinance which will be considered at a future BOS meeting.

From: Sharp, Leigh
Sent: Monday, March 04, 2019 11:26 AM
To: Whitney, Karita <Karita.Whitney@countyofnapa.org>
Cc: Morgan, Greg <Greg.Morgan@countyofnapa.org>; Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>
Subject: FW: NAPA HAS TOO MANY TREES

FYI and record keeping....

From: Cortez, Nelson <Nelson.Cortez@countyofnapa.org>
Sent: Monday, March 4, 2019 9:07 AM
To: Tran, Minh <Minh.Tran@countyofnapa.org>; Rattigan, Molly <Molly.Rattigan@countyofnapa.org>; Franchi, Helene <Helene.Franchi@countyofnapa.org>; Sharp, Leigh <Leigh.Sharp@countyofnapa.org>; Brax, Jeffrey <Jeffrey.Brax@countyofnapa.org>; Louie Valdez <valdezj001@gmail.com>
Cc: Tijero, Jesus <Jesus.Tijero@countyofnapa.org>
Subject: FW: NAPA HAS TOO MANY TREES

FYI.

From: Jeffrey Earl Warren <jeffearlwarren@gmail.com>
Sent: Sunday, March 03, 2019 4:25 PM
To: Gregory, Ryan <Ryan.Gregory@countyofnapa.org>; Wagenknecht, Brad <BRAD.WAGENKNECHT@countyofnapa.org>; Tijero, Jesus <Jesus.Tijero@countyofnapa.org>; Cortez, Nelson <Nelson.Cortez@countyofnapa.org>; Ramos, Belia <Belia.Ramos@countyofnapa.org>; Pedroza, Alfredo <Alfredo.Pedroza@countyofnapa.org>; Dillon, Diane <Diane.DILLON@countyofnapa.org>
Subject: NAPA HAS TOO MANY TREES

NAPA HAS TOO MANY TREES

Ask any forester. She will tell you it's true. Despite what you read in the papers, Napa, like the rest of the west, has too many trees. Our forests are unhealthy.

Tree density per acre varies from the Rockies, the Northwest, the Sierras to Napa Valley. Google "How many trees per acre a healthy forest should have," and you'll find that every area of the West currently has 5 to 10 times more trees per acre than there were when Lewis and Clark reached the coast.

According to forester, Ralph Osterling, our Western hills should have around 80 to 100 trees per acre. Currently, we have somewhere between 500 to 800 trees per acre.

That's why this watershed fight is so wrong. First: Citizens defeated Measure C. To re-create "Measure C light" by administrative means, makes a mockery of democracy. It's unethical to favor partisan groups who lost at the ballot box.

Second: The abject ignorance of those advocating for increased "canopy cover" is not only silly, it is "unnatural" and actually dangerous to a healthy environment.

Some advocate increasing tree canopies from 60% to 70% or even 90%. This is counter productive for the following reasons:

If we want to protect our watershed, what we need is a realization that in order to prevent another ecological disaster, we need proper forest management--not additional canopy cover.

We don't need an ordinance which disincentivizes land owners from managing their over-dense forests—and prevents people from cutting trees over 5 inches in diameter, or limits forest management to 10% of trees per acre.

We may need to eliminate 50% to 80% of the trees per acre. Not clear cut, mind you. Judicious thinning of excess growth is what is needed.

According to Lynn Webber's History of the Napa Valley in 1824, when Altimura, first laid eyes on the Napa Valley, he deemed it perfect for cattle because there was *no underbrush* for cows to get tangled up in.

Lighting occasionally caused "natural forest fires," but more important, (according to Henry T. Lewis in his seminal work, "Patterns of Indian Burning in California") the local Indians burned on a regular basis. They did it for a myriad of reasons; from crop management, to making it easier to find acorns. But they did it every year.

That's why when George Yount arrived in 1834 there was almost no "understory" to fuel fires.

The understory that is clogging our forests, not only robs nutrients from normal healthy trees and blocks sunlight, this same understory provides a "step ladder" effect in the event of fire. Fire climbs up the little stuff and burns the bigger trees. This is why talk of 40% "shrub retention" is not only ludicrous it is dangerous. (See Lake County).

Cal Fire has now recognized the importance of healthy forests to prevent catastrophic conflagrations.

From the US Forest Service website: *The problem fire protection officials face is that not only does green vegetation burn, the forest is overstocked — 100 to 200 trees per acre, where a healthy forest has 40 to 60 trees per*

acre. Thinning green vegetation not only reduces the fire danger, it also frees up resources for the remaining plants and trees, making them more healthy, restoring their vigor and making them more resistant to fire as well as infestation by bark beetles and other parasites.

A secondary benefit from healthy forests is more water for our rivers and streams.

An ancient Redwood can soak up from between 1,000 to 2,000 gallons per day. A mature oak tree hundreds of gallons per day during the dry months. Because our Western Hills have trees of all types and all ages, no one has been able to give me an accurate account of what an average acre of madrone, pine, oak, Douglas firs, Redwoods, et al soaks up daily. Yet, if we have 5 to 10 times too many trees per acre, that means 5 to 10 times as much water is being soaked up by trees and not going into our springs, creeks and rivers. (Trees *shut down* in October, which is why we see puddles in creeks and small increases in river flows—though there has been no rain all summer long).

Lastly, let's stop all talk of "we have to do our part to fight climate change." Due to the Ag Preserve, we have done more to combat climate change than any county in the country. Urban environments create massive carbon footprints, compared to vineyards and forests. When we came here in the '50's zoning was one home per acre! The Ag Preserve limits urbanization to one home per 40 acres on the flat and one home per 160 acres in the hills.

This restriction means rural land owners have done more than their share to combat climate change, by eliminating tens of thousands of homes.

It is wrong for folks who live in the municipalities or have recently moved to the hills (because they are so pristine due to the Ag Preserve) to ask country folk to give up more of their property rights. We've done 10,000 times more, already than urban dwellers.

As to setbacks from the tiny dry creeks that begin in the hills, my father's home is on 13 acres. If we followed the proposed setbacks we would have less than two acres usable.

How much more do you want us to give up?

But don't take my word for it. Ask the experts--not the groups with political agendas.

We all want a healthy watershed. Current rules and regulations have made that possible. The beauty you see today is because of policies rural people abided by yesterday.

What we've done is working. Please stop discriminating against country folks. Rural lives matter!

Jeffrey Earl Warren

Broker Associate
Mobile 707.486.1025
License # 00981449

Email jeffearlwarren@gmail.com

Website www.jeffreyearlwarren.com

Golden Gate Sotheby's International Realty
780 Trancas St. Napa, Ca 94558

Whitney, Karita

From: Whitney, Karita
Sent: Friday, March 01, 2019 3:44 PM
To: Anderson, Laura; Booher, Mary; Morrison, David; Bordona, Brian; Fuller, Lashun; Thepkaisone, Cesselea; Bledsoe, Teresa
Cc: Morgan, Greg; Valdez, Jose (Louie)
Subject: Water Quality and Tree Protection Ordinance Correspondence

Below please find correspondence received concerning the Water Quality and Tree Protection Ordinance which will be considered at a future BOS meeting.

From: Sharp, Leigh
Sent: Friday, March 01, 2019 3:15 PM
To: Whitney, Karita <Karita.Whitney@countyofnapa.org>
Cc: Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>; Morgan, Greg <Greg.Morgan@countyofnapa.org>
Subject: FW: Spring Mountain District Association Board of Directors

Regarding Water Quality and Tree Protection Ordinance (formerly Watershed Protection Ordinance).

Leigh

From: Cortez, Nelson <Nelson.Cortez@countyofnapa.org>
Sent: Friday, March 1, 2019 3:12 PM
To: - Board of Supervisors <BOS@co.napa.ca.us>
Cc: Tran, Minh <Minh.Tran@countyofnapa.org>; Rattigan, Molly <Molly.Rattigan@countyofnapa.org>; Franchi, Helene <Helene.Franchi@countyofnapa.org>; Sharp, Leigh <Leigh.Sharp@countyofnapa.org>; Brax, Jeffrey <Jeffrey.Brax@countyofnapa.org>; Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>; Tijero, Jesus <Jesus.Tijero@countyofnapa.org>
Subject: FW: Spring Mountain District Association Board of Directors

Do not reply all

Board,

Please see correspondence addressed to you below.

Thanks,

Nelson

From: Sheldon Richards <sheldon@palomavineyard.com>
Sent: Friday, March 01, 2019 1:44 PM
To: Tijero, Jesus <Jesus.Tijero@countyofnapa.org>; Tijero, Jesus <Jesus.Tijero@countyofnapa.org>; Cortez, Nelson <Nelson.Cortez@countyofnapa.org>; Cortez, Nelson <Nelson.Cortez@countyofnapa.org>; Tijero, Jesus <Jesus.Tijero@countyofnapa.org>; Planning Commissioner Joelle Gallagher <joellegPC@gmail.com>; Whitmer, David <Dave.Whitmer@countyofnapa.org>; Planning Commissioner Anne Cottrell <anne.cottrell@lucene.com>; Mazotti, Andrew <Andrew.Mazotti@countyofnapa.org>; Planning Commissioner Jeri Hanson <JeriGillPC@outlook.com>

Cc: Julie Ann Kodmur <corking@julieannkodmur.com>; Sarah McCrea <sarah@stonyhillvineyard.com>; Sam Baxter <sam@terravalentine.com>; Bill Wiebalk <Bill@schweigervineyards.com>; Sheldon Richards <sheldon@palomavineyard.com>

Subject: Spring Mountain District Association Board of Directors

Dear Napa Valley Supervisors and Commissioners:

We are writing to voice our deepest concerns over both the process and content of the Napa County Water Quality and Tree Protection Ordinance (and the user permit process). We believe these concerns are so serious that the only proper course is for you to take consideration of this ordinance off the table at this time.

Specifically, two major topics have not been adequately addressed to move forward:

- 1. No clear rationale has been provided – we are missing the “why.” Indeed, there is a common perception throughout the Valley that the Board is acting for political reasons, not in response to real problems.
- 2. The county has not stated what the expected impacts of the ordinance will be. How much plantable land will be lost, and how will that loss impact the General Fund? What measurable gain will there be to the environment?

The lack of a solid basis for passing this ordinance poses a risk not just to us – but everyone who calls Napa Valley home. Too much is at stake, from our overall safety and wellbeing as citizens to the health of our local economy and base of employment.

We embrace the chance to work with you to fill in the gaps – to assess whether there is an adequate “why” behind the ordinance and gauge their impact. We are committed stewards of the environment and welcome changes to our conservation regulations when they are called for and will bring about positive impacts. Until that time, we urge you as a unified, collective voice to put this process on hold until you can address these unanswered concerns.

Sincerely,

Sheldon Richards, SMDA Board and members
President, Spring Mountain District Association

Sheldon Richards
4013 Spring Mountain Road
St. Helena CA 94574
h. 707.968.9494
w. 707.963.7504
c. 707.318.9608
f. 707.963.7504
sheldon@palomavineyard.com
info@palomavineyard.com

Whitney, Karita

From: Whitney, Karita
Sent: Wednesday, February 27, 2019 2:38 PM
To: Gregory, Ryan; Wagenknecht, Brad; Dillon, Diane; Pedroza, Alfredo; Tran, Minh; Brax, Jeffrey
Cc: Valdez, Jose (Louie); Anderson, Laura; Sharp, Leigh
Subject: Draft Water Quality and Tree Protection Ordinance Correspondence
Attachments: Draft Tree and Watershed Correspondence Part 1.pdf; Draft Tree and Watershed Correspondence Part 2.pdf

Attached please find correspondence from Jim Wilson and Randy Dunn received concerning the Water Quality and Tree Protection Ordinance which will be considered at a future BOS meeting.

(This is a Brown Act communication, please do not reply all)

From: Valdez, Jose (Louie)
Sent: Wednesday, February 27, 2019 1:33 PM
To: Booher, Mary <Mary.Booher@countyofnapa.org>; Anderson, Laura <Laura.Anderson@countyofnapa.org>; Bordona, Brian <Brian.Bordona@countyofnapa.org>; Fuller, Lashun <Lashun.Fuller@countyofnapa.org>; Thepkaisone, Cesselea <Cesselea.Thepkaisone@countyofnapa.org>; Bledsoe, Teresa <Teresa.Bledsoe@countyofnapa.org>; Morrison, David <David.Morrison@countyofnapa.org>; Sharp, Leigh <Leigh.Sharp@countyofnapa.org>
Cc: Whitney, Karita <Karita.Whitney@countyofnapa.org>; Morgan, Greg <Greg.Morgan@countyofnapa.org>; Ramos, Belia <Belia.Ramos@countyofnapa.org>
Subject: Draft Water Quality and Tree Protection Ordinance Correspondence

Good afternoon.

Please see the attached correspondence received today regarding the Draft Water Quality and Tree Protection Ordinance.

Thank you.

Louie Valdez
Administrative Manager –
Clerk of the Board of Supervisors
County of Napa, CA
1195 3rd St., 3rd Floor
Napa, CA 94559
(707)-253-4196 Office



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A Commitment to Service

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Position on all Agricultural Watershed (AW) Zoned lands in Napa County

1

Retention rate of 85% of the forest canopy and 40% retention rate of shrub and grasslands

2

3:1 mitigation for any removal of forest

Preservation must be done on-site.

3

Slope – no planting on slopes >30%

Lands not developable due to protected slopes or stream corridors or existing easements are effectively protected and do not constitute comparable lands eligible for preservation.

4

Class 1 streams – 125 feet minimum buffer from any development

All vegetation protected

Class 2 streams – 75 feet minimum from any development

All vegetation protected

Class 3 streams – 35 feet minimum from any development

All vegetation protected

5

Wetlands – 150 feet minimum from any development

6

Municipal reservoirs – 500 feet minimum from any development

7

Altering the ordinance would go to the voters for approval of any changes

8

Require on-going monitoring and enforcement of the program to ensure compliance

9

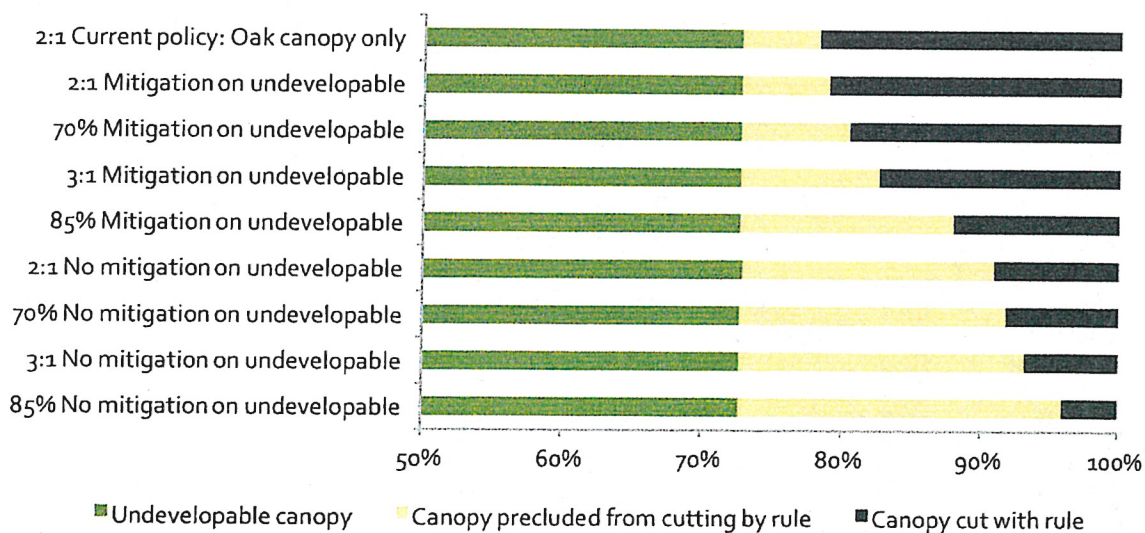
Does not apply to vineyards replanted within existing footprint

Summary of Policy Outcomes

Whether or not mitigation is allowed on undevelopable lands is the single biggest determinant of how much land is protected from development. A 2:1 (66%) canopy retention policy where mitigation is not allowed on undevelopable area saves almost 5,000 acres *more* forest than an 85% canopy retention policy that allows mitigation on undevelopable land.

Table 9. Mitigation options sorted by amount of canopy area protected

Policy	Canopy Set aside	Canopy Precluded from Cutting	Canopy Protected	Canopy Cut	Oak Canopy Cut
2:1 Current policy: Oak canopy only	76,722	8,933	125,350	34,782	24,851
2:1 With mitigation on undevelopable	105,687	10,090	126,507	33,624	
70% With mitigation on undevelopable	112,092	12,448	128,865	31,267	
3:1 With mitigation on undevelopable	120,099	15,855	132,273	27,859	
85% With mitigation on undevelopable	136,112	24,509	140,926	19,206	
2:1 Without mitigation on undevelopable	28,851	28,851	145,706	14,426	
70% Without mitigation on undevelopable	30,600	30,600	147,017	13,114	
3:1 Without mitigation on undevelopable	32,786	32,786	149,203	10,929	
85% Without mitigation on undevelopable	37,157	37,157	153,574	6,557	



100 acre scenario
using average veg
and slope %

Forest 60 acres total

Shrubland 20 acres total

Grassland 20 acres total

70% of forest is
>30% slope
= 42 acres

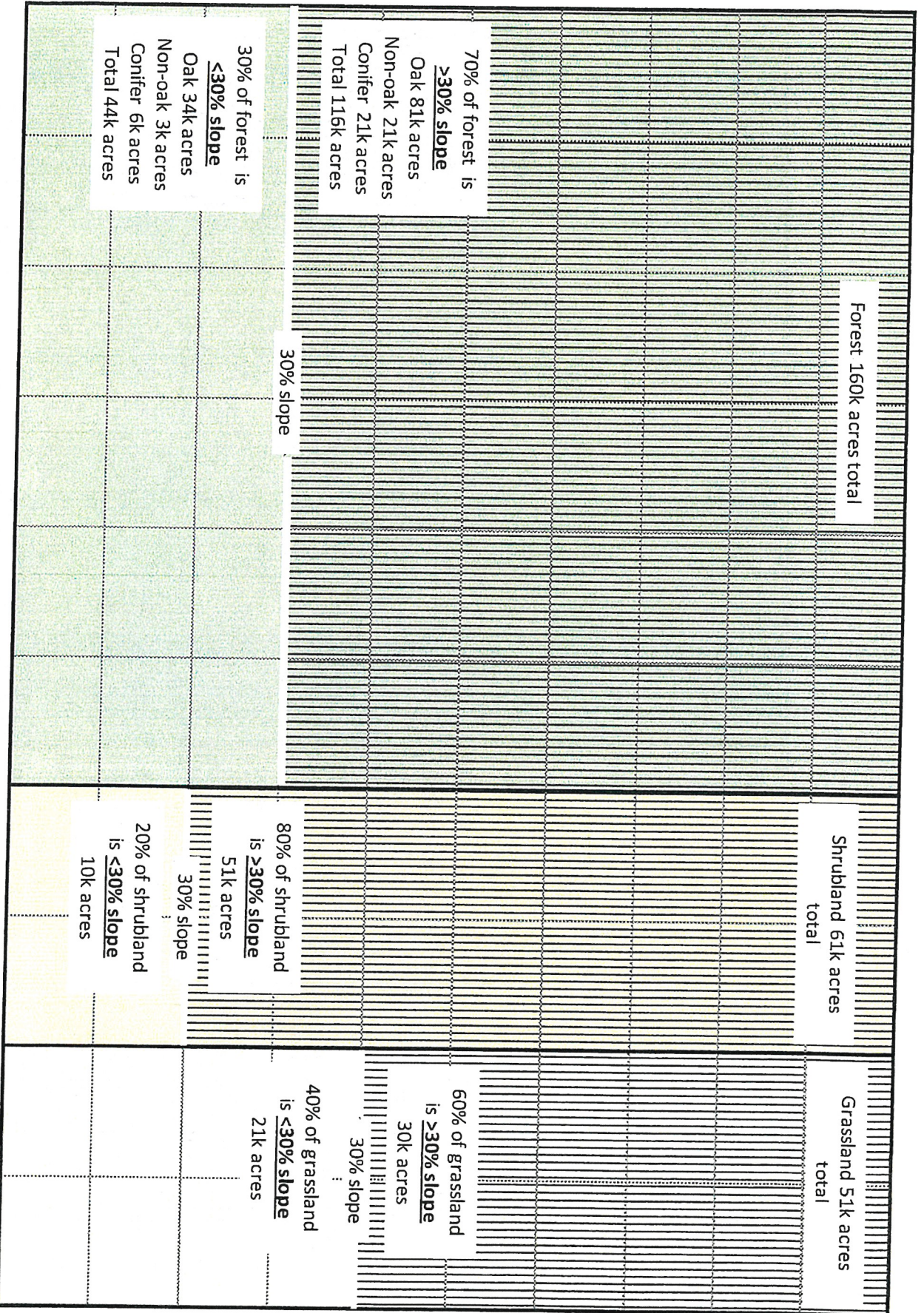
30% slope

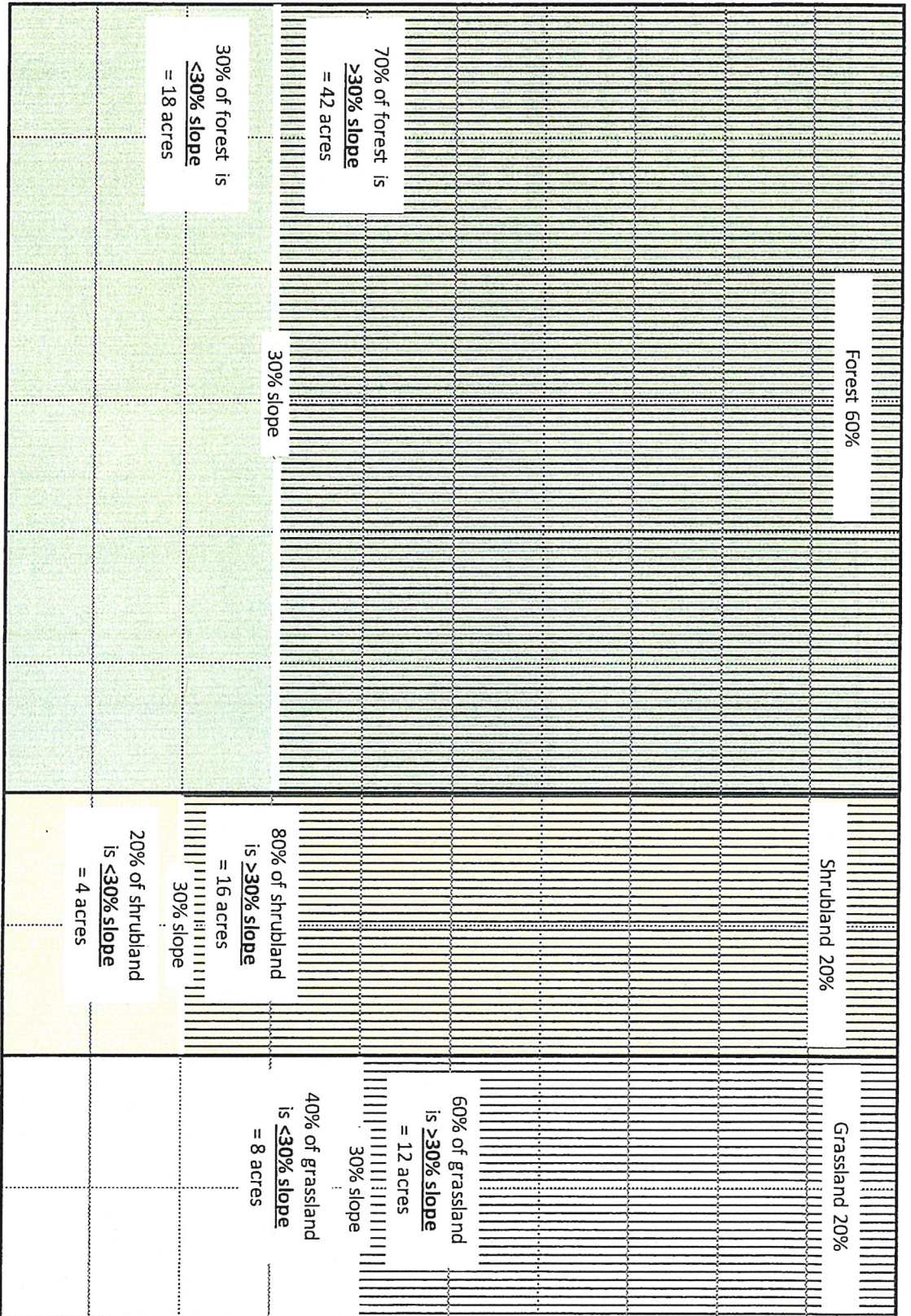
30% of forest is
<30% slope
= 18 acres

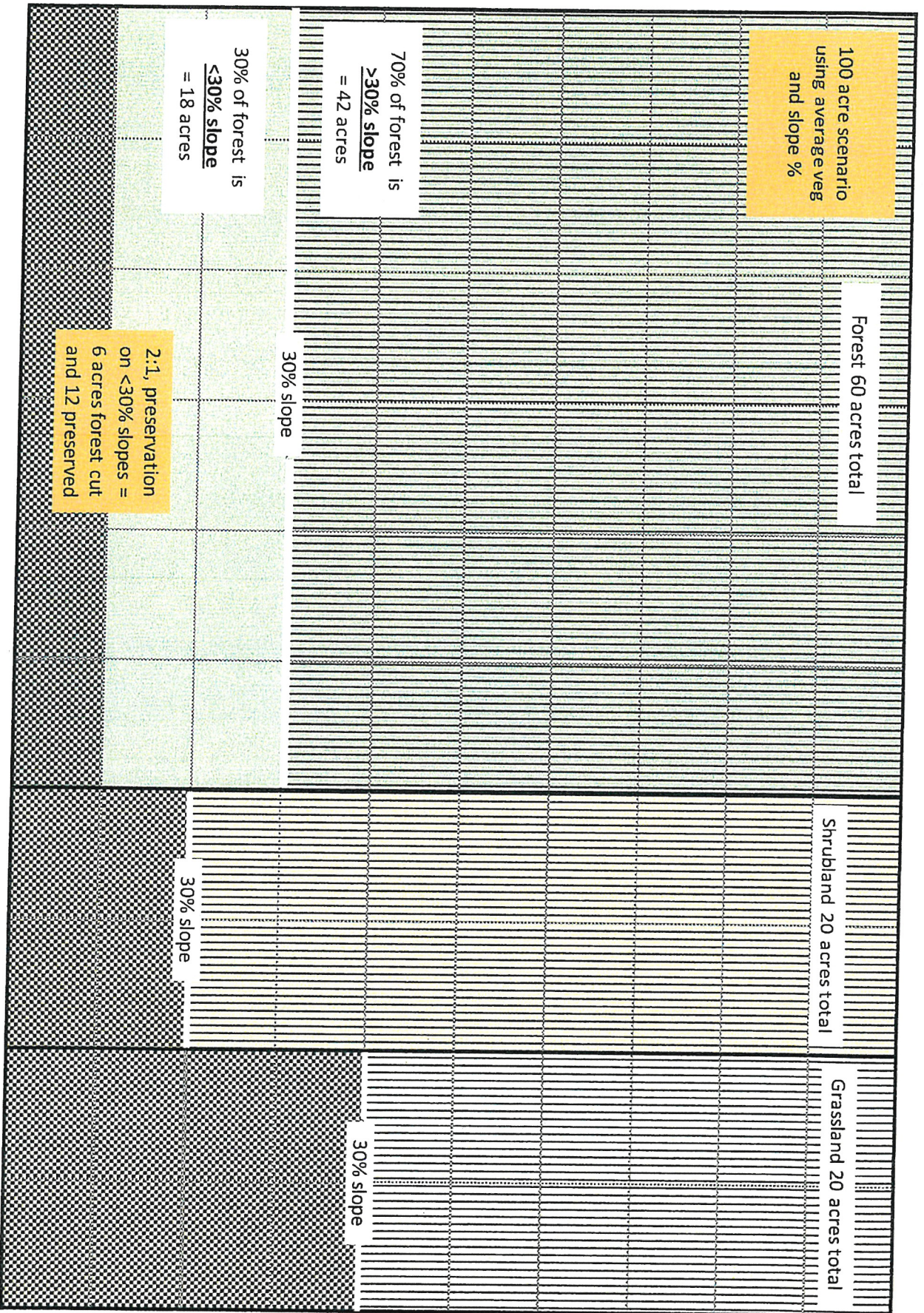
3:1, preservation
on <30% slopes =
4.5 acres forest cut
and 13.5

30% slope

30% slope







Whitney, Karita

From: Whitney, Karita
Sent: Wednesday, February 27, 2019 8:25 AM
To: Booher, Mary; Anderson, Laura; Bordona, Brian; Fuller, Lashun; Thepkaisone, Cesselea; Bledsoe, Teresa
Cc: Valdez, Jose (Louie); Morgan, Greg
Subject: Water Quality and Tree Protection Ordinance Correspondence
Attachments: scan19022614164.pdf

Importance: High

Attached please find correspondence received concerning the Water Quality and Tree Protection Ordinance which will be considered at a future BOS meeting.

