- CASE STUDY I -

GRGICH HILLS ESTATE

Vineyard area:

American Canyon: 201 acres, 160 vineyard
Carneros: 101, 88 vineyard
Yountville: 75, 63 vineyard
Rutherford: 24, 18.4 vineyard
Calistoga: 50, 34 vineyard
=364 vineyard acres

Site Characteristics: Variable based on site – Rolling hills, benchland, valley bottom. Some sites have new plantings, some have century-old vines still producing superb fruit.

Tools/Equipment used:

- Fischer TWISTER

Passes: 1 - 2 passes depending on growing season conditions

Organic Herbicides? No.

Grazing? Hire sheep before bud break (Kaos). Sometimes 2 passes depending on the season and site.

Tillage? No

Weeds of concern? What weeds? Companion plants

Aesthetics? Aim for biodiversity, living roots, and 100% ground cover year-round

COSTS:

Annual farming costs/acre:	$11,000
Depreciation of vineyard/acre:	$1,300
Weed Management Costs:	
Tractor w/TWISTER $80/pass 2x a year	=$160
In-row mowing $25/pass 2x a year	=$50
Sheep $100/"mow" 1x a year	=$100
Yearly Total Mowing Cost/Acre	**=$310**

Certification(s):

- Regenerative Organic Certified
- CCOF
- Napa Green Vineyard (in process)
- Napa Green Winery

- CASE STUDY II -

SPOTTSWOODE ESTATE

Vineyard area: 45 vineyard acres

Site Characteristics: Bale clay loam soils on western bench of St Helena

Tools/Equipment used:

- Tractor
- Spader
- Self Powered Mower
- ATV
- Electro Static Sprayer
- Air Blast Sprayer
- Disc Harrow
- Spring Tyne Harrow
- Seeder
- Undervine Mower
- Rotary Disc Undervine Cultivator

Passes: 4 spray passes, 1 partial cultivation pass, 2 mowing passes

Organic Herbicides? No

Grazing? Yes – in house flock of Navajo Churro sheep

Tillage? Partial/minimal – season dependent

Weeds of concern? None

Aesthetics? We don't find bare soil/clean cultivating aesthetically pleasing

COSTS:

Annual farming costs/acre		**$19,000**
Weed Management Costs:		
Tractor w sprayer	$60/pass 4x a year	=$240
In-row mowing	$100/pass 2x a year	=$200
Sheep	$100/"mow" 1x a year	=$100
Yearly Total Mowing Cost/Acre		**=$540**

Certification(s):

- CCOF
- Regenerative Organic (ROC)
- Fish Friendly Farming
- Demeter
- B Corp
- Napa Green Vineyard
- Napa Green Winery
- B Corp
- TRUE Zero Waste
- IWCA

- CASE STUDY III -

V. SATTUI WINERY

Vineyard area: Vittorio's Vineyard: 29 acres

Site Characteristics: Pleasanton Loam located on flat valley floor. Varietals planted include Alicante Bouchet, Cabernet Sauvignon, Mouvedre, Counoise, Cabernet Franc and Petite Verdot. Blocks vary in row spacing from 7 to 9 feet. Under-row mechanical weed control is the main strategy to regulate weeds at this site.

Tools/Equipment used:

- Hand weeding: 1 pass
- Clemens: 3 passes (Used mainly for flat ground, with no rocks)
- Fischer TWISTER: Used specifically for inclined and rocky terrain

Organic Herbicides? No

Grazing? Yes, we have used Napa Pasture Protein. Cori Carlson is the owner and main contact for sheep grazing.

Tillage? Yes

Weeds of concern? Wild Oats, Queen Anne's Lace, Malva, Filaree

COSTS:

Weed Management Costs:

Hand weeding w/shovel	$400/acre/pass x2 passes	=$800/acre
(on hills & areas where mechanical weeding is not an option)		
Clemens	x3 passes	=$400/acre
Weed Eater		=$400/acre
(used specifically for inclined terrain, where Clemens is not an option)		
Sheep Grazing		=~$1,000/acre
TOTAL:		**=$2,600/acre**

One-Time Costs:

Moving up irrigation lines to accommodate TWISTER*:

Each metal bracket holding the irrigation line removed, irrigation line moved up, then re-secured with metal bracket again.