From: Valdez, Jose (Louie)
Sent: Tuesday, February 26, 2019 3:47 PM
To: Gregory, Ryan <Ryan.Gregory@countyofnapa.org>; 'Diane Dillon' <diane@dianedillon.net>; Wagenknecht, Brad <BRAD.WAGENKNECHT@countyofnapa.org>; Ramos, Belia <Belia.Ramos@countyofnapa.org>; Pedroza, Alfredo <Alfredo.Pedroza@countyofnapa.org>
Cc: Morrison, David <David.Morrison@countyofnapa.org>; Brax, Jeffrey <Jeffrey.Brax@countyofnapa.org>; Tran, Minh <Minh.Tran@countyofnapa.org>; Whitney, Karita <Karita.Whitney@countyofnapa.org>; Morgan, Greg <Greg.Morgan@countyofnapa.org>; Capriola, Thomas <Thomas.Capriola@countyofnapa.org>; Sharp, Leigh <Leigh.Sharp@countyofnapa.org>
Subject: FW: Letter from Concerned Land Owner
Importance: High

Members of the Board:

Good afternoon.

Please see the correspondence below regarding the Draft Water Quality & Tree Protection Ordinance.

Thank you.

Louie Valdez
Administrative Manager –
Clerk of the Board of Supervisors
County of Napa, CA
1195 3rd St., 3rd Floor
Napa, CA 94559
(707)-253-4196 Office



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From: Ramos, Belia <Belia.Ramos@countyofnapa.org>
Sent: Tuesday, February 26, 2019 3:37 PM
To: Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>
Subject: FW: Letter from Concerned Land Owner
Importance: High

Sent with BlackBerry Work
(www.blackberry.com)

From: Sharon Beiner <sbeiner@prcpllc.com>
Date: Tuesday, Feb 26, 2019, 1:36 PM
To: Ramos, Belia <Belia.Ramos@countyofnapa.org>
Subject: Letter from Concerned Land Owner

Please see the attached

George Banks
(707) 942-4132

George Banks
270 Franz Valley School Road
Calistoga, CA 94515

Belia Ramos
County of Napa
1195 Third Street
Suite 310
Napa, CA 94559

Ms. Ramos,

As a hillside land owner in Napa County, I would hope that you do not further destroy the value of my property. The county land use laws are already much too oppressive with regards to planting and farming my land. Any further attempts to "Put canopy or 30%" restrictions is unwanted and unnecessary.

Thank you for your consideration.



George Banks

Whitney, Karita

From: Whitney, Karita
Sent: Monday, February 25, 2019 9:07 AM
To: Tran, Minh; Booher, Mary; Anderson, Laura; Morrison, David; Bordona, Brian; Brax, Jeffrey; Sharp, Leigh; Fuller, Lashun; Thepkaisone, Cesselea; Bledsoe, Teresa
Cc: Valdez, Jose (Louie); Morgan, Greg
Subject: Water Quality and Tree Protection Ordinance Correspondence (BOS Future Meeting)

Below please find correspondence concerning the Water Quality and Tree Protection Ordinance which will be considered at a future BOS meeting.

(This is a Brown Act communication, please do not reply all)

From: Tijero, Jesus
Sent: Monday, February 25, 2019 8:42 AM
To: Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>
Cc: Whitney, Karita <Karita.Whitney@countyofnapa.org>; Morgan, Greg <Greg.Morgan@countyofnapa.org>
Subject: FW: Water Quality and Tree Protection ordinance information

Good morning,

See letter below addressed to the Board and Planning Commission regarding the watershed and tree protection ordinance.

Jesus Tijero
Staff Assistant BOS
Napa County
Office: 707-253-6170
Cell: 707-363-7467



From: Igor Sill <igor.sill@gmail.com>
Sent: Saturday, February 23, 2019 11:10 AM
To: Dillon, Diane <Diane.DILLON@countyofnapa.org>; Pedroza, Alfredo <Alfredo.Pedroza@countyofnapa.org>; Ramos, Belia <Belia.Ramos@countyofnapa.org>; Wagenknecht, Brad <BRAD.WAGENKNECHT@countyofnapa.org>; Tijero, Jesus <Jesus.Tijero@countyofnapa.org>; Cortez, Nelson <Nelson.Cortez@countyofnapa.org>; joellegPC@gmail.com; dave.witmer@countyofnapa.org; anne.cottrell@lucene.com; andrew.mazzotti@countyofnapa.org; jeriGillIPC@outlook.com; Tom Davies <tom@vsattui.com>; Tom Dinkel <tom@doslagosvineyards.com>; Peter Stoneberg <pstoneberg@gmail.com>; Patrick Elliott-Smith <elanwine@aol.com>; Elana Hill <Elana@primesolum.com>; Celeste Cooper <Celeste.Cooper@blackstallionwinery.com>; Gregory, Ryan <Ryan.Gregory@countyofnapa.org>; Harvest Duhig <harvestvino@gmail.com>; Samuel Peters <sampeters_apaa@live.com>; Darioush Khaledi <darioush@darioush.com>; Cathy Corison <cathy@corison.com>; Susan Boswell <susan@chateauboswellwinery.com>; gene@casanuestra.com;

Carmen Policy <cpolicy@casapiena.com>; Andre Crisp <andre@lunavineyards.com>

Subject: Water Quality and Tree Protection ordinance information

Dear Napa County Supervisors & Planning Commission:

I would like to bring to your attention important information regarding the issues raised at last Wednesday's Napa County Planning Commission's review of Water Quality and Tree Protection Ordinance as part of the Napa County Strategic Plan. First, please recall that a majority of Napa County voters defeated Measure C. As a small family farmer in Napa I would like you to realize that we, the small family farm are facing a very real, dire crisis with survival as our single biggest concern.

Anti-winery rhetoric geared towards increasing winery restrictions and further protectionism is overtaking control of Napa's greatest treasure, the finest wine-producing area in the world. The 1968 agricultural preserve was passed by Napa's then Board of Supervisors and later strengthened by a majority of voters to preserve, promote and protect agricultural land in Napa Valley for future generations. The ordinance established agriculture as the "best use" of these lands and kept Napa from being over-developed. With it, Napa's vineyards are now the most regulated agricultural industry in California.

Activist demands threaten Napa's vintners and winemakers contributions to our schools, housing, tax revenues, jobs that support our local community and our citizens. As a small Napa farmer, I concur completely with the following position and statement:

"In my opinion, if his proposed ordinance is approved, it will not only nearly stop the planting of new vineyards, it will derail the economic engine of the Napa Valley" said Tom C. Davies of St. Helena, President of V. Sattui Winery.

As a further example, I would like you to reflect on the enormous contributions of many of Napa Winery owners to Napa's protective environment. An example is Mr. Davies' employer, Dario Sattui, himself a pioneer visionary of a clean, sustainable Napa agricultural community who faced activist environmentalist through similar intimidation, bullying, shunning and character assassination some 20 years ago.

This excerpted from a 17 year old article published in SFGate:

<https://www.sfgate.com/wine/article/The-empire-that-Sattui-built-A-tourist-s-dream-2792191.php>

"Looking down on Sterling Vineyards across the valley, the castle is going to be a tourists' dream, but it's seen as a travesty by many locals who decry the commercialization of their beautiful valley.

Even ardent environmentalists and preservationists concerned about erosion, watershed disturbance, deep disruption of the soil and the "viewshed" or look of the area cite Sattui's contributions to the Land Trust and don't want to jeopardize his stated goal of shielding most of his land from development. Sattui envisions the grounds will have olive trees and chickens running around, dogs lying in the path and signs in Italian. "I want people to enjoy themselves," he says. The new and still-unnamed winery won't have a deli but it will offer tours. He also says he's not doing it for the money, but just to have fun. "It's my fantasy," he admits, "a way to restore my family's wine tradition."

And here 17 years later, what a thoughtful, wonderful contribution he has and continues to make to Napa and its citizenry. Today, Castello di Amorosa is a world famous iconic Napa estate winery and has allowed Sattui to become one of Napa's biggest tax payers, generous contributor to Napa's welfare, Napa's land trust, environment, culture, and many other causes; truly one of Napa's greatest philanthropists.

Lastly, I would like you to consider the exhaustive research and analysis response by Napa County Planning, Building, and Environmental Services Department and publicly released in response to erroneous, inaccurate activist information as cited below:

"I would like to respond to Ms. Chris Malan's letter, published on Sept. 2, 2018, where she recommends that water be the focus of the county's Strategic Plan ("Impose moratorium on new slope vineyards"). Ms. Malan's comments are welcome, and water is likely to play a prominent role in the plan, but the letter contains incorrect information. My intent is not to be argumentative, but it is critical for the success of the Strategic Plan that community decisions be based on factual evidence.

The Strategic Plan will define county priorities through 2022, and the actions needed to achieve those goals. While debate often centers around land use, the county has nearly 20 departments and over 1,350 employees, who deal with issues including law enforcement, fire, healthcare, libraries, support services, parks, and roads. The Strategic Plan will encompass all of the county's many responsibilities and public concerns.

I would like to respond to several specific issues raised by Ms. Malan.

Algae blooms are a health concern throughout California. They are caused by increased water temperature, high nutrient concentrations, and low water flows. In 2014, the San Francisco Bay Regional Water Quality Control Board (RWQCB) approved a proposal to take the Napa River off the list of impaired water bodies for nutrients resulting in excessive algae growth. The State Water Quality Control Board (SWQCB) will consider the delisting in the summer of 2020.

County staff have worked with the RWQCB to ensure that the new vineyard Waste Discharge Requirements are compatible with our erosion control plan process. **As a result of these requirements, other jurisdictions in the Bay Area will be following the model that Napa County established more than 25 years ago to protect watersheds and the quality of our streams.**

Forests are not being eliminated within Napa County. Nearly 42 percent of the county (or 213,000 acres) consists of oak woodlands, riparian forest, or conifer forest. In comparison, only 13 percent of the county is used for farmland, and 6 percent is developed with urban uses. **Trees cover more than twice as much land in Napa as agriculture and cities combined.**

Since 1991, the county has approved an average of eight new wineries annually. There have never been 50 new wineries approved in one year. In fact, there haven't been 50 new wineries approved over the past eight years combined. The highest number of new wineries approved in any one year was 17 in 2006.

Most vineyards are not planted on steep slopes. There are currently 53,451 acres of vineyards in Napa County. More than 57 percent of the vineyards are on lands that have slopes of less than 5 percent. More than 85 percent of vineyards are on slopes of less than 15 percent.

The Conservation Regulations already require stream buffers and tree retention. Setbacks of 35 to 150 feet are mandated for vineyards, depending on the surrounding slopes. Setbacks may also be applied to vineyard replanting and previously disturbed areas may be required to be revegetated. A minimum 60 percent of all tree canopy must be retained on any parcel where a vineyard is proposed. When biological studies are also applied, 90 percent of on-site trees are protected.

Extensive monitoring of wells around the Napa Valley shows that ground water levels remain steady. There is no evidence of subsidence, water quality impacts, salt water intrusion, or streams being affected by overdrafting. The county has prepared a Groundwater Sustainability Plan (Basin Analysis Report), as required under state law. The plan is currently under review by the California Department of Water Resources. In addition, the county has joined with the city of Napa to voluntarily study water quality in the watersheds of the municipal reservoirs.

The Napa River is proposed for listing as an impaired water body for chlordane, DDT, dieldrin, mercury, and PCBs. No action by the SWQCB has yet been taken. However, the pesticides referenced have been banned for over 30 years. Mercury is a mineral that naturally occurs throughout the region and has not been mined locally more than 50 years.

The county administers 29 permits that allow the use of hold and haul to process high strength wastewater. Six facilities are located within city limits and another five are within the airport industrial area (served by the Napa Sanitation District). Only 18 of over 500 wineries (less than 4 percent) have hold and haul permits. Note that on-site wastewater systems also need to have their tanks regularly pumped.

Public policy should be based on goals that we can all agree upon, relying on fact-based analysis. I appreciate and share Ms. Malan's interest in protecting our natural resources and welcome the ongoing dialogue. The best way that we can ensure a comprehensive and balanced approach to protecting our natural resources is for the public, business leaders, and local government to work together in developing a sustainable vision for all of Napa County."

David Morrison, Director

Napa County Planning, Building, and Environmental Services Department

I also support the position that Napa County stop limiting the number of visitors and employees each winery is allowed to have, but instead base winery visitation on a winery's supported infrastructure, such as water, parking and handling of its wastewater.

In closing, we all recognize that our Napa agriculture has a unique heritage. This legacy of farming is present today and remains one of the most important agricultural places in the world. The 1968 agricultural preserve was passed by Napa's then Board of Supervisors and later strengthened by a majority of voters to preserve, promote and protect agricultural land in Napa Valley for future generations. The ordinance established agriculture as the "best use" of these lands and kept Napa from being over-developed. This was long before Napa County's future as a prosperous wine country was assured, when many felt Napa Valley might go the way of urbanized Silicon Valley. Napa County's Ag Preserve was a visionary land-zoning ordinance, the first of its kind in the USA and, our farming legacy thrives today because of it, having become one of the most productive counties in the entire nation. Since then, the rest of the Bay Area has seen a huge growth difference, mirroring Los Angeles and Silicon Valley's sprawling urbanization while Napa maintains its strategic growth plans. If governmental growth projections are correct, Napa Valley will remain a regional oasis of agriculture 50 years from now. With it, Napa's vineyards have become the most regulated agricultural industry in California. The cost of compliance results in significant additional expense and time for us farmers, property owners as well as the County.

All farmers that I know in Napa are tremendously diligent, responsible, eco-conscientious and concerned about always doing the right thing with their farms and surrounding lands.

It has become obvious that certifications of National Wildlife Federation, FishFriendlyFarming, CCOF and NapaGreen have become abundant and virtually posted everywhere, just note the number of vineyard signs attesting to prevention of water pollution, limited or total non-use of chemical fertilizers and pesticides to protect our surrounding waterbodies, wild life and air quality. This is a voluntary, conscientious movement by us farmers to continue to "do the right thing" for Napa's land and community, without the need for further excessive governmental bureaucratic involvement.

Napa is well known for its outsized share of activists that have alarmed the community with deceptive and erroneous reporting of false information surrounding Napa's long term strategic plan. Let's consider the science-based facts, and not alter, change or add restrictions to an already restrictive and functioning policy. Thank you, Igor Sill, one of Napa's small family farmers, Atlas Peak, Napa.

Whitney, Karita

From: Whitney, Karita
Sent: Friday, February 22, 2019 11:13 AM
To: - Board of Supervisors; Anderson, Laura; Bledsoe, Teresa; Booher, Mary; Bordona, Brian; Brax, Jeffrey; Fuller, Lashun; Morgan, Greg; Morrison, David; Sharp, Leigh; Thepkaisone, Cesselea; Tran, Minh; Valdez, Jose (Louie)
Subject: Water Quality and Tree Protection Ordinance Correspondence
Attachments: J.White-Napa Co Farm Bureau and A. Footman.pdf

Attached please find correspondence received concerning the Water Quality and Tree Protection Ordinance which will be considered at a future BOS meeting.

(This is a Brown Act communication, please do not reply all)

KARITA WHITNEY \ Deputy Clerk of the Board
Napa County Executive Office
1195 Third Street, Suite 310 \ Napa CA 94559
Tel.707.253.4423 \ Karita.whitney@countyofnapa.org

- Leigh
- David
- BO's



NAPA COUNTY
FARM BUREAU

February 12, 2019

Planning Commission
County of Napa
1195 Third Street, Suite 210
Napa, CA 94559

RECEIVED

FEB 19 2019

NAPA COUNTY
EXECUTIVE OFFICE

RE: Watershed Protection Ordinance

Dear Planning Commissioners:

The Napa County Farm Bureau has been reviewing the current watershed protection ordinance and would like to request the following be added to the ordinance.

While Napa County's local CEQA Guidelines document that replants are exempt from CEQA review, County Code is silent on this point. We believe vineyard replanting programs should be expressly categorized as ministerial within the meaning of the California Environmental Quality Act and the State CEQA Guidelines.

We believe the following language should be added to Section 13, 18.108.90 – Requirements for Vineyard Replanting Programs, subsequent to subsection F:

G. Ministerial provisions; exception. It is the intent of the board of supervisors that the vineyard replanting programs shall be ministerial within the meaning of the California Environmental Quality Act and the State CEQA Guidelines. It is the further intent of the board of supervisors that the review of permit applications and the issuance of permits of such vineyard replanting programs shall be ministerial acts.

H. Interpretation and application. This chapter shall be interpreted, administered, and construed in light of the legislative intent expressed in Subsection G. If any provisions, sentences, or words in this chapter are ambiguous or capable of more than one (1) interpretation, staff shall interpret, administer, and construe them as conferring only ministerial authority. Staff shall not exercise personal judgment, special discretion or judgment, or personal, subjective judgment in deciding whether or how projects should be carried out, except in the case of discretionary permit applications.

I. Ministerial system of regulation; automatic repeal. It is the intent of the board of supervisors in enacting this chapter to establish and maintain a ministerial system of regulation for vineyard replanting programs, consistent with the strong policy direction in the general plan to support agriculture as the highest and best use of the land and not unduly complicate and

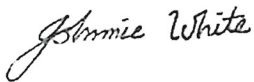
discourage vineyard development and agricultural grading and drainage. As a legislative matter, treating vineyard replanting programs as discretionary actions would be contrary to the legislative intent of this chapter. As a result, if for any reason a court of competent jurisdiction holds in a final order that the approval of a vineyard replanting program intended to be ministerial is, in fact, discretionary, the requirement for approval of vineyard replanting program or erosion control plan prior to vineyard replanting shall be automatically repealed without further action by the board of supervisors. A "final order" means an order, writ, judgment, or other finding that is no longer subject to modification or reversal on appeal. If this chapter is repealed by this subsection, vineyard replanting development shall be allowed and shall not require separate permitting. Nothing in this subsection is intended to affect any court order.

We request that this language be added to the ordinance in an effort to codify replants as ministerial within the meaning of the California Environmental Quality Act and the State CEQA Guidelines.

If you have any questions, please contact our office.

Thank you.

Sincerely,



Johnnie White
President
Napa County Farm Bureau

CC: Board of Supervisors
Minh Tran
David Morrison

Leigh
- David M
- BOS

Feb - 16 - 2019

Dear County of Napa Board of Supervisors:

On January 29 I attended the Napa County Board of Supervisors' Public Hearing where about 60 people like me had their three minutes of Free Speech to address the issue of improving the standards regarding the clearing of our watershed forests for the expansion of more vineyards. I told our story of living in Angwin and the suffering we have had from the clearing of land and the creation of a vineyard next to us. We are two old people in our 70s who had peace and harmony in our lives until vineyard development replaced the forest of trees next to our home.

Next to our home on Linda Falls Terrace is a five acre parcel that was purchased by a wealthy doctor and his wife from Florida for their retirement dream home and a vineyard. Evidently they felt this relatively flat piece of land would be more suitable for grape growing if they hauled in truck load after truck load of rocks and dirt to create a small hill for the new vineyard. In doing so they destroyed the small forest of trees adjacent to our home that served as a windbreak for us.

They hired Pina Vineyard Management Company as their contractor, and the presence of large earth moving machinery and tractors for vineyard development created a great amount of dust blowing onto our home. Then the vines were planted and men in white suits, gloves and face masks began spraying herbicides and pesticides that also blew onto our property and into our home. When I noticed our small fruit trees dying along our property line, I asked one of the men what they were using as chemicals, and he said, "We know what we are doing." Pina has never told us what they are spraying or when it would be sprayed. What is so secret about what they are doing?

When we bought our property there was a small ditch along the property line with this new neighbor that was never a problem for us. But once the shape of the neighbor's property was elevated with this small hill, additional water from that property was coming onto our property. I tried to raise our side of that ditch myself with rocks and dirt. At my age it was too much, so I had to hire help for this. But the runoff from next door was too much and rushed through our yard and patio into our garage. Even placing sandbags did not do the job.

In my speech to the Board of Supervisors, a staff person told the Board they were unaware of our problem and would have Code Enforcement look into it. Two weeks have passed and no one has contacted us. And now we have had this past week of heavy rain, and again this ditch has overflowed into our garage. I called one of the owners of Pina Vineyard Management, Mr. Johnny White, and he told me it was not water from their client's property but water from across the road from our home. This is not true. While some water comes from that side of the road, the only change has been from the increased water from the raised vineyard next door.

Going back to the Board of Supervisors hearing when I spoke, Johnny White and his partner Davie Pina also spoke to the Board. They are telling the Board of Supervisors that there are already too many rules in Napa County regarding vineyard development, and they ask that no new rules and no strengthening of old rules be done. They have also written letters to the editor expressing their same feelings. They have a conflict of interest since their business is to remove our watershed for more vineyards.

Some of these same people say there is no science to support stronger restrictions on vineyards. I can assure you that even though my property has no test tubes or Bunsen burners, our home is a living example of "science in action". Just come to visit us, and you can see for yourself. And no one from Napa County Code Enforcement has come to witness our problems caused by this new vineyard next door. Who is going to help us and others from similar problems?

Sincerely,

Ana Vigil Footman

630 Linda Falls Terrace, Angwin

94508

707-968-5390. -

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FEB 19 2019

NAPA COUNTY
EXECUTIVE OFFICE

Whitney, Karita

From: Whitney, Karita
Sent: Wednesday, February 20, 2019 12:22 PM
To: - Board of Supervisors; Anderson, Laura; Bledsoe, Teresa; Booher, Mary; Bordona, Brian; Brax, Jeffrey; Fuller, Lashun; Morgan, Greg; Morrison, David; Sharp, Leigh; Thepkaisone, Cesselea; Tran, Minh; Valdez, Jose (Louie)
Subject: Water Quality and Tree Protection Ordinance Correspondence
Attachments: E. deMan, G. Brakesman, M. Benvenuto.pdf

Attached please find correspondence received concerning the Water Quality and Tree Protection Ordinance which will be considered at a future BOS meeting.

(This is a Brown Act communication, please do not reply all)

KARITA WHITNEY \ Deputy Clerk of the Board
Napa County Executive Office
1195 Third Street, Suite 310 \ Napa CA 94559
Tel.707.253.4423 \ Karita.whitney@countyofnapa.org

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FEB 19 2019

Concerning the Draft Water Quality and Tree Protection Ordinance

COUNTY OF NAPA
EXECUTIVE OFFICE

After listening to some six hours of heartfelt concern from members of the community and expert testimony from actual scientists, it was extremely discouraging to hear members of the Board of Supervisors say things like, "70% sounds good to me" or "70% is better than 60%, so we saved some trees here today."

Comments like that fail to acknowledge the severity of the climate crisis and the contribution of deforestation to climate change, which is an actual national and global emergency. We have no time to lose. And we can't afford to put all of our efforts into fixing "traffic" or "housing" because, as one supervisor has stated, that will "give us more bang for the buck." Because, while we wait for *that* "bang" to start paying out, we continue to make the problem worse by destroying the one thing that is working in our favor right now. And it costs *no* bucks.

The following bullet points are from General Technical Report WO-59, "Carbon Storage and Accumulation in United States Forest Ecosystems," prepared by the U.S. Department of Agriculture. (https://www.nrs.fs.fed.us/pubs/gtr/gtr_wo059.pdf)

- The average forest in the United States contains 158 thousand pounds per acre (1 7.7 kg/m²) of organic carbon.
- The quantity of carbon varies considerably between regions, with Pacific Coast States containing 205 thousand pounds per acre (23.0 kg/m²)
- Pacific Coast States, including Alaska, contain the highest average carbon in forest soils, 64 percent of the total.
- There are significant differences in carbon storage among forest types. . . . Douglas - fir contains the highest average carbon because of the large quantity stored in the trees.
- On average, *live* trees are *accumulating* carbon at a rate of 1,252 pounds per acre per year (0.14 kg/m²/yr), a rate of increase of 2.7 percent of the amount stored in live trees
- Although oceans store a far greater amount of carbon than terrestrial ecosystems, our ability to manage terrestrial ecosystems is greater and likely to have a greater mitigation effect.

Let's make it easy. Let's say a property owner of developer wants to convert 100 acres of forest to vineyard. That forest is currently accumulating 1,252 pounds of atmospheric carbon per acre per year, or a total of 125,200 pounds of carbon *per year*.

While the ideal solution would be to not remove *any* living trees, if you were to take away 10% of the trees (assuming the 90% retention rate endorsed by the Watershed and Oak Woodland Protection Committee) that same forest could still accumulate 112,680 pounds of carbon per year.

But, if you were to take away 30%, the amount currently being considered in the draft ordinance, that same forest would now only be able to accumulate 87,640 pounds of carbon per year. That's a net loss of 37,560 pounds of carbon per year that could have been accumulated, but will instead be left in the atmosphere to contribute to climate change. Over ten years, the net cost of deforesting 30% rather than 10% will cost us 370,560 pounds of carbon that will be left in the atmosphere to contribute to global climate change. And that doesn't even take into account the impacts to the soil's ability to sequester carbon, which we are now learning has an even greater capacity.

With the current draft of the ordinance, at 70% canopy retention, at least 10,000 acres in Napa County can be deforested. Each one of those acres has the capacity to accumulate 1,252 pounds of atmospheric carbon per year, a total of 568 metric tons!

The weight of climate change does not rest on Napa County's shoulders alone. But given the current crisis, every person, every municipality, every county, state, and nation must do what they can. And here in Napa County, we can do this. To think that "saving some trees," by changing the canopy retention from 60% to 70% is enough, is to deny that there is a climate crisis. To think that focusing on traffic and housing, because it will give us the "biggest bang for the buck," is to kick the climate can down the road.

If the county wants to focus its efforts on traffic and housing, fine. But then it should call a moratorium on destroying *any* more forests and woodlands until those efforts show some positive results. At the very, very least, you should include the 90% canopy retention in the Watershed Protection Ordinance currently under consideration.

Elaine de Man
St. Helena, CA
Feb. 19, 2019

From: gretchen@springmountaindistrict.org <gretchen@springmountaindistrict.org>

Date: Saturday, Feb 16, 2019, 08:01

To: Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>

Subject: Spring Mountain District Association - New Ordinance

Napa County Planning Commission,
RE: Draft Water Quality & Tree Protection Ordinance
Commissioners and Supervisors,

The Spring Mountain District Association represents a group of 34 vineyard owners and wineries who are based in the mountains above St. Helena. We farm our steep hillsides without incident, and welcome visitors to our rugged and beautiful setting.

We feel that the Commission is moving forward with proposed amendments (to the Draft Water Quality & Tree Protection Ordinance) without relying on any kind of fact-based evidence.

We urge you to reconsider enacting any of these proposed amendments. Please don't do this as a sop or urge to satisfy a vocal group of local people. There is no scientific rationale for any of the proposed changes.

Our livelihoods are at stake. We are already enormously restricted in how we can farm and how we can welcome visitors. Please don't threaten the Napa Valley wine industry-----in our case the mountain vineyard farmers.

We welcome you to come walk through our vineyards and tasting rooms, so you can see how unique our settings are--- they need to be protected, not threatened by punitive, onerous and unnecessary new regulations.

Sincerely,

Gretchen Brakesman

Gretchen Brakesman

Executive Director – Spring Mountain District Association

Cell : 707.363.7236

gretchen@springmountaindistrict.org



WINEGROWERS
of napa county

members

Black Stallion
Winery

Cakebread Cellars

Catlin Farm

Duckhorn
Vineyards

E. & J. Gallo
Winery

Far Niente Winery

HALL Wines

Harlan Estate
Winery

Joseph Phelps
Vineyards

Jackson Family
Wines

Michael Mondavi
Family Estate

Piña Vineyard
Management

Realm Cellars

Renteria Vineyard
Management

Round Pond
Estate

Rombauer
Vineyards

Silver Oak Cellars

Silverado
Premium
Properties

Trefethen Family
Vineyards

Trinchero Family
Estates

February 19, 2019

Napa County Planning Commission
1195 Third Street, Second Floor
Napa, California

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FEB 19 2019

COUNTY OF NAPA
EXECUTIVE OFFICE

RE: Draft Watershed Protection Ordinance

Dear Commissioners:

Winegrowers of Napa County is a non-profit organization whose principal mission is to promote policy that preserves sustainable agriculture as the highest and best use of the natural resources while protecting the ability of wineries to produce, market, and sell wine. Winegrowers submits this comment letter on the draft Watershed Protection Ordinance ("WPO") that was released just after 6:00 p.m. on February 8, 2019. Our initial concerns are detailed below. Due to the extremely aggressive timeline for consideration and adoption of the WPO, Winegrowers continues to review this re-writing of the Conservation Regulations. As this process moves forward, Winegrowers reserves the right to make additional comments.

The WPO's vegetation retention requirements should be current conditions, not pre-fire conditions.

The draft WPO imposes vegetation retention requirements based on vegetation existing on June 16, 2016. There are several problems with this date. First, the June 2016 date does not match the expressed intent of the Board of Supervisors, who on January 29, 2019 directed staff to move forward according to "the latest aerial photograph". Second, June 2016 pre-dates the 2017 Napa Fire Complex and subsequent clearing by PG&E. If the 2017 fires were a reason for the WPO, as stated in the WPO's recitals, there is no logic to a limitation based on pre-fire conditions. Lastly, the public has limited ability to evaluate the impact of the WPO. A landowner knows what vegetation is present today, but Napa County's residents do not have ready access to aerial photos of their property from 2016. Winegrowers understands that aerial imagery of current conditions is available and recommends that the benchmark date for vegetation retention date be current conditions, not past conditions.

Napa County has not provided adequate notice to property owners whose lands will be subject to new regulations under the WPO.

Winegrowers is concerned that the WPO is being rushed forward at a pace that prevents thoughtful legislation and risks of unintended consequences. The title "Watershed Protection Ordinance" in itself implies that it's focused on the hillside areas zoned Agricultural Watershed, and the idea of vegetation retention requirements throughout



WINEGROWERS
of napa county

Napa County only arose on January 29, 2019. During the Board's workshop, Director Morrison confirmed that the "Decision Matrix" options would regulate all of Napa County, not only AW zoned lands. Winegrowers is concerned that inadequate notice and bypassing the CEQA process will result in legislation without input from the public that is difficult to amend.

Napa County Code requires mailed notice to property owners whose land is subject to proposed amendment to zoning.¹ Where the number of property owners exceeds one thousand, the County recognizes the how critical it is to notice such a mass audience "by placing a display advertisement of at least one-eighth page in at least one newspaper of general circulation within the county at least ten days prior to the hearing."² The notice for the Commission's February 20 hearing was not a display advertisement, but was only a legal notice in the classified section. Public notice and participation are especially important given that the draft WPO will impose new regulation onto all unincorporated areas of Napa County. The WPO will apply to the Airport Industrial Area, Silverado Country Club, and residentially zoned land in Napa County. These property owners have a due process right to notice compliant with County Code.

The use of CEQA exemptions is inappropriate.

The Staff Report published on February 12 provides a lengthy thirteen-page CEQA memorandum arguing that the County is exempting the WPO from environmental review. The CEQA Memorandum cites five exemptions from CEQA including "minor alterations in land use limitations" in areas of less than 20% slope and the "commonsense" exemption. Imposing a 70% vegetation retention requirement on all of Napa County would not seem to qualify as a minor change, and the alteration to land use limitations expressly applies to areas over 20% in slope. Furthermore, both these exemptions are intended to apply to specific projects, not County-wide legislation. Napa County cannot simply assume that measures intended to protect the environment are entirely benign.³ CEQA review could analyze the potential impacts from increased fire risk resulting from prohibiting vegetation management on roughly 70% of Napa County. Another possible impact is the displacement of development pressure from Napa County into incorporated areas or neighboring counties.⁴ Additionally, a thoughtful and orderly legislative process could consider consistency between the draft WPO and Napa County's General Plan and the Agricultural Preserve both of which state that agriculture is the primary or predominant use of Napa County lands.⁵ Lastly, Winegrowers notes that any future changes to the WPO likely will not qualify for these exemptions from CEQA. If the WPO needs to be amended to address an unintended consequence of this rushed process, that future change would be subject to CEQA review and possibly an EIR.

¹ Napa County Code §18.136.040(B)(1). The draft WPO imposes several of the regulations listed in California Government Code §65850 on lands that do not currently have those regulations. Therefore, the provisions of Chapter 18.136, including notice, apply to the WPO's consideration and adoption.

² Napa County Code §18.136.040(C).

³ *Dunn-Edwards Corp. v. Bay Area Air Quality Mgmt. Dist.* (1992) 9CA4th 644.

⁴ *Muzzy Ranch Co. v. Solano County Airport Land Use Comm.* (007) 41 CA4th 372, 382 (use of commonsense exemption upheld only because airport plan "simply incorporates existing general plan and zoning").

⁵ Napa County General Plan Policies AG/LU-1 and AG/LU-15; Napa County Code §18.16.010. Even the Agricultural Watershed zoning district provides that agriculture is the predominant use of the land. (NCC §18.20.010)



WINEGROWERS
of napa county

The new stream definition should be clarified to exclude drainage ditches, culverts, and other constructed features.

It is important to remember that this definition will apply to all unincorporated areas of Napa County, not just rural areas in the hillsides. The definitions of Ephemeral and Intermittent Streams also should be clarified to clearly rule out artificially constructed features including drainage ditches, culverts, and stormwater drains. Winegrowers appreciates that the word "natural" is contained in the definition, and Winegrowers proposes the following additions to the current draft WPO:

"Ephemeral or intermittent stream" means any natural channel with bed and banks containing flowing water or showing evidence of having contained flowing water, such as deposit of rock, sand, gravel, or soil, that shows evidence of annual scour and sediment transfer to a "stream" as defined in this chapter but does not itself meet the definition of "stream" in this chapter. This definition does not include features that are the result of human activity including but not limited to drainage ditches, culverts, or stormwater drains.

Thank you for the opportunity to comment on this important matter.

Sincerely,

Michelle Benvenuto
Executive Director

cc: Board of Supervisors
Minh Tran, County CEO
Jeffrey Brax, County Counsel
David Morrison, PBES Director

Whitney, Karita

From: Whitney, Karita
Sent: Tuesday, February 19, 2019 3:09 PM
To: - Board of Supervisors; Tran, Minh; Booher, Mary; Anderson, Laura; Morrison, David; Bordona, Brian; Brax, Jeffrey; Sharp, Leigh
Cc: Valdez, Jose (Louie); Morgan, Greg
Subject: Watershed Protection Correspondence (BOS Future Meeting)
Attachments: J. Ruygt Ltr.pdf

Attached please find correspondence received concerning Watershed Protection which will be considered at a future BOS meeting.

(This is a Brown Act communication, please do not reply all)

KARITA WHITNEY \ Deputy Clerk of the Board
Napa County Executive Office
1195 Third Street, Suite 310 \ Napa CA 94559
Tel.707.253.4423 \ Karita.whitney@countyofnapa.org

California Native Plant Society

RECEIVED

Feb 19, 2019

To: Napa County Board of Supervisors
c/o Jose Luis Valdez, Clerk of the Board
1195 Third Street, Suite 310
Napa, CA 94559
707-253-4380
Email: Jose.Valdez@countyofnapa.org

FEB 19 2019

COUNTY OF NAPA
EXECUTIVE OFFICE

Following are specific comments regarding the proposed Watershed Protection ordinance matrix:

Slopes : We support *Option B* although we advise that the list of exemptions be reduced to eliminate those exceptions that would allow conversion of < 1 acre areas with slopes of > 30%. Cultivation and permanent exposure of such areas to continual ground erosion should not be permitted.

Municipal Reservoirs : A setback of 200 ft for all development may be scientifically sound and acceptable to control erosion on slopes of 10% or less but we recommend that this setback be increased incrementally under an adopted schedule to a setback of 500+ ft. on slopes approaching 30%.

Wetland Definition: We agree that wetlands should be defined by at least two parameters as is the case in Sonoma County. Under the federal definition, three parameters (unlike "one parameter" as stated in *Option B*) – soil mottling features, presence of wetland indicator plants and seasonal standing surface water define a wetland. On thin rocky volcanic soils in Napa County, soil characteristics (mottling) is rarely achieved despite the fact that wetland indicator plants and standing water in season are characteristic. Therefore we urge you to adopt *Option C*.

Wetland Setbacks: The recommended *Option A* oversimplifies the complexity of this issue. A setback of 50 ft. may be adequate on slopes of < 5 % but we recommend that this number be adjusted incrementally if surrounding slopes are greater. We suggest 100 ft. setback if 10% slopes exist or 200 ft. if slopes are 15% or greater or if special status species occur in the wetland. For areas within the setback, an accepted plan should also be designed and approved to prevent degradation of the wetland by invasive species. If a wetland has connectivity with a channel that feeds it upslope, this connectivity must be included with appropriate setbacks to prevent interruption of the hydrology that sustains the wetland.

Stream Definition: We support *Option B*, adding language to regulations to include Class 3 streams. This language should be prefaced in the environmental regulations by a sound discussion of the significance of these streams in providing nutrients and sediments into riparian systems and for providing the first order of buffering of agricultural runoff.

Stream Setbacks: We support *Option C* – 125 ft. on Class 1 streams, 75 ft. on Class 2 streams and 35 ft. on Class 3 streams. There should continue to be requirements of greater setbacks based on slope steepness according to an established schedule for slopes approaching 30 %.

Tree Canopy Definition: The current definition is inadequate or perhaps just unclear. The definition should be inclusive of undisturbed wooded habitat including stands of trees. It is unclear if interrupted tree canopies, as often occurs in blue oak woodlands and valley oak savannah communities, limit the application of the ordinance.



Dedicated to the preservation of California native flora



The current definition appears to apply to forest habitats only, although the definition of “continuous” is debatable in this context. It must be made clear that isolated trees and patches of grassland are part of such communities and must be considered in the determination of “canopy” coverage. The functionality of woodland communities includes the herbaceous cover that is a result of an interrupted canopy. By contrast, a forest community typically includes a brushy understory with perennial herbs and leaf litter and supports a different suite of fauna.

Tree Canopy Retention: *Option B* provides 60% retention throughout county. While this appears to be a large step in the right direction, this does not take into consideration the cumulative impacts that have already occurred. It does not parse out the impacts that have already occurred to various vegetation types. It is estimated that approximately 32,000 acres of Valley Oak Woodland have already been converted to various uses in Napa Valley. It is justifiable to not allow further development of this vegetation type. Black Oak Alliance covers 2,220 acres and perhaps 80% retention better applies for its protection. By contrast, Blue Oak Alliance covers 44,190 acres and Coast Live Oak covers 13,178 acres so perhaps 60% is a reasonable approach to conservation of these veg types although it is uncertain how these numbers compare to the percentage that has already been converted. In the light of climate change, further land conversion must be justified and the maximum retention rate achievable should be applied.

Shrub Canopy: *Option B* provides the greatest level of protection but the logic behind the lower value placed on chaparral communities is not justified. Shrub communities support the highest botanical diversity of vegetation types in Napa County and its preservation should follow that of forested and wooded types. We support 60% retention of shrub canopy. The following table was generated from data that has been assimilated to compose a Flora of Napa County. This table highlights the significance of Chaparral communities in supporting plant biodiversity. (Some species occur in one vegetation type only, many occur in multiple types but none occur in all types.)

Occurrence of Native Species in Napa County by Major Vegetation Types

Type	Number	% of Total
Forest	549	45.5
Woodland	607	50.3
Chaparral	722	59.8
Grassland	293	24.3
Wetland	179	14.8
Riparian	167	13.8
ruderal (disturbed)	67	5.5
<i>Total</i>	1,207	

If the same analysis is applied to special status species in Napa County, nearly 65% of Napa County’s 125 species can be found in chaparral (shrubland) communities.

Tree Mitigation Ratio: Tree loss mitigation by onsite planting is ill advised. The forced tree planting on otherwise undeveloped landscape defies what nature has dictated on undisturbed sites and just multiplies the significance of impacts of land conversion. Mitigation is more effective if it involves restoration of damaged sites or acquisition of “at risk” comparable habitat in the region. This issue is alluded to in the category that follows on the table which deals with Mitigation Location. We support language in the ordinance that favors restoration and acquisition over mitigation planting onsite.

Exemptions: We support amendment of local CEQA Guidelines to require that all new vineyard (agricultural) development including planting of < 5.5 acres be subject to the ordinance. We also recommend that timberland conversion exemption language be modified to prevent incremental conversion of 3 acre pieces to agricultural development. This can be done by limiting the number of such conversions per parcel.

Code Section 18.108.050.S – This measure permits the continuation of environmental damages from grandfathered developments. If positive progress is to be made to restore severely damaged stream corridors then a replant should initiate an opportunity to negotiate an increase in setback. Perhaps the landowner has the option to replant at greater density and not loose vine and production numbers while still providing a greater setback. Perhaps the landowner can be negotiated with to make the right environmental choice by offering a tax benefit for a conservation easement. Options for recovery of damaged riparian habitat should be studied.

Local CEQA Guidelines: We support *Option B*, which would require that all new vineyard development be subject to the ordinance.

Some additional recommendations to address issues not covered in the proposed Watershed Protection Ordinance:

Grassland habitats, particularly those found on slopes of <5 % continue to be ignored in land use ordinances. Perhaps 80% of valley floor grasslands has already been developed in Napa County. These grasslands support a significantly different suite of annual plant species than upland grasslands do and generally include a mosaic of seasonal wetlands including vernal pools. Together, grassland and wetlands support over 400 species of native plants. It is time to incentivize preservation of critical remaining resources. It is unjust to continue to ignore this environmental tragedy. We recommend that the county develop tax incentives or provide a funding mechanism to compensate landowners in a way that allows them to sustain current uses maintaining these critical natural communities.

Invasive plant species are a continual and increasing threat to native species and communities. Degradation leads to a decline in ecological values and habitat services. Conversion of land and fencing leads to isolation of plant communities and increased habitat degradation. Invasive species are often a secondary impact result from incomplete weed management within managed areas such as roadsides and farms. Requirements should be established to prevent invasive noxious weeds from moving off farmed /managed areas and into wildlands.



Jake Ruygt
Conservation Chairman,
Napa Valley Chapter, California Native Plant Society
2201 Imola Avenue
Napa, CA 94559

Whitney, Karita

From: Whitney, Karita
Sent: Tuesday, February 19, 2019 1:02 PM
To: - Board of Supervisors; Tran, Minh; Booher, Mary; Anderson, Laura; Morrison, David; Bordona, Brian; Brax, Jeffrey; Sharp, Leigh
Cc: Valdez, Jose (Louie); Morgan, Greg
Subject: Watershed Protection Correspondence (BOS Future Meeting)
Attachments: B. Kirkpatrick, J. and A. Meijer, D. Solari and D. Wirth.pdf

Attached please find correspondence received concerning Watershed Protection which will be considered at a future BOS meeting.

(This is a Brown Act communication, please do not reply all)

KARITA WHITNEY \ Deputy Clerk of the Board
Napa County Executive Office
1195 Third Street, Suite 310 \ Napa CA 94559
Tel.707.253.4423 \ Karita.whitney@countyofnapa.org

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FEB 18 2019

COUNTY OF NAPA
EXECUTIVE OFFICE

Dear Supervisor Bella Ramos,

I am contacting you with great concern about this Watershed Protection Ordinance to be heard in Napa County Courts very soon. This issue was voted down twice by the voters of Napa County, should there be such an issue that an ordinance can over turn the vote of the people that is of great concern. We as a community follow the proper channels of the County and State and are able to solve these issues. I am counting on you not to let a few bullies pull the county down a slippery slope of not getting their way in an election and trying to change what the vote is to fit their own interest. I would like my voice heard, what will happen with my property? Will my taxes go down when I cannot use land I own? Will I have to follow an ordinance that is not in my best interest? Please be my voice and my family's voice.

Follow the due process and take it to the vote of the people. What if you had won the election by a small margin? What if district wanted to adopt an ordinance that would change the election you had won?

This is not how this works! When someone is in violation of the law, they are held accountable. Really? They will threaten you with a lawsuit? When that happens, I personally will gather friends, family, and neighbors to fight the right thing to do! Thank you for your time and support on this very important issue. Please feel free to contact me with questions or concerns on this issue.

Warm regards,
Bradley Kirkpatrick
5833 Pope Valley Road
Pope Valley,
Ca. 94567
707-965-2837

Whitney, Karita

From: Valdez, Jose (Louie)
Sent: Monday, February 18, 2019 12:18 PM
To: Whitney, Karita
Subject: FW: Comments on Napa County Water Quality and Tree Protection Zoning Ordinance

Sent with BlackBerry Work
(www.blackberry.com)

From: Ramos, Belia <Belia.Ramos@countyofnapa.org>
Date: Monday, Feb 18, 2019, 12:17
To: Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>
Subject: FW: Comments on Napa County Water Quality and Tree Protection Zoning Ordinance

Sent with BlackBerry Work
(www.blackberry.com)

From: Jody Frease Meijer <jody.frease@gmail.com>
Date: Monday, Feb 18, 2019, 9:27 AM
To: Morrison, David <David.Morrison@countyofnapa.org>
Cc: Andreas Meijer <meijer.andreas@gmail.com>, joellegpc@gmail.com <joellegpc@gmail.com>, Whitmer, David <Dave.Whitmer@countyofnapa.org>, anne.cottrell@lucene.com <anne.cottrell@lucene.com>, Mazotti, Andrew <Andrew.Mazotti@countyofnapa.org>, jerigillpc@outlook.com <jerigillpc@outlook.com>, Wagenknecht, Brad <BRAD.WAGENKNECHT@countyofnapa.org>, Gregory, Ryan <Ryan.Gregory@countyofnapa.org>, Dillon, Diane <Diane.DILLON@countyofnapa.org>, Pedroza, Alfredo <Alfredo.Pedroza@countyofnapa.org>, Ramos, Belia <Belia.Ramos@countyofnapa.org>
Subject: Comments on Napa County Water Quality and Tree Protection Zoning Ordinance

Dear Mr. Morrison,

Please find below our comments on the proposed ordinance in advance of the February 20th, 2019 public meeting.

We are owners of a 17 acre Ag Watershed property, with an ECP currently under review by Napa County for a small vineyard. We are writing to express our concerns with the proposed Watershed Protection Ordinance, and particularly with some of the harsher recommendations from County staff.

First: any purchaser of land in the Ag Watershed is instructed that "the best and highest use" of the land is for agriculture. Land is assessed accordingly for property tax purposes, as it is considered valuable agricultural land. For many owners of hillside properties, the restrictions under consideration would make most agriculture--not just vineyards--difficult or impossible. It's not easy now, under current rules. In our own case, we nominally have 5-6 acres of growable land. By the time we worked our way through the ECP process, we're down to 2.5 gross, and about 1.9 net plantable acres. We believe that with the proposed rules we would be

down to nearly none, or so little as to make it financially unfeasible to continue. And we would have to abide by the same rules for any crop. We would be the owners of "agricultural land" on which agriculture is forbidden. Who will compensate smaller landowners like us for loss of market value of our properties? Will property tax assessments be adjusted accordingly?

Second: non-agricultural use of Ag Watershed land is also highly restricted, but does allow for construction of primary and secondary homes. County staff's recommendations would apply 30% slope rules to residential development as well as agriculture. We're lucky in that we already have a primary dwelling on the property. We have neighbors who do not. And our ability to add a second dwelling as allowed under current AW zoning rules would probably disappear. Building on hillside sites is already highly restricted and prohibitively expensive for many. Now it would be impossible in many cases. Again: who compensates landowners for loss in property value?

Historically, landowners who purchased their property under one set of rules have been grandfathered in when land use regulations change. What makes this situation so different? What emergency are we facing so dire that it requires destroying the land value of what is for many the biggest investment in their lives?

Third: the County recommends that any new regulations be applied immediately even to existing ECP applications that are under completeness review. Anyone who is in this situation has already spent tens of thousands of dollars just to be able to submit their ECP for bio and anthropological surveys, soils engineering and vineyard design. It can take the County months to review and respond to applications. We ourselves waited 4 months for County staff to respond with information needed by our engineer to prepare a completeness response. It would be exceptionally unfair to penalize those who followed every rule by forcing them to start over.

Again, what is the dire emergency here that would require this? Are current regulations really so dangerously inadequate? If so, shouldn't any hillside development completed under old rules be required to adapt to the new standards, including tearing out vineyards if necessary?

As a counterpoint, we attended a meeting with Napa County staff a few months ago in support of a neighbor who is trying to get a driveway design approved for his hillside property. In the meeting, staff mentioned that new road standards would soon be published, but explicitly assured our neighbor that he would not have to re-do his design to meet them. Why should a different rule be applied for this situation?

In the meantime, we sincerely hope that that County staff will diligently and speedily continue the review process while these regulations are under discussion. Given the staff recommendation, isn't there a perverse incentive here to delay review under the assumption that rules will change anyway?

As a final note: contrary to some of the more overblown rhetoric of Measure C proponents, those of us with Ag Watershed properties aren't all big corporations intent on raping the land. Many of us are small landowners who want to be able to enjoy our properties under the rules we agreed to when purchasing them. Again, sensible regulation makes sense. We'd submit that we already have it--and then some.

We understand that there is a desire to mend fences after the divisive battle over Measure C. What's perturbing is that this seems to be taking the form of simply implementing Measure C to great extent, against the expressed will of the voters. We sincerely hope that Napa County is responding to a documented environmental and scientific problem, and not a political one.

Respectfully submitted,
Jody and Andreas Meijer

Whitney, Karita

From: Valdez, Jose (Louie)
Sent: Monday, February 18, 2019 12:03 PM
To: Whitney, Karita
Subject: FW: Watershed Protection Ordinance

Sent with BlackBerry Work
(www.blackberry.com)

From: Ramos, Belia <Belia.Ramos@countyofnapa.org>
Date: Monday, Feb 18, 2019, 11:53
To: Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>
Subject: FW: Watershed Protection Ordinance

Sent with BlackBerry Work
(www.blackberry.com)

From: Diana Solari <nvfrco@gmail.com>
Date: Saturday, Feb 16, 2019, 3:00 PM
To: JoellegPC@gmail.com <JoellegPC@gmail.com>, Whitmer, David <Dave.Whitmer@countyofnapa.org>, anne.cotrell@lucene.com <anne.cotrell@lucene.com>, Mazotti, Andrew <Andrew.Mazotti@countyofnapa.org>, jerigillpc@outlook.com <jerigillpc@outlook.com>, brad.wageknecht@countyofnapa.org <brad.wageknecht@countyofnapa.org>, Gregory, Ryan <Ryan.Gregory@countyofnapa.org>, Dillon, Diane <Diane.DILLON@countyofnapa.org>, Pedroza, Alfredo <Alfredo.Pedroza@countyofnapa.org>, Ramos, Belia <Belia.Ramos@countyofnapa.org>
Subject: Watershed Protection Ordinance

This county resident is opposed to this ordinance. For now, i believe the current conservation regulations will suffice. I would like to see a more in depth sharing of the research done in composing this ordinance before it becomes law.

Diana Solari
Business Manager
Napa Valley Farm & Ranch
ph: 707.942.4342
fx: 707.942.9502

Whitney, Karita

From: Valdez, Jose (Louie)
Sent: Monday, February 18, 2019 12:03 PM
To: Whitney, Karita
Subject: FW: Watershed Protection Ordinance. 2/20/19 at 9 AM

Sent with BlackBerry Work
(www.blackberry.com)

From: Ramos, Belia <Belia.Ramos@countyofnapa.org>
Date: Monday, Feb 18, 2019, 11:54
To: Valdez, Jose (Louie) <Jose.Valdez@countyofnapa.org>
Subject: FW: Watershed Protection Ordinance. 2/20/19 at 9 AM

Sent with BlackBerry Work
(www.blackberry.com)

From: Doug Wirth <douglaswirth@gmail.com>
Date: Saturday, Feb 16, 2019, 11:29 AM
To: Brad.Wagenknecht@napacounty.org <Brad.Wagenknecht@napacounty.org>, Ryan.Gregory@napacounty.org <Ryan.Gregory@napacounty.org>, Diane.Dillon@napacounty.org <Diane.Dillon@napacounty.org>, Alfredo.Pedroza@napacounty.org <Alfredo.Pedroza@napacounty.org>, Ramos, Belia <Belia.Ramos@countyofnapa.org>
Cc: Robert Wirth <rbwirth@wavecable.com>, Jim Wirth <jim.wirth@tricommercial.com>
Subject: Watershed Protection Ordinance. 2/20/19 at 9 AM

Dear Supervisors: My family owns land in extreme eastern Napa County near Berryessa Peak that would be adversely affected by the proposed Watershed Protection Ordinance. No justification has been advanced for the added restrictions on development of sloped land over 30%, setbacks from streams and more broadly defined wetlands, tree canopy retention of 70% on all unincorporated land, and tree removal mitigation of 3:1. Added restrictions in addition to CEQA and existing federal law are not necessary and will depreciate the value of landholdings. Land owners are better situated to determine the highest and best use of their land without interference from local authorities. I urge you to reject this ordinance when it comes before you for consideration. Thank you, Doug Wirth.

Sent from my iPhone

MAR 22 2019

Summary Brief

Napa County Planning, Building
& Environmental Services

Napa County Conservation Policy

Existing Conditions and Proposed Policy Impacts

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MAR 22 2019

March 22, 2019
Amber Manfree Consulting

COUNTY OF NAPA
EXECUTIVE OFFICE

Napa County, California, currently has over 50,000 acres of productive agricultural land, mostly planted in premium wine grapes. The Napa Valley floor has been essentially built-out following replanting of other crops to vineyard over the past few decades. This has resulted in economic and social pressures to expand vineyard acreage by converting wildlands. Overarching contemporary issues of climate change and biodiversity loss call this practice into question, as Napa County wine grape production is expected to be negatively impacted by climate change, and as the region is a biodiversity hotspot by virtue of its California Floristic Province location.

In order to inform the discussion of how to best respond to this situation, estimates have been made of developable area under existing policies and under several suggested policy alternatives in order to compare possible outcomes. Scientific research shows that leaving wildlands intact is an effective way to retain carbon, protect water supplies, and support biodiversity. Policies that achieve this goal are recommended.

Key Findings

1. **Mitigating on slopes.** The most significant policy factor affecting the ratio of conservation to development is whether or not conservation credit ("mitigation" or "retention") is allowed on lands not at risk of development (undevelopable lands; e.g., with slopes greater than 30%).

Recommendation: Increase effective conservation by requiring that mitigation be done on site and on land that is at risk of development.

2. **Tree Canopy.** County-wide analysis of land cover and developable area on a per-parcel basis estimates suggests:
 - A 3:1 mitigation policy where mitigation is allowed on undevelopable land would increase county-wide canopy protection by 4% over current conditions, leaving more than 27,800 acres of canopy - predominantly oaks - at-risk of deforestation.
 - A 2:1 mitigation policy without mitigation on undevelopable land would increase canopy protection by 12% over current conditions, leaving about 14,600 acres of canopy at risk of deforestation.
 - A 3:1 mitigation policy without mitigation on undevelopable land would increase canopy protection by 14% over current conditions, leaving about 10,900 acres of canopy at-risk of deforestation.

Recommendation: For all canopy, require at least 3:1 mitigation on-site, with no mitigation on undevelopable areas.

3. **Shrubland.** County-wide 40% shrubland retention will have virtually no conservation benefit if conservation credit is allowed in undevelopable land. This is because most parcels with development potential contain significant area with slopes over 30% and/or streams, which is already precluded from development by the Hillside Ordinance.

Recommendation: Require that all shrubland retention be done on developable areas.

4. **Water supply.** Increased tree canopy retention will offer improvement in water security. In several sensitive domestic water supply drainages, grass and shrub are extensive land cover types, so canopy protections alone will not dramatically change development patterns. At least four of seven reservoirs have had, or currently have, sediment loading issues due to sources more than 500 feet away, and algae issues related to nutrient loading are an emerging concern. Linear setbacks (buffers) proposed for water supply reservoirs are unlikely to protect water supplies, because pollutant delivery is a function of the rate of a waterway's energy dissipation against its bed and banks of per unit downstream length, not linear distance across a landscape.

Recommendation: In addition to maximizing tree protection, retain shrub and grasslands in water supply watersheds. Hydrologic analysis and ongoing monitoring is needed to ensure water quality objectives are met. A hydrologic model, informed by field data, is the established method for evaluating watershed development impacts.

5. **Urgency.** The Intergovernmental Panel on Climate Change states that "rapid, far-reaching and unprecedented changes in all aspects of society" will be required to limit global warming to 1.5°C. Preventing further loss of wildlands is a key short-term climate stabilization strategy, one of numerous actions needed to buffer the worst climate change impacts.

Recommendation: Retaining more natural resources by limiting the conversion of wildland to other uses keeps climate management options open.



Napa County Conservation Policy

Existing Conditions and Proposed Policy Impacts

Analysis prepared for Napa Growers / Vintners for Responsible Agriculture
By Amber Manfree, PhD
admanfree@gmail.com
©Amber Manfree March 2019

"...wine's future is tied inextricably to a vital Earth and a vital population. Grape growers and winemakers must understand both the dire condition of the planet and the small, but significant, role their industry holds in the human matrix. They must seek, therefore, in a responsible manner, their proper and effective role in the adaptation to and the mitigation of global climate change. The future of the wine industry is dependent upon an effective course of action. The Romans declared, "Vino veritas," or "in wine there is truth (Jones and Webb, 2010)." The simple, yet tragic, truth is the Earth's climate is changing. How the wine industry responds will determine if the industry is to survive."

- Michelle Renée Mozell 2014

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MAR 22 2019

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Executive Summary

Napa County, California, currently has over 50,000 acres of productive agricultural land, mostly planted in premium wine grapes. The Napa Valley has been essentially built-out following conversions of other crops to vineyard over the past few decades, resulting in economic and social pressure to expand vineyard acreage by converting wildlands. Overarching contemporary issues of climate change and biodiversity loss call this practice into question, as Napa County wine grape production is expected to be negatively impacted by climate change, and as the region is a biodiversity hotspot by virtue of its California Floristic Province location.

In order to inform the discussion of how to best respond to this situation, estimates have been made of developable area under existing policy and under several policy alternatives to compare possible outcomes. Scientific research shows that leaving wildlands intact is an effective way to retain carbon, protect water supplies, and support biodiversity, so policies that achieve this goal are recommended.

Key Findings

1. **Mitigating on slopes.** The most significant policy factor affecting the ratio of conservation to development is whether or not conservation credit ("mitigation" or "retention") is allowed on lands not at risk of development (undevelopable lands; e.g., with slopes greater than 30%).

Recommendation: Increase effective conservation by requiring that mitigation be completed on site and on land that is at risk of development.

1. **Tree Canopy.** County-wide analysis of land cover and developable area, which estimated outcomes on a per-parcel basis, suggest:
 - A 3:1 mitigation policy where mitigation is allowed on undevelopable land would increase county-wide canopy protection by 4% over current conditions, leaving more than 27,800 acres of canopy - predominantly oaks - at-risk of deforestation.
 - A 2:1 mitigation policy without mitigation on undevelopable land would increase canopy protection by 12% over current conditions, leaving about 14,600 acres of canopy at risk of deforestation.
 - A 3:1 mitigation policy without mitigation on undevelopable land would increase canopy protection by 14% over current conditions, leaving about 10,900 acres of canopy at-risk of deforestation.

Recommendation: For all canopy, require 3:1 mitigation on-site, with no mitigation on undevelopable areas.

2. **Shrubland.** County-wide 40% shrubland retention will have virtually no conservation benefit if conservation credit is allowed in undevelopable land. This is because most parcels with development potential contain significant area with slopes over 30% and/or streams, which is already precluded from development by the Hillside Ordinance.

Recommendation: Require that all shrubland retention be done on developable areas.

2. **Water supply.** Increased tree canopy retention will offer improvement in water security. In several sensitive domestic water supply drainages, grass and shrub are extensive land cover types, so canopy protections alone will not dramatically change development patterns. At least four of seven reservoirs have had, or currently have, sediment loading issues due to sources more than 500 feet away, and algae issues related to nutrient loading are an emerging concern. Linear setbacks (buffers) proposed for water supply reservoirs are unlikely to protect water supplies, because pollutant delivery is a function of the rate of a waterway's energy dissipation against its bed and banks of per unit downstream length, not linear distance across a landscape.

Recommendation: In addition to maximizing tree protection, retain shrub and grasslands in water supply watersheds. Hydrologic analysis and ongoing monitoring is needed to ensure water quality objectives are met. A hydrologic model, informed by field data, is the established method for evaluating watershed development impacts.

3. **High-value agriculture.** Climate change is predicted to shift premium grape growing regions toward the coast and northward away from Napa.

Recommendation: Storing carbon in trees and soil to slow climate change impacts is one step toward protecting existing high-value crops. Transition Napa's winegrowing industry from a growth mode to a sustainability mode.

4. **Urgency.** The Intergovernmental Panel on Climate Change states that "rapid, far-reaching and unprecedented changes in all aspects of society" will be required to limit global warming to 1.5°C. Preventing further loss of forest and shrublands is a key short-term climate stabilization strategy; one of numerous actions needed to buffer the worst climate change impacts.

Recommendation: Retaining more natural resources by limiting the conversion of wildland to other uses keeps climate management options open.

Introduction

Napa County's pleasant Mediterranean climate and robust economy attract residents and tourists, and the economic potential of its agriculture continues to compel developers to convert wildlands to agriculture and sprawling estates. The County's wildlands possess tremendous biodiversity and natural beauty and they provide valuable ecological services such as clean drinking water, clean air, and carbon storage. For all these reasons, wildlands merit conservation and preservation. Many acres of wildlands have already been converted to vineyard and other uses. Symptoms of extensive land conversion and poor management, such as reduced aquatic ecosystem function, persist even after massive restoration efforts and nearly 30 years of well-intentioned local conservation policies. The pressures of preservation and wise use of resources are in constant tension, and projected climate change impacts elevate the need for thoughtful science-based decision-making.

The purpose of this study is to explore potential land-availability scenarios. County-wide land use and land cover are paired with a mathematical model to clarify current land availability and explore future availability under different policies. Differences in required conservation and allowed development under various constraints are estimated with existing and custom data.

A base model was developed which describes the maximum area currently available for agricultural or other permitted development. The base model answers the question, "What could be developed given current land cover constraints and policy?" Total estimated county-wide developable¹ land area is about 85,500 acres before considering 2:1 Mitigation and sixty-forty "60/40" retention policies, and about 75,900 acres after considering them (section 2). The base estimate is qualified by dividing it into categories of soil quality, vegetation cover type, and Land Use Zoning. Figures presented in this report are estimates. The model does not assess development likelihood or practical limitations such as water supply, remoteness, or climate.

This report is a starting point for policy discussion, and should be considered in tandem with contextual information, such as climate change literature, biodiversity literature, etc. The conservation summary provided in Center for Biological Diversity comments to the Napa County Board of Supervisors (2019) is a helpful reference. Economic impacts of policies, interactions with policies other than 2:1 Mitigation requirements and 60/40 retention, and assessments of habitat value should be considered as well.

1. The term "developable" is used in this report to signify areas that are not precluded from conversion to agriculture or other Land Use Zone-appropriate use by an existing use or existing policy. Lands which are precluded from development are referred to as "undevelopable."

Section 1 - Quick Reference & Existing Conditions

Quick reference. Approximate areas of conditions for all of Napa County are listed below. All figures are in acres.

Napa County

(Napa County 2004)

Total area	507,440
Land area	481,320

Model Estimates

(Manfree 2019)

Base developable area	85,500
Developable area	
less 2:1 policy	76,500
Developable area	
less 2:1 and 60/40	75,900

Slope

(Napa County 2002)

Total area < 30% slope	276,540
Land area < 30% slope	250,880
Land area < 30% slope,	
less estuarine wetlands	240,040
Land area > 30% slope	230,440

Reserves (fee title)

(GreenInfo Network 2018)

Federal	42,996
State	43,260
County	920
City	10,082
Special District	5,534
Non-profit	9,438
Total reserve area	133,116

Land area of reserves	112,229
-----------------------	---------

Easements

Napa Land Trust	
(wildlands)	24,805
Other	4,196

Farmland Type

(CDC 2016)

Farmland	75,570
Grazing land	179,330
Other undeveloped	204,830

Vegetation - countywide

(Thorne 2004)

Oak woodlands	148,828
Broadleaf (non-oak)	20,248
Conifer	38,601
Total canopy	207,677

Shrubland	61,244
Grassland	51,762

Other land cover

(Manfree 2018, Napa County 2016)

Existing vineyard	50,680
Stream setbacks	26,650
Lake Berryessa	19,080
Other water bodies	16,293
Roads	17,321
Railroad	332

Land Cover and Land Use

Tables detailing countywide existing vineyard (table 1), farmland type (table 2), and land cover (vegetation) (table 3) provide an overview of existing conditions. For an explanation of the minor discrepancies in total areas between tables, see the methods section and appendices. Current vineyard acreage is concentrated in the Agricultural Preserve zone, particularly on the floor of Napa Valley (figure 1).

Table 1. Countywide Existing Vineyard per Land Use Zone

(Data: Manfree 2018, Napa County 2013; 2016)

Land Use Zone	Zone Total Acres	Vineyard Acres	Percent Vineyard
Agricultural Watershed	422,905	24,196	6%
Agricultural Preserve	31,594	20,587	65%
Agricultural Watershed, Airport Compatibility	19,305	3,611	19%
Municipal/ urban	21,285	1,708	8%
Residential Country	3,263	486	15%
Residential	953	23	2%
Industrial Park, Airport Compatibility	1,092	16	1%
Residential Country, Urban Reserve	103	12	11%
Agricultural Preserve, Historic Restaurant	16	10	63%
Residential, Urban Reserve	319	3	1%
Planned Devel, Affordable Housing, Airport Compatibility	46	3	6%
Public Lands	29	3	10%
Local Commercial	127	2	2%
Airport	833	1	0%
Commercial Neighborhood	81	0	0%
Local Commercial, other	3	0	6%
Planned Development	1,868	0	0%
Other Zones	2,770	0	0%
Total:	506,592	50,661	10%

Farmland Type by Land Use Zone

Table 2. Countywide Farmland Type by Land Use Zone

See Appendix 1 for description of categories (Data: CDC 2016, Napa County 2013).

Farmland Type - Higher Quality Farmland									
Land Use Zone	Local importance	Statewide importance	Prime	Unique	Grazing	Other	Urban	Water	Total Acres
Ag Watershed (AW)	13,686	5,135	7,583	13,340	171,238	186,939	2,071	21,897	421,890
Ag Preserve (AP)	1,060	1,742	20,571	1,811	629	4,671	1,109		31,593
Municipal/ urban (MU)	1,486	667	1,212	87	1,004	2,498	14,244	87	21,285
AW, Airport									
Compatibility (AC)	848	2,026	759	1,461	3,978	7,873	1,081	1,278	19,303
Residential Country (RC)	101	74	329	99	690	847	1,123		3,263
Planned Development (PD)	19	1	22		60	390	1,340	36	1,868
Industrial Park, AC	528	1	19		19	4	521		1,092
Residential (R)	1	3	9		40	175	724		953
AW, Skyline Wilderness Park	46				853	43			943
Airport	283	12			7	81	450		833
R, Urban Reserve (UR)						49	270		319
General Industrial, AC	56				8	53	186		304
Industrial	4				8	199	70		281
Public Lands, AC	31	128	83		3	13	6		263
Industrial, AC	70				2	7	123		202
PD, AC						25	143		169
R, AC	2				26	12	76	42	157
Local Commercial	24		2		13	8	80		127
AW, UR						110	2		112
Residential Country, UR	31	13			5	18	37		103
Commercial									
Neighborhood (CN)	7				31		43		81
Marine Commercial (MC), AC	0				9	13	39	15	76
AW, Affordable Housing (AH)	12				59		2		73
Napa Pipe Mixed Use R					1		44	11	56
Napa Pipe									
Industrial/Business Park							41	10	51
PD, AH, AC		3				36	7		46
Public Lands			4			11	14		29
Residential Country, AH	22				1				23
PD, AH			8			1	10		20
AP, Historic Restaurant			15			1			16
MC	1				2	1	10		14
MC, AH					11		2		13
AW, Produce Stand						4			4
Local Commercial, other						3			3
Local Commercial, AH					3				3
Local Commercial, AC	2								2
CN, UR							2		2
Total Acres:	18,321	9,804	30,616	16,800	178,700	204,086	23,873	23,375	505,575

Land Cover Type by Land Use Zone

Table 3 (Part 1 of 2). Countywide Land Cover Type by Land Use Zone

See Appendix 2 for description of categories (Data: Napa County 2013, Thorne 2004)

Land Use Zone	Oak	Broadleaf non-oak	Conifer	Grasslands	Chaparral	Serpentine	Rock outcrop
Agricultural Watershed	141,385	18,721	36,276	42,377	60,173	53,403	1,720
Agricultural Preserve	2,920	313	350	861	1	3	9
Municipal/ urban	1,317	566	342	2,411	42	15	
Agricultural Watershed, Airport Compatibility	1,329	265	1,273	4,940	373		
Residential Country	825	38	86	262	28		
Planned Development	335	15	73	32	67	26	2
Industrial Park, Airport Compatibility	16	3		176			
Residential	171	4	118	2	3		
Agricultural Watershed, Skyline Wilderness Park	316	311		179	94		
Airport	4		4	125			
Residential, Urban Reserve	35	1		6			
General Industrial, Airport Compatibility	4			54			
Industrial	65			0	13		
Public Lands, Airport Compatibility	1			0			
Industrial, Airport Compatibility				2			
Planned Development, Airport Compatibility			42		1		
Residential, Airport Compatibility				17			
Local Commercial	18	5	1	3			
Agricultural Watershed, Urban Reserve	1			98			
Unclassified				1			
Residential Country, Urban Reserve	5	5					
Commercial Neighborhood	34		2	4			
Marine Commercial, Airport Compatibility				17			
Agricultural Watershed, Affordable Housing	40			20		1	
Planned Development, Affordable Housing, Airport Compatibility			31				
Public Lands							
Residential Country, Affordable Housing	2						
Planned Development, Affordable Housing			3				
Agricultural Preserve, Historic Restaurant							
Marine Commercial				1		3	
Marine Commercial, Affordable Housing	3				4		
Agricultural Watershed, Produce Stand				4			
Local Commercial, other							
Local Commercial, Affordable Housing	1			2			
Local Commercial, Airport Compatibility							
Commercial Neighborhood, Urban Reserve							
Total Acres:	148,828	20,248	38,601	51,597	60,800	53,452	1,730

Table 3 (Part 2 of 2). Countywide Land Cover Type by Land Use Zone

Land Use Zone	Agriculture (grazing)	Urban	Water	Wetland	Vacant	No ID	Total Acres
Agricultural Watershed	29,905	6,148	25,675	2,326	798	1,412	420,319
Agricultural Preserve	25,336	1,323	359	38	45	36	31,594
Municipal/ urban	3,510	11,765	359	150	777	26	21,281
Agricultural Watershed, Airport Compatibility	3,965	1,893	2,194	2,094	6	79	18,411
Residential Country	527	1,481	6	6	4		3,263
Planned Development	20	1,156	36	6	99		1,868
Industrial Park, Airport Compatibility	703	152		42			1,092
Residential	19	636					953
Agricultural Watershed, Skyline Wilderness Park	9	20	9	3			943
Airport	85	587		28			833
Residential, Urban Reserve	7	255			16		319
General Industrial, Airport Compatibility	43	171		13	19		304
Industrial		196		6			281
Public Lands, Airport Compatibility	254			9			263
Industrial, Airport Compatibility	15	165	2	17			202
Planned Development, Airport Compatibility		126					169
Residential, Airport Compatibility	5	42	67	16	11		157
Local Commercial	33	63		2	2		127
Agricultural Watershed, Urban Reserve		13					112
Unclassified		82	21	3			107
Residential Country, Urban Reserve	50	43					103
Commercial Neighborhood	6	36					81
Marine Commercial, Airport Compatibility		29	31				76
Agricultural Watershed, Affordable Housing		8	1	3			73
Planned Development, Affordable Housing, Airport Compatibility	5	9					46
Public Lands	25		2	1			29
Residential Country, Affordable Housing	21						23
Planned Development, Affordable Housing		17					20
Agricultural Preserve, Historic Restaurant	14		1				16
Marine Commercial		9					14
Marine Commercial, Affordable Housing		6					14
Agricultural Watershed, Produce Stand							4
Local Commercial, other	3						3
Local Commercial, Affordable Housing		1					3
Local Commercial, Airport Compatibility		2					2
Commercial Neighborhood, Urban Reserve		2					2
Total Acres:	64,561	26,437	28,763	4,762	1,777	1,554	503,109

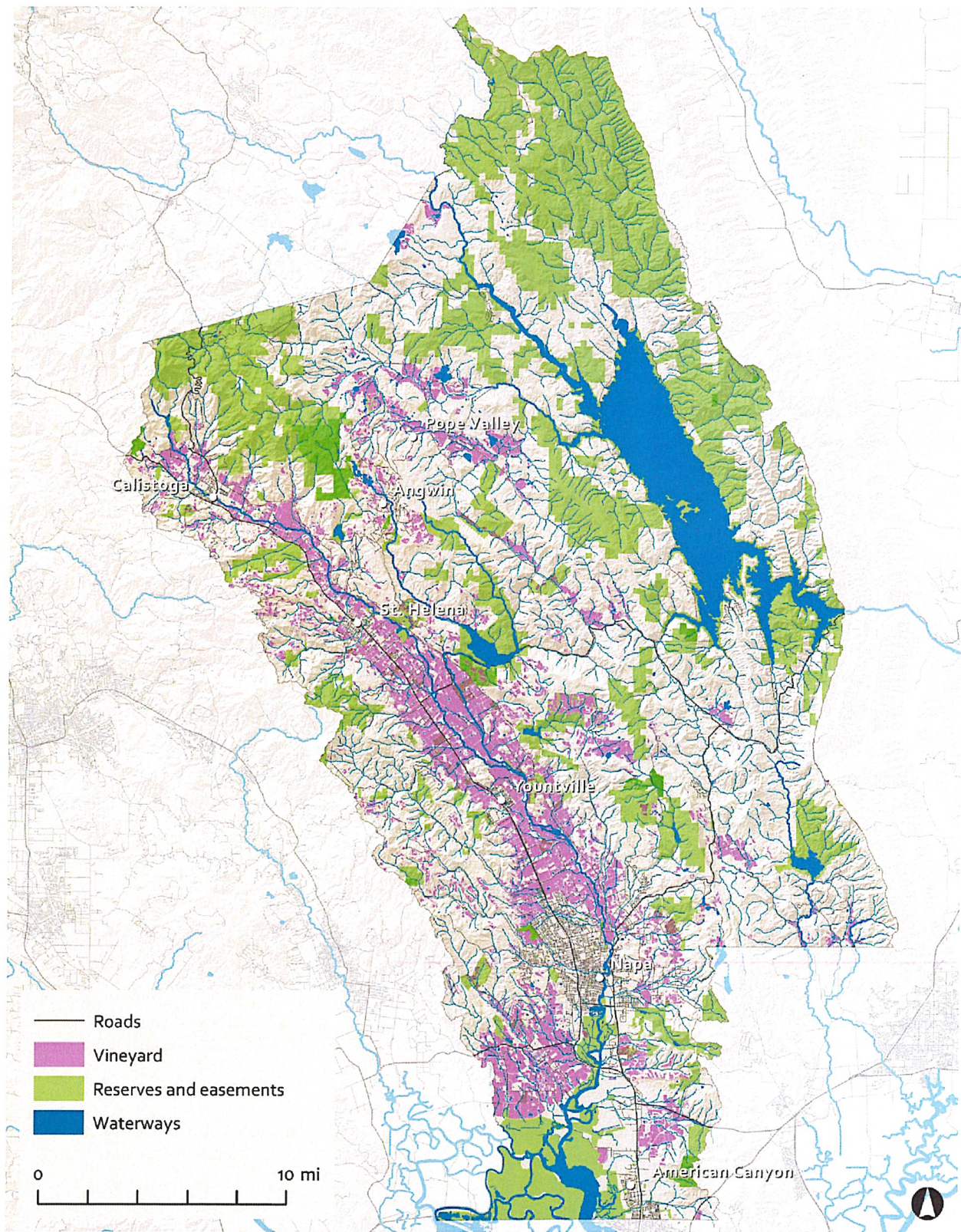


Figure 1. Napa County reference map.

Section 2 - Results of Policy Proposal Options Analysis

Existing Conditions Model Base

Several policies govern conversion of wildlands to vineyard in Napa County:

CEQA. The California Environmental Quality Act (CEQA) requires evaluation of any potentially significant impacts a project may have on the environment and avoidance of, or mitigation for, those impacts. This includes habitat for species with threatened, endangered, rare, and special concern status (State of California 1970).

Oak Woodland Mitigation. In 2004, CEQA was amended to require counties to determine whether conversion of oak woodlands to other uses will have a significant impact on the environment. In Napa, significant oak woodland impacts are typically mitigated on a two-to-one basis, preferably on-site, though off-site mitigation is allowed (State of California 2004).

Hillside Ordinance. Napa County's Hillside Ordinance went into effect in 1993 in response to erosion problems associated with hillside development (County of Napa 1991). This ordinance:

- Requires stream setbacks with widths correlating to adjacent percent slope
- Discourages development on slopes over 30%, requiring exceptions to policy for any such projects.
- In sensitive domestic water supply drainages, wildland conversion projects must retain a minimum of 60% tree canopy and 40% shrubland on-site. Retention credit is allowed on slopes over 30% and within stream setbacks and adjacent parcels having the same owner may be handled as a single area when considering where to count retention.

Zoning. Zoning rules favor agriculture in the Agricultural Preserve and Agricultural Watershed land use zones.

Countywide developable lands total about 85,500 acres before applying the 2:1 oak retention or replacement rule and the 60/40 retention policy. After applying these rules, about 75,900 acres remain in the "developable" category, assuming landowners maximize their opportunity to count canopy or shrubs on undevelopable areas (such as slopes over 30% and stream setbacks) toward conservation goals and mitigation is done on-site. This is an approximation of existing conditions, issued as a base for policy analysis.

The base model for developable area was determined by starting with the total area of Napa County and subtracting areas precluded from conversion to agriculture or other uses due to regulations, existing uses, open water, or unsuitable soils. Estimates of developable area in different tables vary slightly due to secondary datasets that the base model is combined with (see methods and appendices 1 and 2). The largest undevelopable areas include lands over 30 percent slope, open water, reserves, and existing agriculture. Tables 4- 6, and Figures 2-3 show areas from the base model, before applying 2:1 and 60/40 policies.

Table 4. Developable land base model: Land Use Zone and California Department of Conservation Farmland Suitability Class.

See Appendix 1 for description of categories (Data: Manfree 2018, Napa County 2013, CDC 2016)

Land Use Zone	Higher Quality Farmland	Grazing land	Other land	Urban	Total Acres
Agricultural Watershed	8,321	39,569	26,474	369	74,734
Agricultural Watershed, Airport Compatibility	866	1,665	1,401	103	4,035
Agricultural Preserve	736	337	1,317	88	2,478
Municipal/ urban	811	240	757	358	2,167
Residential Country	70	169	244	78	560
Industrial Park, Airport Compatibility	401	16	3	37	456
Public Lands, Airport Compatibility	233	3	9	3	248
Planned Development	22	10	106	87	225
Agricultural Watershed, Urban Reserve	0		86	0	86
Other Zones	119	63	129	108	419
Total Acres	11,579	42,073	30,526	1,231	85,408

Table 5. Developable land base model: Land Use Zone and land cover type.

See Appendix 2 for description of categories (Data: Manfree 2018, Napa County 2013, Thorne 2004)

Land Use Zone	Oak	Broadleaf non-oak	Conifer	Grasslands	Chaparral	Agriculture (grazing)	No ID	Vacant	Wetland vegetation	Total Acres
Agricultural Watershed	31,589	3,025	5,659	18,129	9,513	6,020	282	315	287	74,819
Agricultural Watershed, Airport Compatibility	572	45	652	1,745	163	830	21		12	4,040
Agricultural Preserve	857	68	86	469		953	9	14	24	2,479
Municipal/ urban	345	201	65	785	2	588	6	142	38	2,172
Residential Country	215	22	19	156	5	140			4	561
Industrial Park, Airport Compatibility	7	2		141		285			22	456
Public Lands, Airport Compatibility						242			6	248
Planned Development	92	6	21	9	19	19		57	1	226
Agricultural Watershed, Urban Reserve				86						86
Residential	28		39	1	1	2				72
General Industrial, Airport Compatibility	1			42		9				53
Residential, Urban Reserve	16			5		5		13		39
Residential Country, Urban Reserve	2					35				37
Industrial	24				4				5	33
Local Commercial	10	3		2		18				32
Agricultural Watershed, Affordable Housing	16			14					2	32
Residential, Airport Compatibility				2		4		9	12	26
Commercial Neighborhood	16			4		4				23
Planned Development, Affordable Housing, Airport Compatibility			17			5				21
Residential Country, Affordable Housing						18				18
Planned Development, Airport Compatibility			12							12
Airport	3		3	3						8
Industrial, Airport Compatibility				1					3	4
Agricultural Watershed, Produce Stand				3						3
Local Commercial, other						2				2
Agricultural Preserve, Historic Restaurant						1				1
Local Commercial, Affordable Housing				1						1
Marine Commercial, Affordable Housing										0
Planned Development, Affordable Housing										0
Agricultural Watershed, Skyline Wilderness Park										0
Marine Commercial										0
Marine Commercial, Airport Compatibility										0
Total Acres	33,794	3,372	6,574	21,598	9,709	9,179	317	549	416	85,503

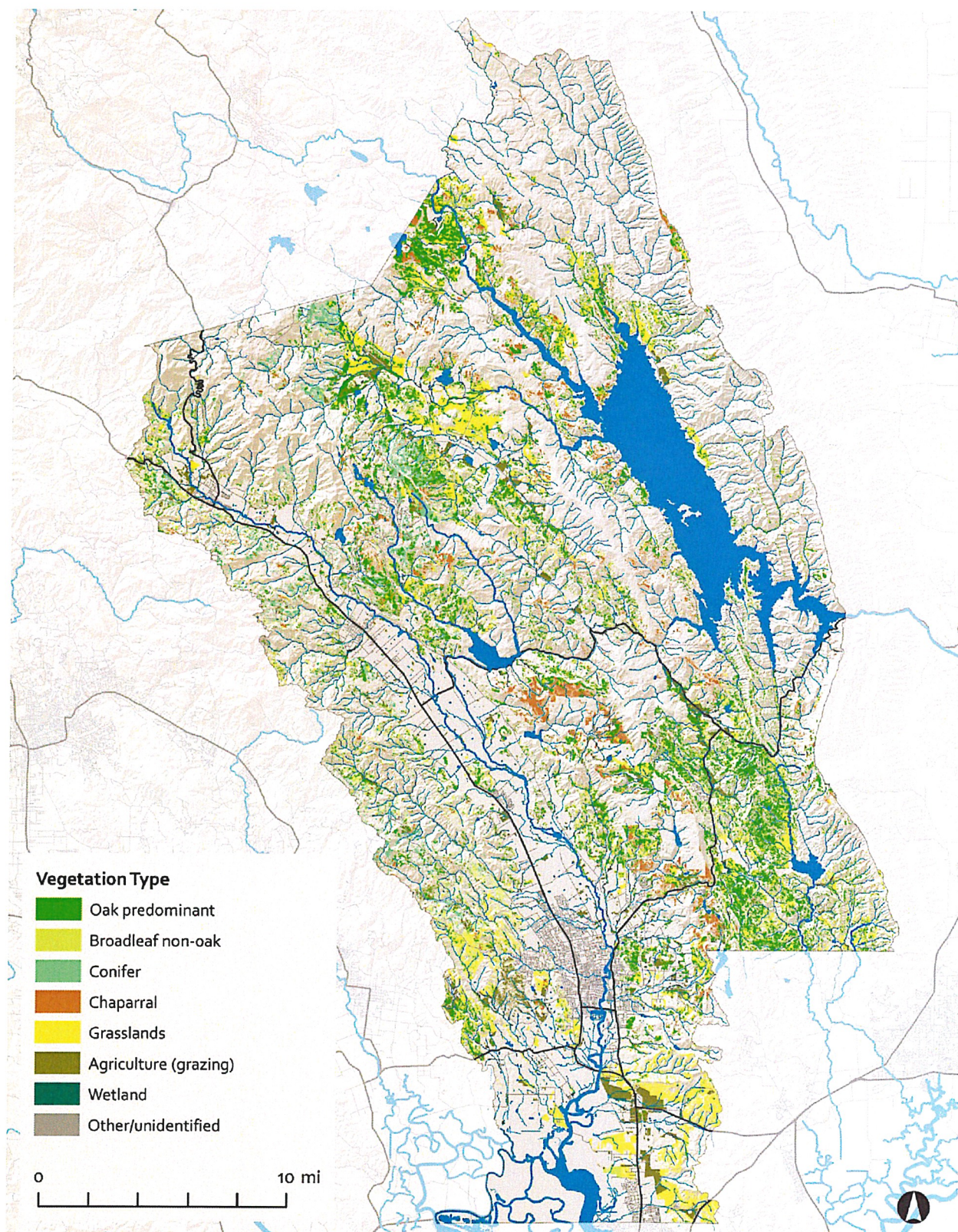


Figure 2. Napa County land at risk of development with vegetation type.
Data: Thorne 2004, County of Napa 2019, USGS 2013; 2016.

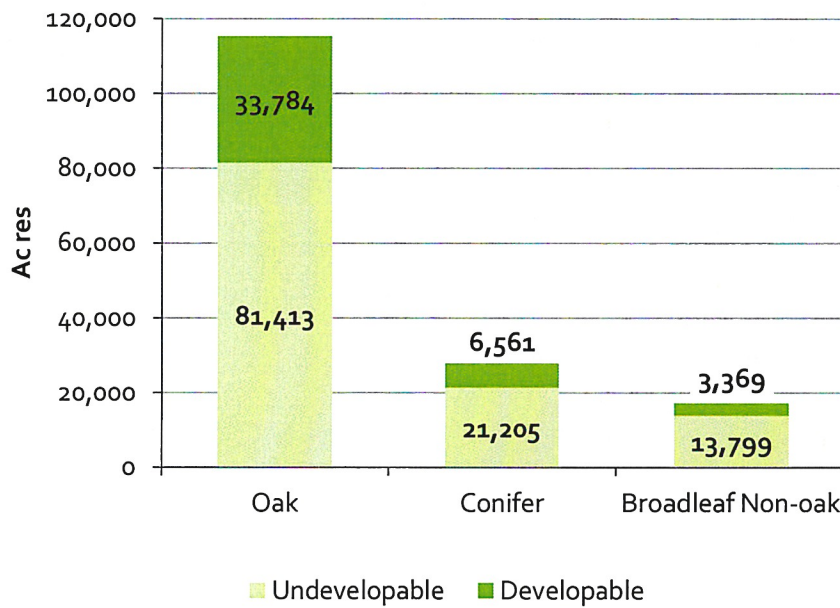


Figure 3. Developable land base model: Canopy.

Undevelopable and developable canopy, by canopy type (data: Manfree 2018, Thorne 2004).

Table 6. Developable land base model: Canopy.

Acreage of subsets of land cover type relevant to this analysis.

	Parcels with developable land	Oak	Broadleaf non-oak	Conifer	total canopy
Developable	85,455	33,784	3,369	6,561	43,714
Undevelopable	271,834	81,413	13,799	21,205	116,417
Total	357,289	115,197	17,167	27,767	160,132

Modeling Existing 2:1 and 60/40 Policy

In addition to slope-related restrictions on development, Napa County enforces policy requiring canopy and shrubland protections. With CEQA protections adopted in 2004, oak trees are mitigated at a 2:1 ratio (State of California 1970, 2004), preferably setting aside existing trees on-site, though planting of new trees onsite or off-site are options. In the early 1990s, Napa County adopted a rule requiring retention of 60 percent of trees and 40 percent of shrubland in water supply watersheds.

These constraints can be applied to the base model to derive a more accurate estimate of existing conditions. Here the base model is described, followed by 2:1 Mitigation and 60/40 rule adjustments. Napa County has also adopted a Voluntary Oak Woodland Management Plan; however participation is at landowner discretion (Napa 2010).

Allowing oak canopy mitigation on lands which are otherwise undevelopable allows about 88 percent of oak “conservation” to occur on lands which are not at risk of development, and includes an option to mitigate off-site.

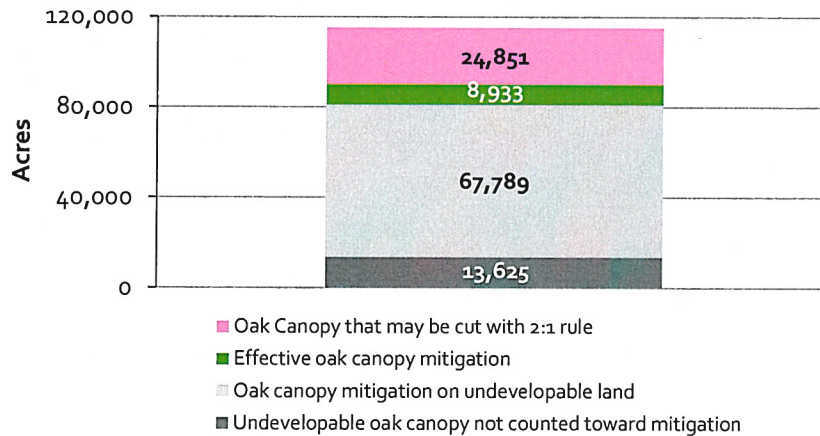


Figure 4. Effectiveness of existing 2:1 oak mitigation.

Analysis assumes landowners mitigate on-site and maximize their opportunity to count canopy or shrub on undevelopable lands toward conservation goals.

Table 7. Existing 2:1 ratio oak mitigation.

Parameter	Acres
Total Oak Canopy	115,197
Developable Oak Canopy	33,784
Undevelopable Oak Canopy	81,413
Oak Canopy Acres Set Aside by 2:1	76,722
Effective Oak Canopy Mitigation by 2:1	8,933
Oak Canopy Cut with 2:1	24,851
Total Canopy Cut with 2:1	34,782

Existing 60/40 Rule Constraints

Napa County's 60/40 rule requires retention of 60 percent of trees and 40 percent of shrubland within a parcel, as it existed June, 1993, when wildlands are converted to other uses in sensitive domestic water supply drainages ("water supply watersheds"). County guidelines state that vegetation selected for retention should maximize habitat value and connectivity. The 60/40 rule is applied in the event that it is more restrictive than 2:1 mitigation and Hillside Ordinance requirements would be. As with the 2:1 rule, the 60/40 rule allows undevelopable areas to count toward mitigation.

Remaining developable areas in agricultural watersheds tend to be dominated by oak and shrubland, followed by grassland and conifer land cover types (table 8 and figure 5).

Table 8. Developable area in sensitive domestic water supply drainages, by vegetation type.

See Appendix 2 for description of categories (Data: Thorne 2004, USGS 2017, County of Napa 2019).*

Watershed	Vegetation Type						Other	Total Acres
	Oak predominant	Broadleaf non-oak	Conifer	Chaparral	Grasslands	Agriculture (grazing)		
Hennessey	2,821	227	1,090	1,077	910	516	41	6,682
Curry	2,050	0	2	107	618	6	16	2,799
Rector	335	23	9	1,238	90	110	28	1,833
Milliken	623	101	7	421	280	85	67	1,583
Bell Canyon	163	16	111	158	17	31	10	506
Madigan	145	14	0	133	20	48	0	360
Kimball	84	2	58	8	67	0	0	219
Total Acres	6,221	382	1,276	3,143	2,001	796	162	13,982

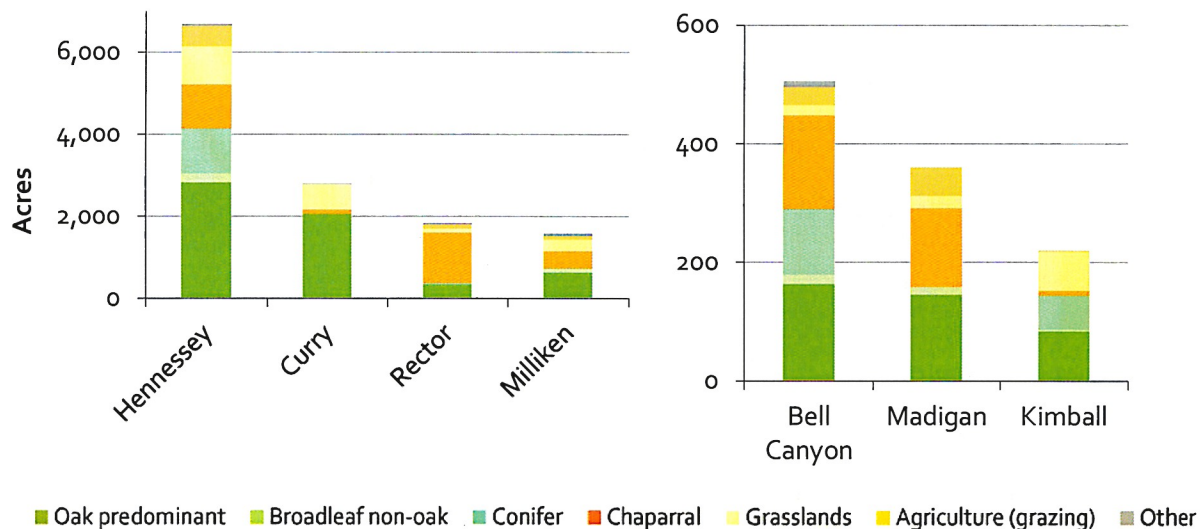


Figure 5. Developable vegetation types in sensitive domestic water supply drainages.

See Appendix 2 for description of categories (Data: Thorne 2004, USGS 2017, County of Napa 2019). Analyses assume landowners maximize their opportunity to count canopy or shrub on undevelopable lands toward conservation goals. Note difference in scales.

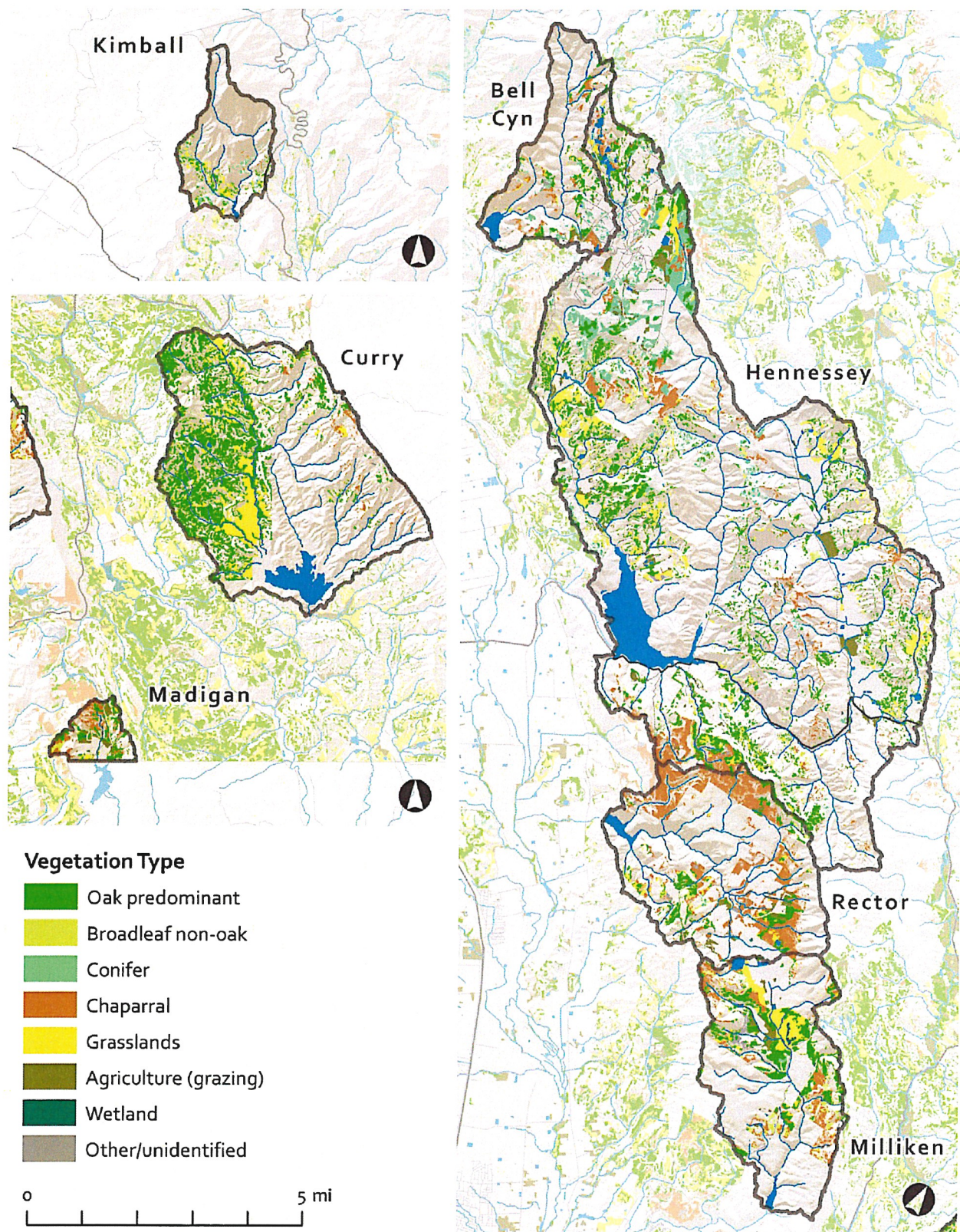


Figure 6. Developable land in sensitive domestic water supply drainages with vegetation type.
 Data: Thorne 2004, County of Napa 2019, USGS 2013; 2016.

Due to the large amount of area precluded from development by slope and stream setbacks that are designed to protect drinking water supplies, almost all 60/40 “retention” occurs on lands that are not at risk of development. Applying 60/40 conservation requirements to parcels which currently have developable land shows that, if developed, 91% (13,879 acres) of canopy “retention,” and 93% (3,703 acres) of shrub “retention,” may occur on undevelopable areas within these parcels. The existing 60/40 rule effectively protects only about 1,660 acres, or 5 percent, of the 31,034 total acres in water supply drainages (figure 7).

The goal of the 60/40 rule was to protect water supplies; however it is unlikely that a 5 percent increase in protected area over the slope and stream setback requirements is accomplishing the objective it was designed to meet. Allowing conservation credit for retention of shrub and canopy in undevelopable areas seriously undermines the effectiveness of the rule.

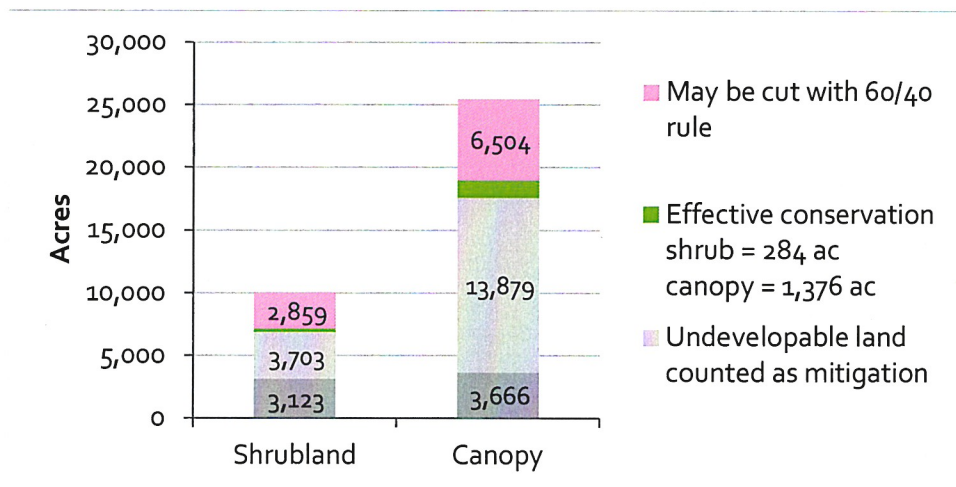


Figure 7. 60/40 Retention Rule Effects

Outcomes of the existing 60/40 policy. (Data: Thorne 2004, USGS 2017, County of Napa 2019). Analyses assume landowners maximize their opportunity to count canopy or shrub on undevelopable lands toward conservation goals.

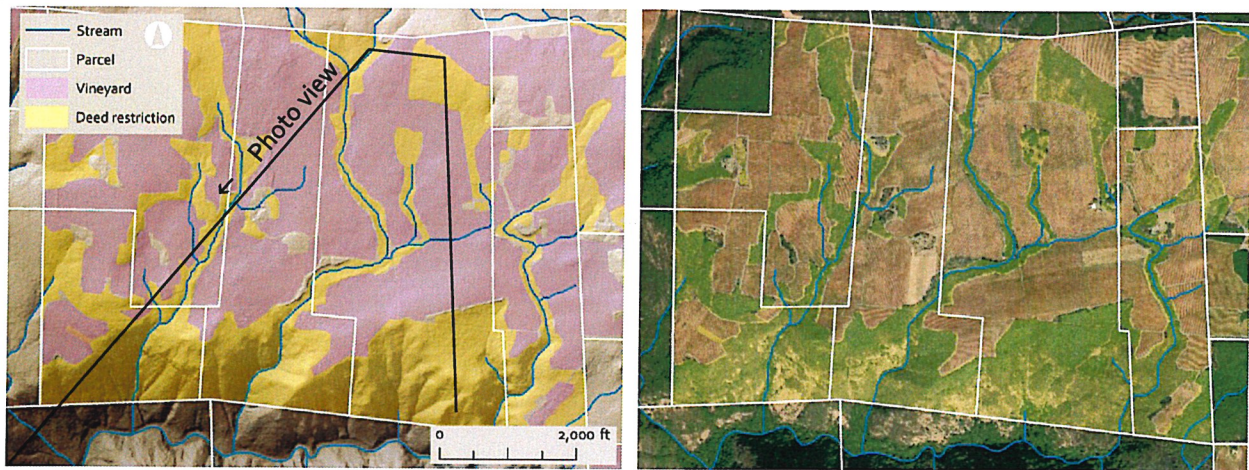


Figure 8. Application of 60/40 policy in Rector Watershed. Original land cover was predominantly shrubland. In the application of the policy, six contiguous parcels with one owner were treated as one, and 472 acres of 1,131 total acres were set aside (42%). Conservation goals are met almost entirely within stream setbacks and on steep slopes and remaining lands have been developed. Oblique aerial photo looking southwest (a), topographic map view (b), aerial photo map view (c).

Conservation Easements and Deed Restrictions

The 60/40 rule went into effect in 1993. Wildland conversion projects have occurred on about 130 parcels in sensitive water supply drainages since then. There are five projects with deed restrictions or conservation easements, involving 16 parcels, recorded as of 2018 (Napa County Assessor; Planning Staff). Areas of canopy and shrub set aside by the CEQA 2:1 requirement and Hillside Ordinance slope

and stream setbacks often meet or exceed 60/40 required conservation goals, so no additional acreage is set aside.

Sixty-forty rule outcomes were researched by identifying parcel numbers for all vineyards built since 1993 and reviewing deeds at the Napa County Assessor's office. The research process underscored the difficulty in tracking this policy. As land ownership changes through time, maintaining conservation targets through deed restrictions may present difficulties. Deed restrictions are not explicitly conservation-oriented and may require active advocacy to avoid nullification over time. The mechanism for codifying conservation associated with local policies is beyond the scope of this report, but should be evaluated and discussed.

Table 9. Deed restrictions and conservation easements associated with Napa County wildland-agricultural conversion projects.

Project (parcel count)	Document Number	Erosion Control Plan	Total Acres	Vineyard Acres	Reserve Acres	Reserve Percent	Type
Cordoniu Napa (1)	2009- 0020950	1226	181	95	77	43%	Deed restriction
Stagecoach (6)	2009- 0007662	P06-00420	1,131	625	472	42%	Deed restriction
Rodgers (7)	2014- 0010438	P14-00309	679	148	462	68%	Conservation easement
Circle S Forever Wild (1)	2017- 0013728	P06-01508	314	(unbuilt)	122	39%	Conservation easement
Ciminelli (1)	2018- 0001247	P15-00006	41	(unbuilt)	15	37%	Deed restriction

Discussion of 2:1 Mitigation Ratio and 60/40 Retention Rule

Whether 2:1 ratio of canopy mitigation or the 60/40 rule protects more area on a given parcel depends on land cover. Two-to-one (66%) oak mitigation, if required on-site and with retention of existing trees, is more stringent in parcels with abundant oak canopy than a 60% canopy retention rule. In water supply watersheds areas with chaparral and conifer, the 60/40 rule will tend to conserve more area. However, given the option to mitigate on steep slopes and in stream setbacks, the “effective conservation” of both policies is restricted. “Effective conservation” discussed here refers to additional conservation acreage beyond that required by slope and stream setbacks.

- If all developable oak forests were converted under the CEQA 2:1 Mitigation rule, with landowners maximizing mitigation in undevelopable areas, up to 24,800 acres of oaks could potentially be converted to other uses, while 8,933 acres of oaks would be prevented from development by the rule.
- If all developable forest and shrubland in water supply watersheds were converted under the 60/40 rule, with landowners maximizing mitigation in undevelopable areas, up to 9,360 acres of trees and shrubs could potentially be converted to other uses, while 1,660 acres would be prevented from development by the rule.

In sum, the 2:1 Mitigation rule and the 60/40 rule preclude 9,588 acres of wildlands from conversion to agriculture or other uses. This reduces county-wide developable area from 85,500 (base model) to about 75,900 developable acres. These are existing conditions. As the 60/40 rule has a very minor conservation impact, it is not considered further in this analysis.

Box 1. Effect of allowing mitigation on undevelopable land

Counting undevelopable lands toward mitigation allows 80% to 90% of the total acreage set aside by a policy (county-wide) to be mitigated on lands that are not available for development.

Percentages of mitigation/retention which may occur on undevelopable land, per policy:

60/40 canopy/shrub retention - existing policy

91% of canopy retention

93% of shrubland retention

2:1 oak canopy mitigation - existing policy

88% of oak mitigation

3:1 canopy mitigation - proposed

87% of canopy mitigation

85% canopy retention - proposed

82% of canopy retention

Comparing Policy Outcomes

Whether or not mitigation is allowed on undevelopable lands is the single biggest determinant of how much land is protected from development, for options under discussion. Below, current policy protections are compared with alternative options. The California 2:1 oak mitigation policy sets a limit on the cutting of oaks and, if local policy were expanded to protect all trees, the 2:1 state policy would set a floor on oak deforestation. Beyond that, the outcomes for specific types of trees would be unpredictable, unless codified (table 10).

Table 10. Mitigation or retention options sorted by amount of canopy area protected.

*Assumes undevelopable areas count toward mitigation. ^Assumes undevelopable areas do not count toward mitigation. Areas expressed in acres.

Policy	Canopy set aside by rule(s)	Canopy precluded from cutting	Total Canopy Protected	Canopy at Risk	Increase in Canopy Protection
Current policy:					
2:1 oak and 60/40*	76,722	9,304	125,721	34,411	n/a
3:1 Mitigation*	120,099	15,855	132,273	27,859	4%
2:1 mitigation^	29,143	29,143	145,560	14,571	12%
3:1 Mitigation^	32,786	32,786	149,203	10,929	14%
85% Retention^	37,157	37,157	153,574	6,557	17%

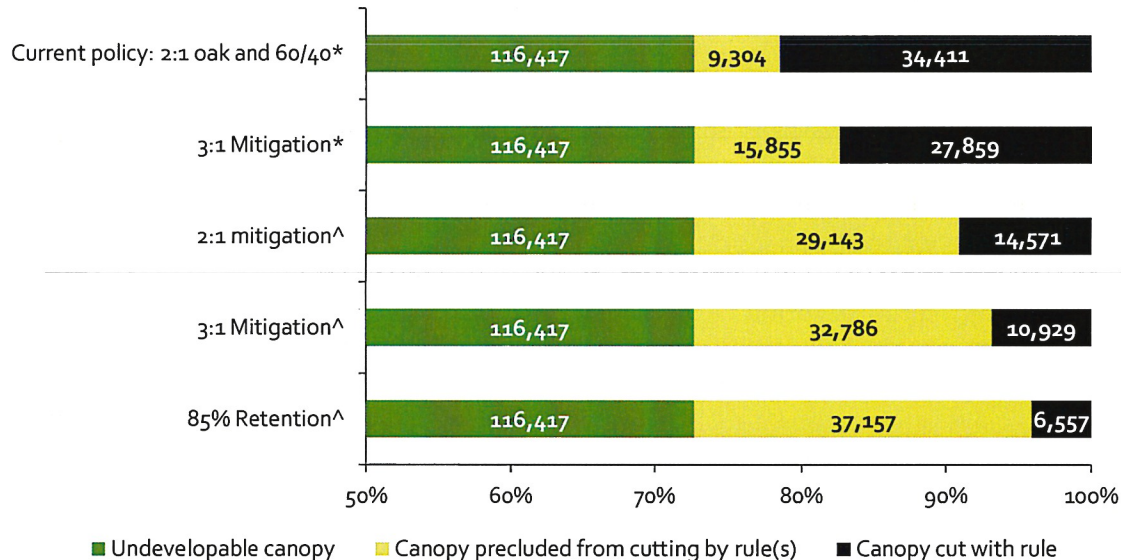


Figure 9. Mitigation or retention option ranked by canopy area protected.

*Assumes undevelopable areas count toward mitigation. ^Assumes undevelopable areas do not count toward mitigation. Areas expressed in acres.

Table 11. Complete Assessment of Policy Outcomes.

On-site mitigation is assumed for all scenarios. All inputs are listed in table 6.

*Assumes undevelopable areas count toward mitigation

^ Assumes undevelopable areas can't count toward mitigation

Policy Variable	Parameter	Acres	Operation
2:1 (66%) Oak Mitigation*	Oak Canopy Acres Set aside by 2:1*	76,722	Total oak * 0.66
	Oak Canopy Precluded from Cutting by 2:1*	8,933	Max of zero or (oak set aside - undevelopable oak)
	Oak Canopy Cut with 2:1*	24,851	Developable oak - oak precluded from cutting
	Total Canopy Cut with 2:1*	34,782	Oak cut + developable conifer + developable non-oak
2:1 (66%) Canopy Mitigation*	Canopy Acres Set Aside by 2:1*	105,687	Parcel total canopy * 0.66
	Canopy Precluded from Cutting by 2:1*	10,090	Max of zero or (canopy set aside - undevelopable canopy)
	Canopy Cut with 2:1*	33,624	Developable canopy - canopy precluded from cutting
	Total Canopy Protected with 2:1*	126,507	Undevelopable canopy + canopy precluded from cutting
2:1 (66%) Canopy Mitigation^	Canopy Acres Set Aside by 2:1^	28,851	Developable canopy * 0.66
	Canopy Cut with 2:1^	14,426	Developable canopy * 0.33
	Total Canopy Protected with 2:1^	145,706	Total canopy - canopy cut
70% Canopy Retention*	Canopy Set Aside by 70%*	112,092	Parcel total canopy * 0.70
	Canopy Precluded from Cutting by 70%*	12,448	Max of zero or (canopy set aside - undevelopable canopy)
	Canopy Cut with 70%*	31,267	Developable canopy - canopy precluded from cutting
	Total Canopy Protected with 70%*	128,865	Undevelopable + canopy precluded from cutting
70% Canopy Retention^	Canopy Set Aside by 70%^	30,600	Developable canopy * 0.70
	Canopy Cut with 70%^	13,114	Developable canopy * 0.30
	Total Canopy Protected with 70%^	147,017	Total canopy - canopy cut
3:1 (75%) Tree Mitigation*	Canopy Set Aside by 3:1*	120,099	Total canopy * 0.75
	Canopy Precluded from Cutting by 3:1*	15,855	Max of zero or (canopy set aside - undevelopable canopy)
	Canopy Cut with 3:1*	27,859	Developable canopy - canopy precluded from cutting
	Total Canopy Protected with 3:1*	132,273	Undevelopable canopy + canopy precluded from cutting
3:1 (75%) Canopy Mitigation^	Canopy Set Aside by 3:1^	32,786	Developable canopy * 0.75
	Canopy Cut with 3:1^	10,929	Developable canopy * 0.25
	Total Canopy Protected with 3:1^	149,203	Undevelopable canopy + canopy precluded from cutting
85% Canopy Retention*	Canopy Set Aside by 85%*	136,112	Parcel total canopy * 0.85
	Canopy Precluded from Cutting by 85%*	24,509	Max of zero or (canopy set aside - undevelopable canopy)
	Canopy Cut with 85%*	19,206	Developable canopy - canopy precluded from cutting
	Total Canopy Protected with 85%*	140,926	Undevelopable + canopy precluded from cutting
85% Canopy Retention^	Canopy Set Aside by 85%^	37,157	Developable canopy * 0.85
	Canopy Cut with 85%^	6,557	Developable canopy * 0.15
	Total Canopy Protected with 85%^	153,574	Total canopy - canopy cut

Reservoir Setbacks

Lands adjacent to most Napa County reservoirs are held by government agencies and/or have reserve status, and are therefore not available for development. Due to these conditions, large setbacks are required to substantively reduce developable area near reservoirs. Most developable areas within 200, 500, and 1,000 foot reservoir setbacks are of CDC "other land" quality. Erosion from upland agriculture into water supply reservoirs causes the public to bear the expense of maintenance needed due to upstream uses benefitting private companies. Even with existing dedicated policy, fine sediment delivery is a problem (Wooster pers. comm.), so additional protections should be considered.

Sediment transport of flowing water is not determined solely by distance. The mechanical power (work per time) being dissipated in a river or stream at high flows, in combination with sediment sources, determine sediment transport. Steep drainages can transport surprisingly high amounts of sediment long distances during peak flows.

Previous cases anecdotally suggest that setbacks of 500 feet would not be adequate to protect sensitive domestic water supply drainages. The Viader hillside vineyard which caused a 1990 landslide into Bell Canyon Reservoir was over 500 feet from the reservoir edge, and the majority of vineyards likely causing turbidity at Friesen Lakes are more than 500 feet from reservoir edges.

Table 12. Development precluded by 200 foot reservoir setback.

Reservoir	Higher-quality farmland	Grazing land	Other land	Total acres
Bell Canyon				0
Berryessa	1	33	29	68
Curry				0
Friesen			54	54
Hennessey	0	1		1
Kimball			2	2
Madigan		1		1
Milliken				0
Rector				0
Total acres	1	35	85	126

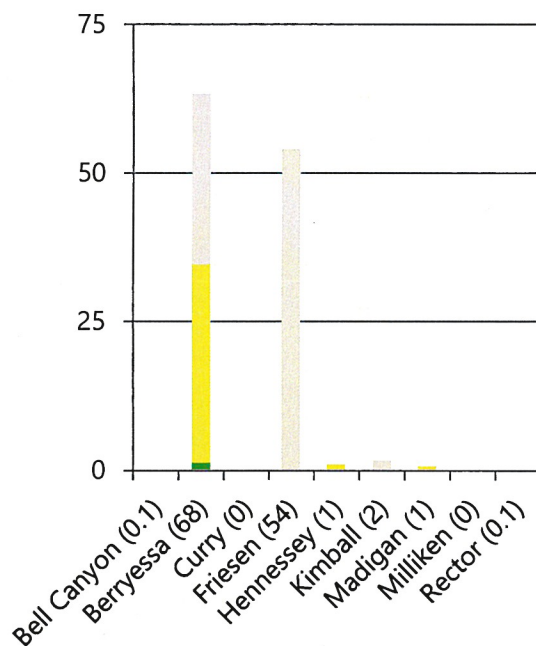
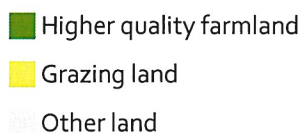


Table 13. Development precluded by 500 foot reservoir setback.

Reservoir	Higher-quality farmland	Grazing land	Other land	Total acres
Bell Canyon			2	2
Berryessa	16	148	83	248
Curry				0
Friesen			111	111
Hennessey	2	8		11
Kimball			10	10
Madigan		7		7
Milliken				0
Rector				0
Total acres:	18	164	206	389

Higher quality farmland
 Grazing land
 Other land

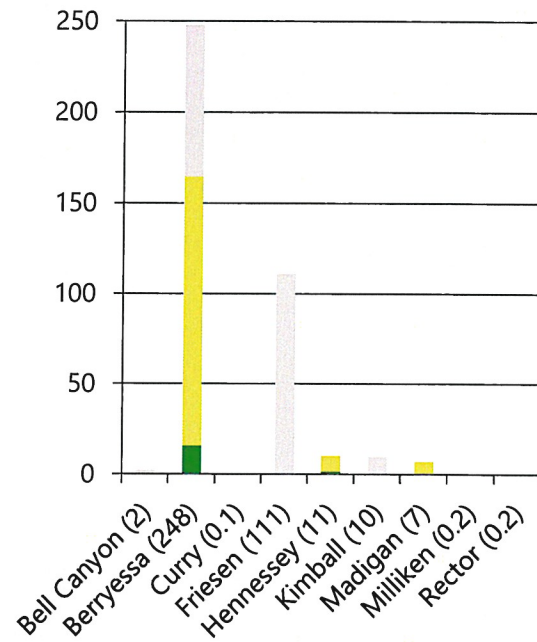
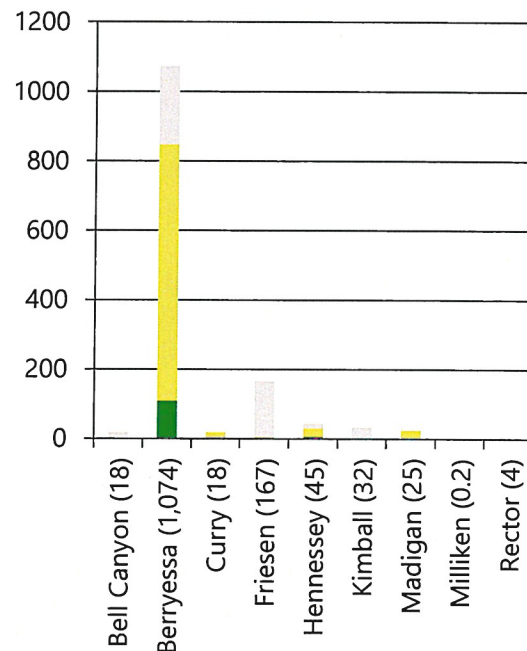


Table 14. Development precluded by 1,000 foot reservoir setback.

Reservoir	Higher-quality farmland	Grazing land	Other land	Total Acres
Bell Canyon			18	18
Berryessa	109	739	226	1,074
Curry	3	15		18
Friesen	4		163	167
Hennessey	7	23	15	45
Kimball			32	32
Madigan		24	1	25
Milliken				0
Rector			4	4
Total acres:	123	801	459	1,382



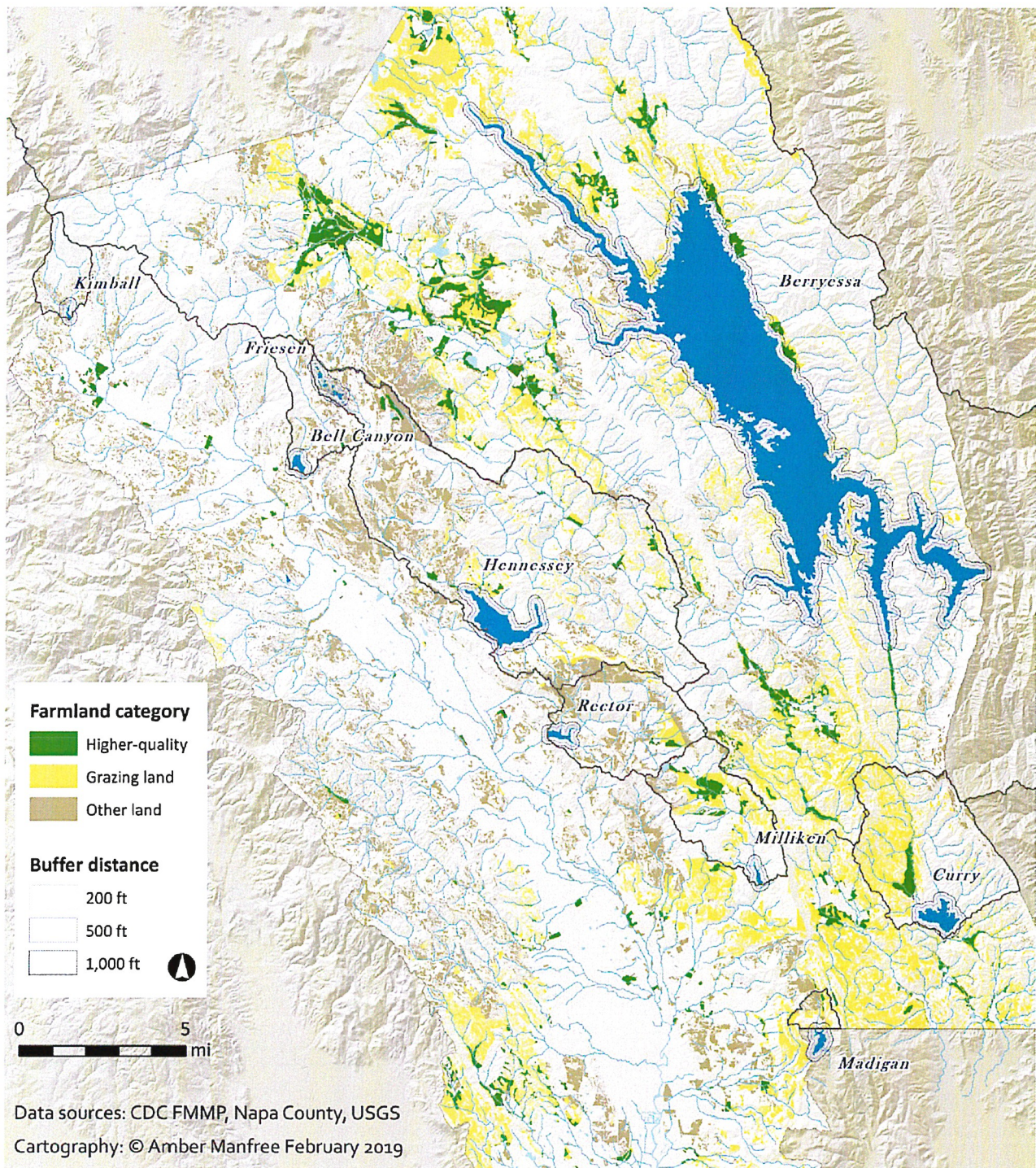


Figure 10. Municipal and drinking water supply reservoir setbacks and farmland quality of developable lands.

Wetland Setbacks

To model the potential impacts of increased wetland protections, a 150 foot buffer was applied to a subset of the US Fish and Wildlife Service wetland dataset (USFWS 2016) "Pond" category and portions of the "Freshwater Emergent Wetland" category that are not adjacent to streams in the model. This buffered subset was intersected with the base model for developable area and with CDC farmland data.

Wetland buffers of 150 feet would preclude 3,304 acres from development.

Wetlands included in this analysis are 5% of Napa County's total area. Applying 150 foot setbacks to these wetlands precludes 3,304 acres, or 4% of developable area from development. Wetlands are generally located in low-lying areas with alluvial soils, which are also typically of higher agricultural value.

Overlap between canopy and wetland is not addressed by this analysis.

Table 15. Countywide USFWS wetlands included in analysis.

Wetland type	Acres
Freshwater emergent	2,097
Freshwater pond	1,854
Lake	24,470*
Total wetland	28,421

*Includes Lake Berryessa

Developable Area and Parcel Size

There are about 49,768 parcels in Napa County. Of these, there are about 8,800 parcels with more than 1,000 square feet of developable area.

Table 16. Parcel distribution by size and Land Use Zone; for parcels with > 1,000 ft² developable area.

Land Use Zone	Parcel Size			Total Parcels
	< 1 acre	1 to 5 acre	> 5 acre	
Agricultural Watershed	305	1,088	3,752	5,145
Municipal/ urban	628	332	258	1,218
Agricultural Preserve	40	242	669	951
Residential Country	47	164	151	362
Residential	221	62	27	310
Planned Development	235	41	30	306
Agricultural Watershed, Airport Compatibility	26	40	133	199
Industrial Park, Airport Compatibility	17	42	49	108
Residential, Urban Reserve	51	24	10	85
Local Commercial	3	5	18	26
Commercial Neighborhood		5	10	15
Residential, Airport Compatibility	5	2	8	15
Residential Country, Urban Reserve		5	7	12
Industrial	1	1	8	10
Airport		4	5	9
Industrial, Airport Compatibility		1	6	7
Agricultural Watershed, Skyline Wilderness Park		2	3	5
Agricultural Watershed, Affordable Housing			5	5
General Industrial, Airport Compatibility		1	3	4
Agricultural Preserve, Historic Restaurant	2	1	1	4
Agricultural Watershed, Urban Reserve		1	2	3
Planned Development, Affordable Housing, AC	1	1	1	3
Marine Commercial		1	1	2
Marine Commercial, Affordable Housing			2	2
Public Lands, Airport Compatibility			2	2
Local Commercial, Affordable Housing	1		1	2
Planned Development, Airport Compatibility	1			1
Marine Commercial, Airport Compatibility			1	1
Residential Country, Affordable Housing			1	1
Agricultural Watershed, Produce Stand		1		1
Total Parcels:	1,584	2,066	5,164	8,814

Small Parcels Quick Reference

County-wide total number of 0 to 5 acre parcels 42,702 parcels

Parcels less than 1 acre

Countywide total 38,071 parcels
With more than 1,000 square feet developable area 1,584 parcels

Homes: essentially all buildable parcels (not roads or slivers) less than one acre have homes

1 to 5 acre

Countywide total 4,631 parcels
With more than 1,000 square feet of developable area 2,066 parcels

Homes: about 1,790 one-to-five acre parcels with >1,000 ft² developable area, or 86%, have homes

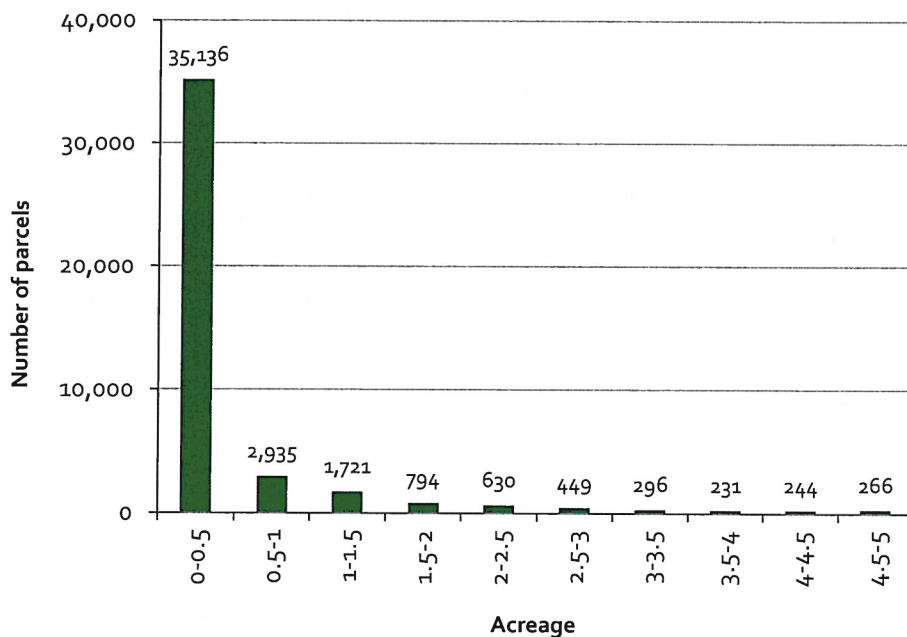


Figure 11. Distribution of zero to five-acre parcels, classified by size.

Remarks

Reviewing aerial photos suggests that developable areas within the majority of <1 acre parcels are unlikely to be converted to agriculture as they are being used as yards.

Home-related figures were estimated using Napa County's "ADDRESSES" dataset, which includes street addresses for houses, as well as addresses not assigned to houses. This likely resulted in a minor overestimate of total homes.

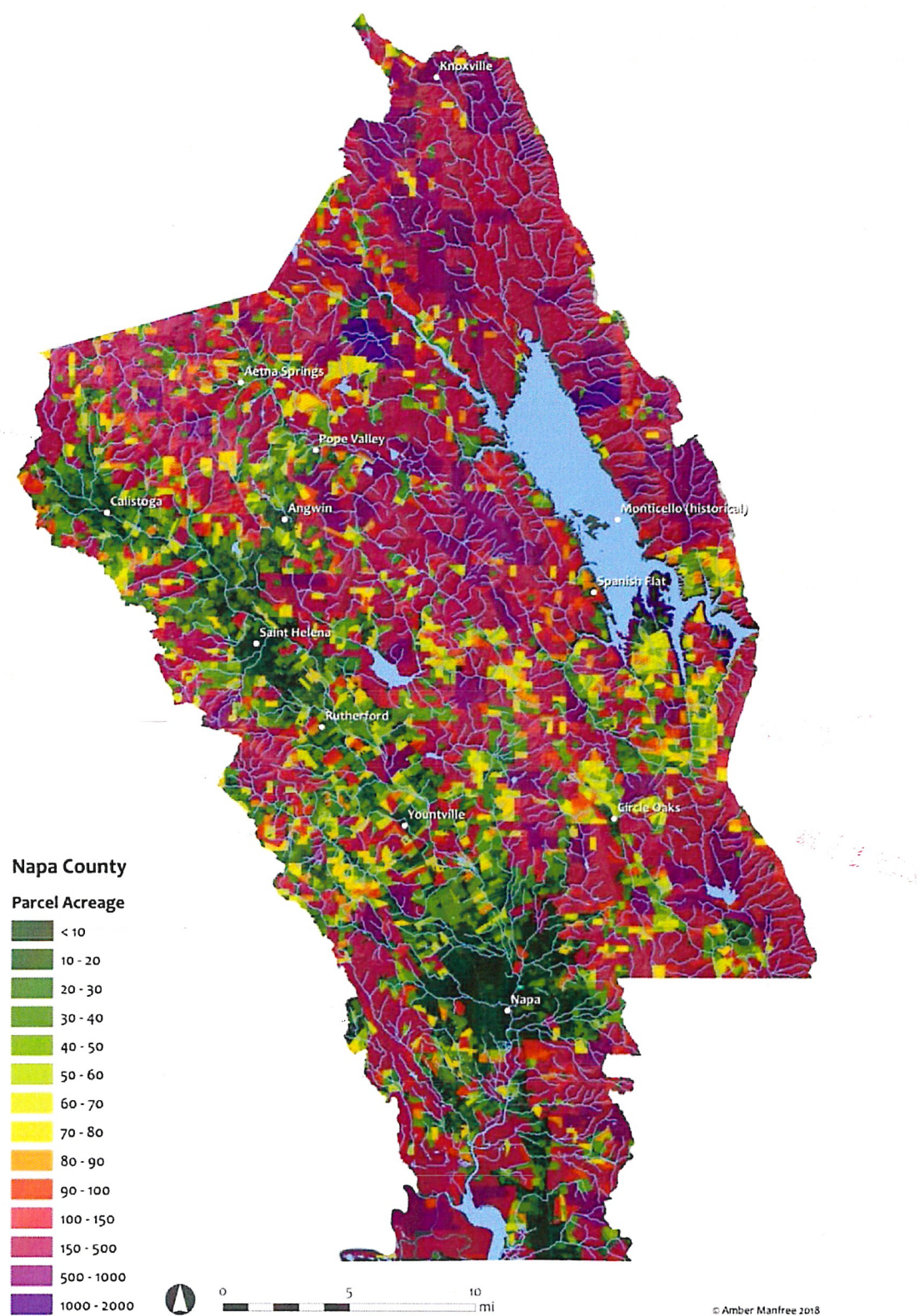


Figure 12. Napa County parcel size.

Small parcels are clustered in towns, valleys, and along roads; large parcels are common on ridgetops and in remote areas (Data: County of Napa 2019).

Developable Area Farmland Quality and Land Cover

The quality of farmland influences how desirable an area is for development. These tables summarize land cover, categorized by Thorne (2004) and Farmland Type, as categorized by the California Department of Conservation (2016) in areas which are developable under current policy.

As the land cover/type categories were developed individually, with different purposes and at different times, there is some agreement and some disagreement about convergent categories, such as grazing.

Table 17. Developable Area Farmland Quality and Land Cover.

Data: (Thorne 2004, CDC 2016, Manfree 2019)

Land Cover Category	Farmland Type - Higher Quality Farmland								Total Acres
	Local importance	Statewide importance	Prime	Unique	Grazing	Other	Urban	Water	
Oak predominant	1,177	9	42	96	21,555	10,442	441	22	33,784
Grasslands	5,354	28	26	56	13,083	2,875	151	20	21,591
Chaparral	76	1	0	10	3,584	6,014	11	4	9,701
Agriculture (grazing)	3,230	450	505	216	1,943	2,435	390	1	9,169
Conifer	8	3	3	25	553	5,842	128	0	6,561
Broadleaf non-oak	30	10	3	15	971	2,306	35	0	3,369
Vacant	19	0	1	5	78	382	63		548
Wetland	144	0	5	1	153	98	12	1	415
Unidentified	31	1	0	0	153	131	1		317
Urban						0	0		0
Total Acres:	10,067	502	586	423	42,073	30,526	1,231	48	85,455

Developable Land: CDC Farmland Quality by Land Cover

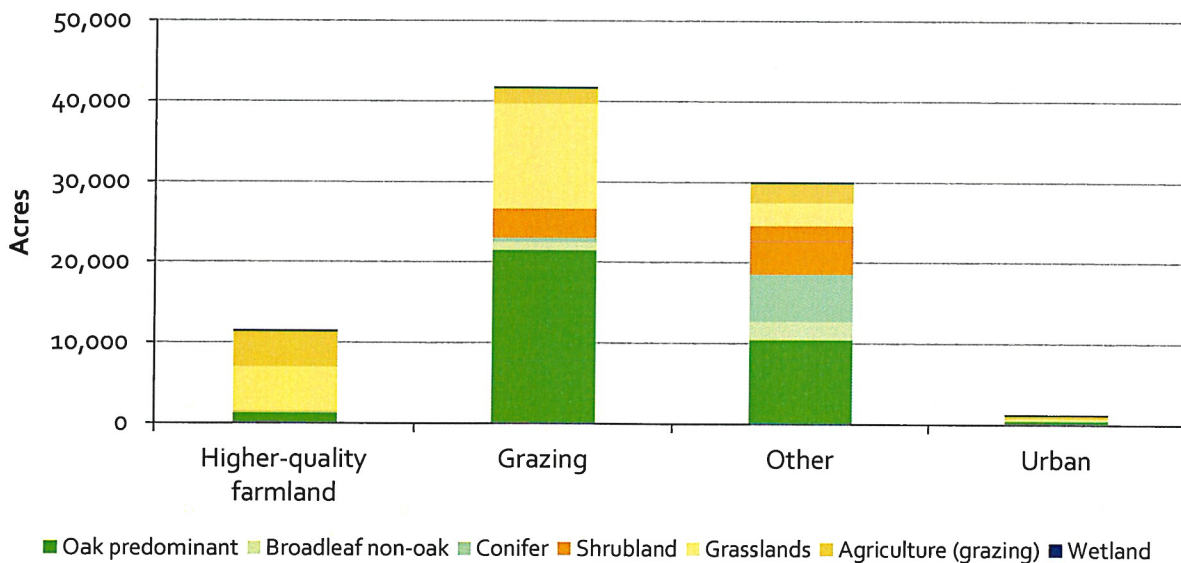


Table 18 (part 1 of 2). Developable area, Farmland Quality and Land Cover by Land Use Zone.

(Data: Thorne 2004, CDC 2016, Manfree 2019) Continued on next page.

Land Cover Category	Farmland Type - Higher Quality Farmland								Total Acres	
	Local importance	Statewide importance	Prime	Unique	Grazing	Other	Urban	Water		
Agricultural Watershed (AW)										
Agriculture (grazing)	2,123	65	129	179	1,693	1,774	54	1	6,016	
Broadleaf non-oak	22	2	2	13	945	2,024	13	0	3,022	
Chaparral	76	1	0	10	3,573	5,837	4	4	9,506	
Conifer	5	2	0	24	545	5,006	65	0	5,647	
Grasslands	4,291	6	12	46	11,329	2,364	57	20	18,125	
Oak predominant	1,073	8	19	71	21,147	9,070	175	22	31,584	
Unidentified	28	1		0	135	118			281	
Urban						0	0		0	
Vacant	6	0	1	5	73	228	1		314	
Wetland	98	0	5	1	130	53		1	287	
AW, Airport Compatibility (AC)										
Agriculture (grazing)	200	236	103	14	93	97	85		828	
Broadleaf non-oak	1	2	0	0	11	30	0		45	
Chaparral				0	7	156			163	
Conifer	1	1	0	1	1	643	5		652	
Grasslands	261	19	5	7	1,423	25	4		1,744	
Oak predominant	7	0	0	2	103	449	8		570	
Unidentified	3	0			18				21	
Wetland	1	0		0	10	0	0		11	
Agricultural Preserve										
Agriculture (grazing)	232	20	145	22	53	410	69		952	
Broadleaf non-oak	3	1	0	1	3	59	0		68	
Chaparral						0			0	
Conifer	0		0	0	0	85	0		86	
Grasslands	156	2	8	2	165	132	4		469	
Oak predominant	82	1	20	23	113	605	12		857	
Unidentified			0	0		9			9	
Vacant			0	0		13	1		14	
Wetland	16	0	0		3	4	0		24	

Table 18 (part 2 of 2). Developable area, Farmland Quality, and Land Cover by Land Use Zone.
Continued from previous page.

Municipal/ urban									
Agriculture (grazing)	262	7	18	1	99	83	115		585
Broadleaf non-oak	2	5	0		11	172	11		201
Chaparral						2			2
Conifer	0	0	0	0	1	60	4		65
Grasslands	497		0	1	116	119	51	0	784
Oak predominant	1		1	1	14	195	133		344
Unidentified				0		5	1		6
Vacant	12		1	0		91	37		141
Wetland	2		0	0	1	30	5		38
Residential Country									
Agriculture (grazing)	53	0	10	0	1	46	29		139
Broadleaf non-oak	1			0	0	17	5		22
Chaparral					1	5			5
Conifer			0	0	6	12			19
Grasslands			0	1	21	122	12		156
Oak predominant	2		2		139	42	29		214
Wetland						1	3		4
Industrial Park, AC									
Agriculture (grazing)	260		0				24		285
Broadleaf non-oak	2								2
Grasslands	110				16	3	13		141
Oak predominant	7		0						7
Wetland	22						0		22
Public Lands, AC									
Agriculture (grazing)	29	122	81		3	4	3		242
Grasslands	0	0	0						0
Oak predominant			0						0
Wetland	1	0				5			6
Planned Development									
Agriculture (grazing)	0		18				1		19
Broadleaf non-oak					0	2	4		6
Chaparral	0		0		3	10	6		19
Conifer	0		2		0	11	8		21
Grasslands	0				0	9	0		9
Oak predominant	0		0		2	45	44	0	91
Vacant					5	30	22		57
Wetland						0	1		1
Other Land Use Zones	118	0	1	0	63	215	108	0	505
Total Acres:	10,067	502	586	423	42,073	30,526	1,231	48	85,455

Section 3 - Methods

There are two main components of this analysis; a base model for developable area and a mathematical model of potential policy impacts. The developable area base model is spatial, created in a geographic information system (GIS) with existing and custom inputs. It was combined with other spatial data to evaluate types of land cover available for development, and to explore potential policy impacts related to vegetation type, reservoirs, and streams.

The base model is subtractive. Beginning with the entire area of Napa County, areas unsuitable for conversion to agriculture have been removed. Examples of areas unsuitable for agriculture include lands with slopes over 30 percent (precluded from development by local ordinance), open water, reserves, existing agriculture, roads, railroads, and stream setbacks. "Developable" polygon areas under 1,000 square feet were removed from the analysis. Houses, driveways, and slivers were removed with hand-digitization, with most attention on the Agricultural Preserve Zone, where these features significantly skewed "developable" total area. See "1. Base Model: Existing Constraints to Development" table below for a complete list of areas removed.

The base model for developable land was intersected with zoning, vegetation, soil quality, and parcel datasets to assess the distribution and total area of feature types and support a parcel-scale analysis of proposed policy impacts, which was completed in spreadsheet software.

Project design is completed on an individual basis by applicants and county planning staff. Many decisions are made at that juncture, which are not possible to include in a county-scale model. For example, adjacent parcels may be managed as one contiguous area when deciding where to accomplish mitigation, which may result in more area being developed on a single parcel than would be allowed if the parcel were considered in isolation. Conversely, the adjacent parcel may have more than the required area set aside to make up the difference.

Another element that determines site-scale decisions is CEQA compliance. Assessments of habitat and other environmental impacts are made during the application process. This may lead to more area being set aside to mitigate or avoid significant impacts to the environment. Modeling effects of CEQA compliance on county-wide development is beyond the scope of this analysis.

Below are notes on source data considerations for select datasets and geoprocessing methods, followed by tables summarizing analysis steps.

Slope

Slope was generated with LiDAR digital elevation models prepared by Towill Incorporated for the County of Napa with aerial imagery acquired in 2002. Datasets for the Napa River watershed and non-Napa River watershed were created at different spatial resolution and are distributed separately. To support a county-wide analysis, the less-resolved non-Napa River watershed dataset was resampled to match the cell size resolution of the Napa River watershed dataset, the two datasets were mosaicked, and missing data were patched with Focal Statistics to provide a continuous surface. The resulting raster was used to generate a county-wide slope dataset that was sorted into classes above and below 30 percent slope, and then converted to vector format for geoprocessing.

Existing Vineyard

Napa County provides data on crop type in its "agriculture_public" shapefile. The most recent available version having was updated by County GIS staff in 2016. This data was hand-edited to reflect vineyard projects built between 2016 and early 2019 using aerial imagery provided by ESRI and Google Earth for reference.

Vegetation Types

The Vegetation dataset for Napa County produced by James Thorne in 2002-2004 for the County of Napa was used for this analysis (Thorne 2004). The dataset is currently under revision, and the update may be incorporated in future analyses. See appendix 1 for more information on this dataset.

Streams

Stream location data prepared by USGS is not extensive and not closely fitted to the LiDAR-generated digital elevation model used for slope analysis. The streams dataset is an acceptable approximation of actual streams for a county-wide analysis. A revised streams dataset would be of great benefit to Napa County, and could be produced with a watershed analysis of the LiDAR and expert digitization.

Stream Setback Buffers

Fifty-foot buffers were applied to USGS blueline stream centerlines to approximate stream setback requirements. Planning staff evaluate stream setbacks on a site-by-site basis with setbacks ranging from 35 to 150 feet from bankfull depending on slope of adjacent land (Napa 2006). Theoretically, as streams get wider, adjacent slopes are lower. As permits are generally not granted to develop areas with over 30% slope, a 50-foot setback is a reasonable model choice, as it accounts for bankfull width of the stream itself plus a setback in the median range for projects on slopes less than 30 percent. Modeling site-specific stream setbacks related to slope could be accomplished with a hydrological model, but is beyond the scope of this study.

Slope %	Setback	Slope %	Setback
< 1%	35 feet	30 - 40%	85 feet
1 - 5%	45 feet	40 - 50%	105 feet
5 - 15%	55 feet	50 - 60%	125 feet
15 - 30%	65 feet	60 - 70%	150 feet

Conservation Lands

Reserves are well-represented in GreenInfo Network's California Protected Areas Database (CPAD). This dataset was used to mask areas precluded from conversion to vineyard due to reserve status. The Napa Land Trust acquired several new properties in 2018, and these were located by researching Assessor's records and represented by extracting parcels from the county-wide parcel dataset. There are a handful of deed restrictions and easements on portions of parcels (some related to the 60/40 rule) that were researched with the assistance of Brian Bordona and John Tuteur. These were hand-digitized based on georeferenced project planning documents.

Farmland

California Department of Conservation (CDC) farmland mapping is based on soils and observed land uses (McLeod, 2018). Soil types grouped as "higher-quality farmland" are likely most desirable for

agriculture; however a substantial portion of recent development has occurred on lands classified by CDC as “grazing” and “other.” Vineyard conversion projects over the past 25 years have often occurred in soil classified as “other.” Trucking in of topsoil and other emerging methods for growing in difficult locations make it impossible to rule out most soil types from potential development in the near future. See appendix 2 for more information on this dataset.

Soils

While soils can be an important consideration for agriculture, the potential for wine grapes to be grown on poor soils and the emerging practice of covering unsuitable soils with better material from off-site locations for agricultural development means that virtually any area meeting other criteria could be planted. With this in mind, analyses were inclusive of most soil types. Areas with serpentine-associated plant communities in the northeastern part of Napa County were excluded from the “developable” category.

Wetlands

Wetland data distributed by US Fish and Wildlife Service (USFWS) were used to model wetlands in this analysis. This dataset has mixed resolution and is not guaranteed for completeness. The source data were subset to exclude riparian zones, which have overriding setback protections provided by local and state policy, represented in this analysis by water body data and buffers on USGS blue line streams.

Parcels

Napa Assessor’s parcel data were cleaned and processed for analysis. Geometry was repaired. For small parcel analysis, polygons with duplicate parcel numbers were dissolved into single polygons and railroad parcels were removed before performing a one-to-one spatial join with zoning data. For county-wide parcel-scale “developable” analysis, gaps were filled before intersecting with other county-wide datasets to prevent data from dropping out of the analysis.

60/40 Rule Deed Restrictions and Conservation Easements

A handful of conservation easements and deed restrictions related to the 60/40 rule were shared as geospatial data by the County of Napa, and the remainder were researched by identifying all projects where wildland was converted to agriculture in water supply drainages since 1993 and looking up deed documents at the Napa Assessors office.

Ratio and Percentage-based Policy Proposals

California Environmental Quality Act (CEQA) requirements and Public Resources Code § 21083.4 allow counties to enforce 2:1 mitigation for canopy removal, preferably on site, with the possibility of counting toward mitigation lands that may be undevelopable due to local policies, such as slope limits and stream setbacks. It is not possible to predict or model off-site mitigation with any confidence. Possible on-site outcomes and the difference between allowing mitigation on undevelopable lands - or not - can be evaluated once a model of developable area is created.

Small Areal Discrepancies

There are small differences in area among tallies presented here which arise from source datasets having slightly different extents or other minor issues. For example, Thorne (2004), CDC FMMP (2016), and County of Napa parcels (2019) datasets each have unique edges at the periphery of the county that do not match. Thorne has no polygon covering Napa Bay, whereas zoning data are continuous across

this area. Due to these and other mismatches, there may be small discrepancies when summarizing data. They should be in the range of 0 to 5 percent of the total.

Analysis Steps

Step 1. Base model: Existing constraints to development.

To create a base model of lands available for agricultural development under existing constraints, subtract unavailable areas from Napa County. Areas subtracted include:

Unavailable Area	Data	Source	Notes
Slopes >30%	LiDAR	Napa County	Geoprocessing
Existing vineyards	agriculture_public	Napa County, hand-digitized update	Filter non-vyrds; include fallow as vyrd (most are replanting); buffered to account for access roads
Serpentine soils	Napa Veg	Napa County / UCD / Thorne	Extract serpentine-associated veg areas
Reserves	CA Protected Areas Database 2018a	GreenInfo Network	
Easements and new reserves	Napa Land Trust	Hand-digitized	Complete through mid-2018
Deed restrictions	Researched in 2018	Napa County	In collaboration with Bordona; Tuteur
60/40 rule areas	Hand-digitized	Estimate parcels affected with post-1993 vyrds in municipal watersheds	Vyrds existing in 1993 doesn't follow 60/40
Roads	Roads	Napa County	Apply 60' buffer
Railroads	Railroads	Napa County	Apply 50' buffer
Water bodies	napa_wtr_bodies, Napa Veg	Napa County, UCD/Thorne	
Napa County stream setback requirements	(1) Streams layer and (2) 60' setback buffer	(1) NHD, (2) Napa County Hillside Ordinance	Apply 60' buffer for approximation of real impacts
Areas too small to be planted	Cull from output	Geoprocessing	<1,000 ft ² removed
Homes, yards, driveways	Cull from output	Hand-digitized	Adds up to about 1,500 ac countywide, mostly in AP

Notes

Pending developments are included in estimate of developable area.

Step 2. Evaluate Land Cover Types.

Intersect each of the following layers with base model of developable area and quantify areas:

Parameter	Data	Source	Question
Oak woodland, conifer, chaparral...	Napa Veg	Napa County / UCD / Thorne	How much of each vegetation cover type is potentially plantable?
Soil suitability for agriculture	Farmland Mapping and Monitoring Program	CA Department of Conservation	Merge all ag-quality categories
Land Use Zoning		Napa County 2013	How much area in each zone is developable?

Step 3. Evaluate proposed percentage and ratio policies and stream setbacks.

Export geospatial data to tables and model impacts of policy mathematically.

Topic	Data	Source	Notes
2:1 rule	Base model-Napa Veg intersection; computation	Manfree, Napa County / UCD / Thorne	Analyzed with and without mitigation allowed on undevelopable lands
3:1 rule	Base model-Napa Veg intersection; computation	Manfree, Napa County / UCD / Thorne	Analyzed with and without mitigation allowed on undevelopable lands
70% rule	Base model-Napa Veg intersection; computation	Manfree, Napa County / UCD / Thorne	Analyzed with and without mitigation allowed on undevelopable lands
85% rule	Base model-Napa Veg intersection; computation	Manfree, Napa County / UCD / Thorne model	Analyzed with and without mitigation allowed on undevelopable lands
60/40 rule	Base model-Napa Veg intersection, watersheds intersect	Manfree, Napa County / UCD / Thorne model	Analyzed with mitigation allowed on undevelopable lands
Reservoir setbacks	Base model-reservoir buffer intersection	Manfree, USGS	How much developable area is within 200', 500', and 1,000' of water supply reservoirs?
Wetland setback	Base model-wetlands intersection; computation	USFWS, UCD/Thorne	How much developable area is within 150' of wetlands?
Zero to five acre parcels	Parcels, base model	Napa County, Manfree	What is the relationship between 0 to 5 ac parcels, zoning, and developable area?

Step 4. Parcel analysis.

Parameter	Data	Source	Notes
Parcel-level impacts	Parcels & model	Napa County & analysis	% available acreage per parcel - intersection
Parcel-level impacts	Parcels & model	Napa County & analysis	Land use zones - intersection
Parcel-level impacts	Parcels & model	Napa County & analysis	Change in development potential (mathematical)
0 to 5 acre parcels	Parcels	Napa County	Subset parcels, dissolve by ASMT, hand-edit to clean

Section 4 - Discussion

The analysis presented in this report integrates information in a way that can be used to assess potential broad-scale outcomes of a variety of policy constraints. It explains the distribution of land types in Napa County and presents estimates of the upward limit of development given existing constraints and prospective policies.

The Bigger Picture

Considering the information presented here in the context of broader concerns is key to making it useful. Global trends in environmental ethics, climate, and economics are overarching trajectories in the debate over how to best manage local resources, and they should be central to the discussion.

Napa County presently has about 20,590 acres of vineyard in the Agricultural Preserve and 24,200 acres in the Agricultural Watershed zone. Particularly in the Agricultural Preserve, existing vineyards are the crown jewel of our region, and protecting them should be a top priority. The important question is not “How much more can we develop?” but rather, “How can we best preserve the value we have?”

Napa County has a unique legacy of conservation and preservation, achieving great success with the establishment of the Agricultural Preserve, the Hillside Ordinance, and the Flood Control Project. Each of these projects is rooted citizen advocacy, eventually being supported and implemented by government agencies. At the time these projects emerged, they were controversial, bitterly fought, and took years to finalize. These projects have demonstrated that citizen action, when channeled effectively and combined with science, can result in local agency leadership. Thanks to these projects, Napa County’s agencies have a remarkable capacity for resource stewardship and are running exemplary programs.

The current debate over conversion of wildlands to vineyard and other uses has many similarities to earlier campaigns. It is citizen-led, involves a lively debate among stakeholders, and will require careful policy-making and implementation to get right. It differs in one important way, however: the debate over wildland conversion exists with the backdrop of global climate change.

Climate change is already affecting crop quality (e.g., Jones et al. 2005), though it does not yet seem to be influencing planting decisions in Napa County. There are many adjustments farmers can make to mitigate climate change impacts, reduce carbon emissions, and increase carbon storage (Mira de Orduña 2010, Mozell 2014, Neethling et al. 2017). In order to protect existing high-value farmlands into the future, every opportunity should be taken to maximize carbon storage and minimize emissions.

Climate change considerations:

- Climate change projections for Napa County predict that the region will become increasingly unfavorable for high-value wine grapes in this century (Jones 2007, Mozell 2014).
- Climate change is raising daily low temperatures faster than daily highs (Karl et al. 1993, Davy et al. 2016), and winters are warming faster than summers (Cayan et al. 2008); these shifts affect growing degree days and crop quality.

- California's fog bank is expected to shrink (Johnstone and Dawson 2010, Torregrosa et al. 2013)
- Species presence and habitat connectivity are required to facilitate movement as temperatures shift and plants and animals must relocate to persist (Heller and Zavaleta 2009, Torregrosa et al. 2013).
- Increased carbon storage in stable sinks, such as living trees, can slow the effects of climate change. The retention of existing forests is an effective strategy because carbon is retained and increases as trees grow (Pregitzer and Euskirchen 2004).

Climate change is sometimes characterized as a looming monstrosity which is causing, or will cause, disasters of monumental scope. I suggest that the more subtle day-to-day effects will ultimately drive the biggest changes in patterns of settlement, agriculture, and economy. For example, slightly more intense storms will frequently cause minor increases in erosion, landslides, and road damage, and leave less time for groundwater infiltration in Napa's steep drainages (Battany and Grismer 2000). Slightly higher high and higher low temperatures will shift growing degree days, affecting crop quality, suitability, and pest success (Caffarra et al. 2012). At first, these small changes will be inconvenient. Over time, they will become increasingly expensive to correct and - eventually - they will transform land use.

Particularly in light of climate change, continued conversion of wildlands to agriculture in lower quality farmland areas is questionable. Low-quality and grazing lands, where most conversion of wildland to vineyard is presently occurring, are more challenging to farm. There are fewer grape varieties suitable for these locations, yields are lower than they would be in higher-quality locations, and wildland-urban interface problems, such as fire, can occasionally disrupt production. These areas are more likely to have groundwater limitations. Their climates are less temperate than the floor of Napa Valley as they are not influenced as much by coastal processes. For all of these reasons, lower-quality lands will be the first to become unprofitable as climate change impacts increase.

Continuing to remove native vegetation from low-quality and grazing land types not only depletes Napa County's best available carbon store and limits species movement, it does so in areas that will be the first to become untenable for farming as climate change progresses. This lose-lose situation should be avoided with policy that better protects wildlands and supports resilience. We can best preserve existing value by focusing on retaining forests for carbon storage and working aggressively toward emissions reduction. Saving trees is the same thing as saving vineyards.

Policy Development

Any new policy should be science-based, enforceable, and have on-the-ground impacts which substantively exceed the protections of current rules. Existing rules (State of California 1970; 2004) require two-to-one (66%) oak canopy mitigation, and retention of 60% of canopy and 40% of shrublands in sensitive water supply drainages, which Napa County tends to implement on-site, so this is the floor for meaningful new conservation policy.

Ratio-based and percentage-based mitigation requirements are different expressions of the same mathematical concept. A 2:1 rule is a 66 percent rule, and a 3:1 ratio is a 75 percent rule. The ratio-based "2:1" language is inherited from statewide regulations, but it is important to recognize that having both a ratio-based and percentage-based mitigation requirement is pointless if other factors (such as

whether mitigation is permitted on undevelopable lands) are held constant, and confusing if they are not. A straightforward way to structure new policy would be to adopt a single rule that is more stringent than existing rules.

Center for Biological Diversity recommends an ordinance that (1) requires retention of a minimum of 90% of existing forests and woodlands, (2) strictly limits development to slopes with less than 30% grade, (3) strongly favors on-site mitigation that leaves undeveloped areas intact, or would require 5:1 off-site mitigation within the watershed, or 10:1 mitigation outside the watershed in a location as nearby as possible (CBD 2019).

These recommendations are in-line with this report, which demonstrates that allowing conservation to occur within undevelopable areas seriously undermines its effectiveness. Important water supply watersheds including Bell Canyon, Hennessey, Rector, and Milliken have proportionally large areas of chaparral and conifer cover, and less oak. To protect these water supplies, adopting broad policies that protect all land cover types and/or increasing protections to water supply watersheds is recommended.

Future directions

This study could be expanded and complemented with additional analyses. Some potential directions include water supply watershed analysis, carbon storage estimates, historical conditions, or an analysis of land cover in undevelopable areas.

A more in-depth study of water supply watersheds to inform policy would be helpful. A GIS analysis paired with in situ water quality data would be ideal.

It may be possible to estimate carbon storage using the Thorne vegetation dataset and/or a LiDAR point cloud, if available.

An estimate of how current land cover compares proportionally to historical conditions could be completed by combining San Francisco Estuary Institute historical ecology data for the Napa Valley with Thorne vegetation data for wildland areas and interpolating non-conforming polygon values in rural areas.

As 30 to 50% slope areas can potentially be developed with exceptions to policy, it could be relevant to evaluate land cover in these lands.

Factors not addressed by this analysis

There are many considerations related to development that are only possible to evaluate at the site scale, on a project-by-project basis. This county-scale analysis represents broad trends and, with luck, discrete errors will tend to cancel each other at the scale of analysis. The methods section of this report provides a basis for reproduction, comparison, and critique by stating assumptions and rationale.

This assessment does not rate the relative quality of lands for carbon storage or conservation value, and it does not consider the presence of special-status species, accessibility, or willingness of owners to sell or develop properties. This report is intended to be considered together with local expert knowledge and assessments of habitat value, landscape connectivity, hydrology, etc.

No attempt is made here to represent development likelihood, which is influenced by many factors such as water availability, microclimate, sun exposure, and remoteness. For individual projects, these

factors are important considerations, however, they are challenging to model at the county scale. Development pressure could be estimated in a follow-up study, but even then would be impossible to predict if or when individual properties may be developed.

Policy effects are not analyzed in tandem with one another as their interactions are best considered at the site scale. At the county scale, it is more helpful to think about comparative policy outcomes.

On-the-ground conditions may have overlap between policy outcomes and land cover types. It may be that the same square foot of ground is precluded from development by slope, stream setback, and canopy retention requirements.

When adjacent parcels have the same owner, mitigation can be applied to the adjacent parcels as if they are one parcel. There is no systematic way to model this outcome, as ownership changes through time and ownership data are not readily available.

Limitations and disclaimer

Information presented here is intended to provide a big-picture, county-scale review of land use and land cover, and not to describe precise conditions on any given property or site. Modeling results are affected by data availability, data accuracy, and data quality. Spatial information is inherently dynamic and can be expected to change over time. It is the responsibility of users to understand data limitations and to use information appropriately. Data were generated in a conscientious, attentive manner and are reasonable estimates; however, data and related graphics are not legal documents and are not warrantied for accuracy, reliability, or completeness.

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Appendices

Appendix 1. California Department of Conservation Farmland Mapping and Monitoring Program

California Department of Conservation (CDC) Farmland Mapping and Monitoring Program (FMMP) classifications were grouped in this analysis. The "Higher quality farmland" category seen in this report includes: prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance.

The following information describing CDC categories has been quoted directly from the CDC website and is included for the reader's convenience (accessed February 2019):

<https://www.conservation.ca.gov/dlrp/fmmp/Pages/Map-Categories,-Criteria,-and-Data.aspx>

Important Farmland Categories

FMMP's study area is contiguous with modern soil surveys developed by the US Department of Agriculture (USDA). A classification system that combines technical soil ratings and current land use is the basis for the Important Farmland Maps of these lands. Most public land areas, such as National Forests and Bureau of Land Management holdings, are not mapped.

The minimum land use mapping unit is 10 acres unless specified. Smaller units of land are incorporated into the surrounding map classifications. In order to most accurately represent the NRCS digital soil survey, soil units of one acre or larger are depicted in Important Farmland Maps.

For environmental review purposes under CEQA, the categories of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Land constitute 'agricultural land' (Public Resources Code Section 21060.1). The remaining categories are used for reporting changes in land use as required for FMMP's biennial farmland conversion report.

Prime Farmland

Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date. Download information on the soils qualifying for Prime Farmland. More general information on the definition of Prime Farmland is also available.

Farmland of Statewide Importance

Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at

some time during the four years prior to the mapping date. Download information on the soils qualifying for Farmland of Statewide Importance.

Unique Farmland

Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.

Farmland of Local Importance

Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. Download a complete set of the Farmland of Local Importance definitions in PDF format. In some counties, Confined Animal Agriculture facilities are part of Farmland of Local Importance, but they are shown separately. The status of each county regarding Confined Animal Agriculture is available in this spreadsheet.

Grazing Land

Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.

Urban and Built-up Land

Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.

Other Land

Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.

Appendix 2. Napa County/ James Thorne - Vegetation Map of Napa County

For the purposes of this analysis, land cover data created by James Thorne were used to remove undevelopable areas such as open water and serpentine soils, as serpentine-associated vegetation is a reliable proxy for soil type. These data were also used to estimate vegetation cover and type for oak, broadleaf non-oak, conifer, and chaparral categories.

The Thorne dataset is detailed beyond the needs of this study. Specific land cover types were grouped to support a general analysis (table 16, below). See literature for complete methods for the creation of the Vegetation of Napa County dataset (Thorne 2004).

Map Key (map next page)



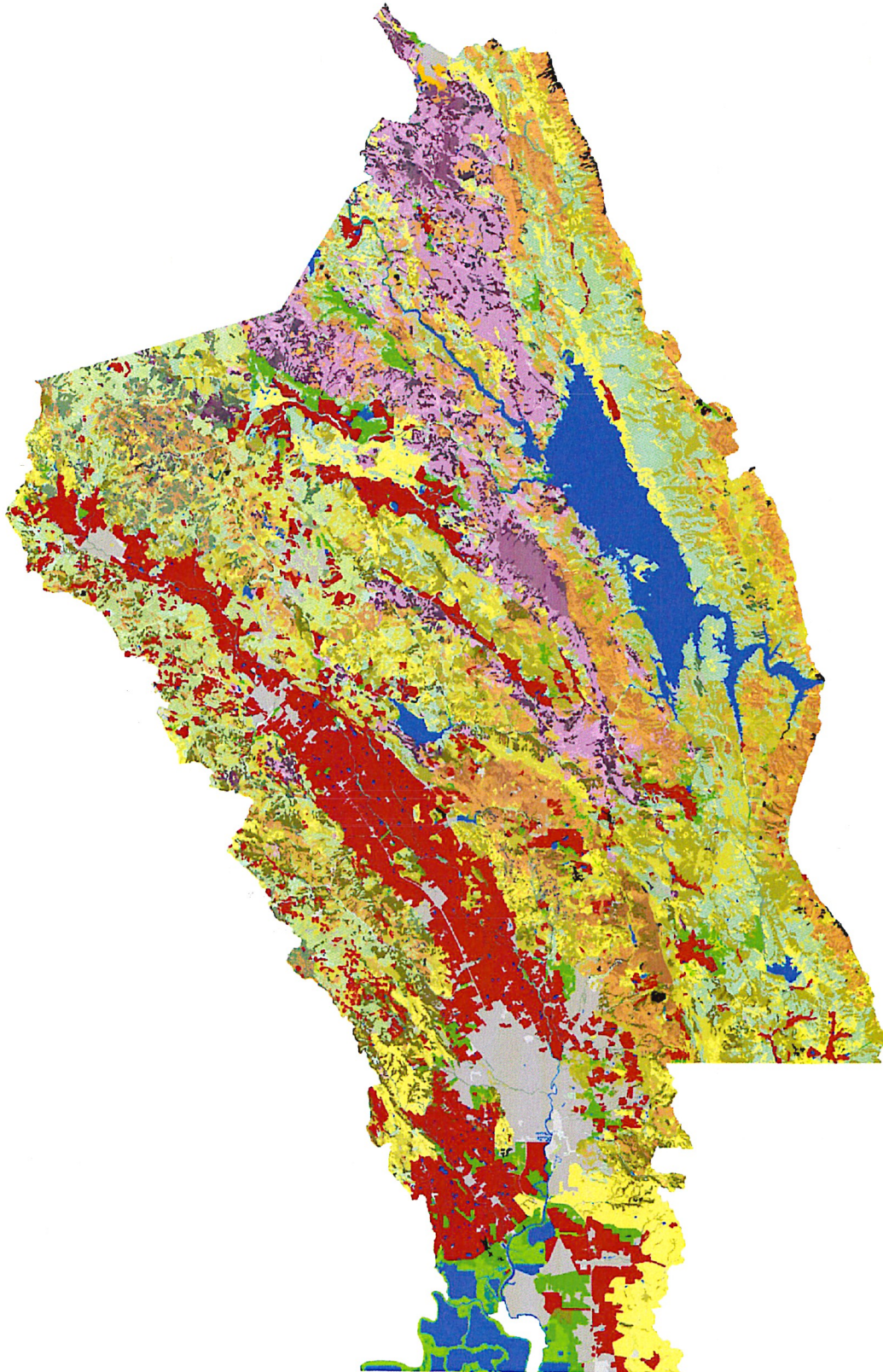


Figure 16. Vegetation of Napa County. Thorne et al. 2004. Key - previous page.

Table 19. Napa County Vegetation

Categories: Thorne, numbered; Manfree, bold.		Acres
Agriculture		64,642
9200 - Agriculture		64,642
Broadleaf non-oak		20,338
1100 - Winter-Rain Sclerophyll Forest & Woodlands		620
1101 - California Bay - Coast Live Oak - (Madrone - Black Oak Big Leaf Maple)		18,343
1123 - Eucalyptus Alliance		408
3201 - White Alder (Mixed Willow - California Bay - Big Leaf Maple) Riparian		967
Chaparral		61,244
1124 - Tanbark Oak Alliance		245
4300 - Sclerophyllous Shrubland		3,277
4301 - Scrub Interior Live Oak - Scrub Oak - (California Bay - Flowering Ash - Birch Leaf Mountain Mahogany - Toyon - California Buckeye) Mesic E		11,057
4302 - Mixed Manzanita - (Interior Live Oak - California Bay - Chamise) West County		8,813
4321 - Chamise Alliance		30,790
4322 - Chamise - Wedgeleaf Ceanothus Alliance		7,019
4501 - Coyote Brush - California Sagebrush (Lupine spp.)		42
Conifer		38,786
2104 - Foothill Pine / Mesic Non-serpentine Chaparral		930
2121 - Foothill Pine Alliance		1,763
2122 - Knobcone Pine Alliance		5,943
2123 - Ponderosa Pine Alliance		168
2126 - Sugar Pine Alliance or Sugar Pine / Canyon Oak		3
2127 - California Juniper Alliance		2
2201 - Coast Redwood - Douglas Fir / California Bay		2,880
2222 - Douglas Fir Alliance		17,390
2224 - Douglas Fir - Ponderosa Pine Alliance		9,382
2230 - Coast Redwood Alliance		324
Grasslands		51,762
7100 - Upland Annual Grasslands & Forbs		12,169
7101 - Native Grassland Restoration Sites		256
7120 - California Annual Grasslands Alliance		39,337
Oak predominant		149,221
1122 - Canyon Live Oak Alliance		567
1201 - Coast Live Oak - Blue Oak - (Foothill Pine)		26,544
1202 - Interior Live Oak - Blue Oak - (Foothill Pine)		18,089
1221 - Coast Live Oak - (Foothill Pine)		13,187
1222 - Interior Live Oak - (Foothill Pine)		5,299
1223 - Mixed Oak (Foothill Pine - Ponderosa Pine)		28,830
3101 - Valley Oak - (California Bay - Coast Live Oak - Walnut - Ash) Riparian		5,721

3102 - Valley Oak - Fremont Cottonwood - (Coast Live Oak) Riparian	520
3121 - Black Oak Alliance	2,221
3122 - Blue Oak Alliance	44,220
3123 - Valley Oak Alliance	2,889
3124 - Oregon White Oak Alliance	1,136
Rock outcrop	1,738
9001 - Rock Outcrop	1,738
Serpentine	53,494
2105 - Foothill Pine / White Leaf Manzanita - Leather Oak - (Chamise -Ceanothus spp.) Xeric Serpentine	7,958
2106 - Foothill Pine / California Bay - Leather Oak - (Rhamnus spp.) Mesic Serpentine	7,280
2124 - McNab Cypress Alliance	2,415
2125 - Sargent Cypress Alliance	2,044
3202 - (Brewer Willow) Poorly Developed Serpentine Riparian	277
4303 - Leather Oak - White Leaf Manzanita - Chamise Xeric Serpentine	26,994
4304 - Leather Oak - California Bay - Rhamnus spp. Mesic Serpentine	4,395
7130 - Native Serpentine Grasslands	2,087
9003 - Serpentine Barrens	44
Wetland	5,089
3221 - Mixed Willow Super Alliance	539
6402 - (Bulrush - Cattail) Fresh Water Marsh	271
6403 - (Carex spp. - Juncus spp. - Wet Meadow Grasses)	275
6501 - Saltgrass - Pickleweed	3,573
9002 - Riverine, Lacustrine, and Tidal Mudflats	432
Water	28,815
9400 - Water	28,815
Urban	26,465
9100 - Urban or Built-up	26,465
Vacant	1,787
9300 - Vacant	1,787
Unidentified	1,571
9999 - Unidentified	1,571
<hr/>	
Total Acres: 504,951	

Appendix 3. Amber Manfree Curriculum Vitae

Education

Ph.D., Geography, University of California, UC Davis, September 2014.

Dissertation: Landscape Change in Suisun Marsh

Available: <https://pqdtopen.proquest.com/doc/1629429650.html?FMT=ABS>

Advisor: Dr. Peter Moyle

Awards: 2015 Kinsella Memorial Prize in recognition of the Outstanding Graduate Research Dissertation in the College of Agricultural and Environmental Sciences at UC Davis

Master of Arts, Geography, UC Davis, December 2012. Specialty in GIS and Geographic Techniques, minor in Plant Ecology

Advisor: Dr. Peter Moyle

Geographic Information Systems (GIS) Competency Certificate, Santa Rosa Junior College, 2009.

Bachelor of Arts, Environmental Studies, Sonoma State University, September 1999. Emphasis in Media Studies.

Research Experience

Postdoctoral research, UC Davis, 2014 - 2018. Research in ecological effects of drought in the Sacramento-San Joaquin Delta. Research in Floodplain Ecology and fish ecology in Suisun Marsh.

Doctoral Research, UC Davis, 2012 - 2014. Read and synthesized historical record for Suisun Marsh, described 200 years of landscape change based on the anthropological record, explorers journals, the map record, and other sources. Designed animated maps to communicate content of the Suisun Marsh Fish and Invertebrate Study dataset.

Masters Research, UC Davis, 2006 - 2012. Characterized hydrogeomorphic change in Suisun Marsh based on the map record and other sources.

Research Assistant, Center for Watershed Sciences (CWS), UC Davis, 2011 - 2014. Editing, cartography, and graphic design for Suisun Marsh: Ecological History and Possible Futures (book) and California Drought Summit program. Microsoft Access database management and GIS support for research and CWS publications.

Research Assistant, Landscape Analysis and Systems Research Laboratory, UC Davis, 2006 - 2011. Modeled landscape-scale impacts of water use patterns in residential neighborhoods.

Publications

Opperman, Jeffrey J., Peter B. Moyle, Joan L. Florsheim, Eric W. Larsen, and Amber D. Manfree. Floodplains: processes and management for ecosystems. UC Press, Berkeley, (2017).

Baumsteiger, Jason, Robert E. Schroeter, Teejay A. O'Rear, Jonathan D. Cook, Amber D. Manfree and Peter B. Moyle. Factors affecting distribution and abundance of a trio of invasive Black Sea jellyfish in San Francisco Estuary, California. PLOS ONE (in Press).

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<http://californiawaterblog.com/2014/08/18/drought-journal-search-for-sierra-fish-goes-from-bad-to-worse/>

Manfree, Amber D., and Peter Moyle. May 2014. Planning for the inevitable at Suisun Marsh. May 1, 2014. California WaterBlog, UC Davis Center for Watershed Sciences.
<http://californiawaterblog.com/2014/05/01/planning-for-the-inevitable-at-suisun-marsh/>

Presentations and Posters

Manfree, Amber D. Warming up to (Climate) Change. How studying landscape change can help communities adjust to a shifting environment. Presented at the 2016 Okanagan Water Board Annual Meeting.

Manfree, Amber D. Exploring a long-term fish dataset with ArcGIS animation tools. Presented at the at 2015 Annual ESRI User Conference.

Manfree, Amber D. The Fishes of Suisun Marsh: Exploring and Communicating 35 years of research with data animations. Presented at the at 2015 Annual California Geographical Society Conference.

Manfree, Amber D. Landscape-scale aquatic reconciliation in the North Delta Arc. Presented at the 2015 Annual Meeting of the California-Nevada Chapter of the American Fisheries Society.

Manfree, Amber D. Garden Nurseries and Trophic Relays: Spatial partitioning by fish size class in the Arc reflects higher juvenile recruitment and foraging success in regions of high pelagic food production. Presented at the 2015 Interagency Ecological Program Workshop.

Manfree, Amber D., Peter B. Moyle. Thirty-Five Years of Fish Studies in Suisun Marsh: Perspectives and Animations. Presented at the 2014 8th Biennial Bay-Delta Science Conference.

Manfree, Amber D. A new look at the fishes of Suisun Marsh. Presented at the 2014 Annual Meeting of the California-Nevada Chapter of the American Fisheries Society.

Manfree, Amber D., Peter B. Moyle, Peggy L. Fiedler. Suisun Marsh, past and prospects: Highlights from the forthcoming book with UC Press. Presented at the 2013 11th Biennial State of the Estuary Conference.

Manfree, Amber D. Suisun Marsh historical ecology: Notoriously swampy and overflowed lands. Presented at the 2012 7th Biennial Bay-Delta Science Conference.

Manfree, Amber D. Historical Ecology of Suisun Marsh. Poster presented at 2011 Annual California Geographical Society Conference.

Manfree, Amber D. Modeling wet and dry weather water quality in Sacramento County's urban residential areas. Presented at the 2010 Annual California Geographical Society Conference.

Manfree, Amber D., Andrew Bale, Steven Greco, Loren Oki, Darren Haver, Jay Gan, Sveta Bondarenko. Modeling the effects of landscape best management practices on water quality in urban residential areas. Presented at the 2010 239th Annual American Chemical Society Conference.

Manfree, Amber D., Steven Greco, Andrew Bale. Modeling the effects of household-scale BMPs in urban residential zones. Presented at the 2009 Annual Meeting of the American Association of Geographers.

Cartographic work

Comprehensive Conservation and Management Plan. 2016. San Francisco Estuary Partnership.

State of the Estuary Report. 2015. San Francisco Estuary Partnership.

Connolly Ranch welcome map interpretive signage. 2014. Napa Land Trust and Connolly Ranch.

The Shifting Cultural Landscape of the San Francisco Bay Area, 1772 - 1846. 2013. Self-published.

Watersheds of California. 2010. Self-published.

Teaching Experience

Instructor

Introduction to GIS, 2017, 2018, and 2019 courses for the UC Davis Extension
GIS for Watershed Analysis, 2018 course for the UC Davis Extension
Communicating with Maps, 2018 course for the UC Davis Extension
GIS Methods for Hydrology, Spring 2016 and Summer 2014
Practical GIS for Field Research, Fall 2012 and Spring 2013

Teaching Assistant

Introduction to Geographic Information Systems, Fall 2011
Site Ecology for Landscape Architects, Spring quarters 2007 - 2010
History of Landscape Architecture, Winter 2007

Curriculum Development

Led development of GIS curriculum plan for undergraduate studies at UC Davis; effort sponsored by James Quinn at the UC Davis Information Center for the Environment, Fall 2009

Guest Lectures

Careers in GIS. September, 2018. Invited by Professor Alison McNally to lecture undergraduate students at Cal-State Stanislaus.

How Historical Ecology informs our Sense of Place. July, 2017. Invited by instructor Sahoko Yui to lecture to UC Berkeley Landscape Architecture students about applying historical research to Landscape Design.

What does it mean to design with nature? November, 2012. Invited by Dr. Claire Napawan to lecture to UC Davis Landscape Architecture students in introductory course. Lectured on environmental ethics, landscape change geography, and reconciliation ecology.

GIS, GPS, and Cartography. June 2012. Napa Valley Personal Computer Users Group.

Genetics and Evolution for Landscape Architects, Spring 2010. Guest lecture to students in Site Ecology for Landscape Architects.

Community Service

Suisun Marsh Complete Marsh Project, 2017, 2018

Suisun Marsh Fish and Invertebrate Study field sampling, 2008-2016.

Bodega Bay Annual Field Survey volunteer, 2009, 2010, 2011, 2014, 2017

North Bay Fish Study (Hobbs; Napa, Sonoma, and Petaluma creeks), 2016

Outdoor education modules for Napa Resource Conservation District student field trips, 2014, 2015

Organized tour of Napa River restoration projects for UC Davis affiliates, 2015

South San Francisco Bay Salt Ponds Fish Study, 2014

Pine Creek Annual Fish Survey (Modoc County), 2010

Putah Creek Annual Field Survey, 2009