Total cost/acre: $600/acre

**If irrigation lines are higher than 24 inches, no issue.*

Certification(s):

- Napa Green Vineyard
- Napa Green Winery (in progress)
- CCOF
- Fish Friendly Farming

- CASE STUDY IV -

DOMINUS ESTATE

Vineyard area: 103 acres

Site Characteristics: Gravelly clay loam soils (slope 3-10%)

Tools/Equipment used:

- Tractors: John Deere, Kubota, Solectrac
- Boisselet: Inter-vine mowers
- Boisselet: Weed knives
- Perfect: Flail shredder
- Gearmore: Rotary mower
- Shovels

Passes: 1 pass to shred pruning shoots + 2-3 passes to mow

Organic Herbicides? No

Grazing? Yes, work with Kaos

Tillage? We stopped tilling this year (2023) and do not plan on tilling next year

Weeds of concern? We control the propagation of Dwarf mallow (Malva neglecta) and Morning Glory by hoeing with shovel

Aesthetics? Vineyards can stay very tidy if cover crops are mowed or crimped and weeds controlled with handwork. Cover crops with native flowers have added aesthetic value and help reduce dust, cool ambient air temperature during summer, increase air humidity, increase life soil biology, and increase biodiversity.

COSTS (2023):

Annual farming costs/acre:	$37,439 per producing acre
Weed Management Costs:	
Mowing with tractors (in-row + intervine):	$167/acre*
Manual weed management:	$294 per acre*

**Doesn't include employee benefits cost*

Certification(s):

- Napa Green Vineyard
- Napa Green Winery
- CCOF
- Fish Friendly Farming

- CASE STUDY V -

ESTATE VALLEY FLOOR

Vineyard area: 44 acres

Site Characteristics: Rolling hills. A few rocky areas. Some side-slope where it's too narrow for a tractor.

Tools/Equipment used:

- Handheld gas-powered weed wackers used just after weeds germinate
- Gramegna tractor-mounted in-row tiller. Challenges: Slow & one-sided
- Shovel
- Piloting a few weed-trimmer attachments

Passes: 1 - 2 passes depending on growing season conditions

Organic Herbicides? Tried but were expensive, ineffective, and felt their use was moving away from why we're organic in the first place.

Grazing? Hire sheep before bud break (Kaos)

Tillage? Currently, some blocks are no-till and some alternate till. Goal to be entirely no-till. Even in a dry year we didn't see a drop in yield in no-till blocks.

Weeds of concern? Some of the very aromatic we don't want in the fruiting zone (e.g., hit Mare's Tail with a targeted shovel pass). Johnson grass - tall, vigorous and deep-rooted - do worry about competition.

Aesthetics? Fair tolerance for weeds in the vineyard. Mostly dead or dormant for core vineyard management. Some dead/dormant weeds are also shading out further weed growth.

COSTS:

Annual farming costs/acre	**~$12,000**
Weed Management Costs:	
Suppress (organic herbicide):	$138.57/pass
Gramegna:	$141.06/pass
Weedwacker:	$119.70/pass
Yearly Weed Management Cost/Acre	**=$400/acre**

Certification(s):

- Regenerative Organic
- CCOF

- CASE STUDY VI -

VINEYARD MANAGEMENT COMPANY

Vineyard area: Management company for dozens of vineyards. Managing 600 acres in Napa County

Site Characteristics: Variable (Calistoga to Angwin to Carneros)

Tools/Equipment used:

- Gramegna Cultivator
- Pellenc Cultivator
- Hand work: Shovel

Passes: 2 - 3 depending on season and owner weed tolerance

Organic Herbicides?

- Some. Only using Suppress currently but it needs multiple passes per year and efficacy is limited.
- Early applications have been replaced with sheep.

Grazing? Some. Depending on owner preference and availability

Tillage? Site and owner dependent.

Weeds of concern? Yellow starthistle; Bindweed/Morning glory

Undervine Weed Management Costs:

Tractor: Gramegna	$500-800/pass/acre
Tractor: Pellenc	$300-600/pass/acre
Handwork: Shovel	$500-1000/pass/acre
Sheep	$80-850/pass/acre (entirely dependent on site)

Certification(s):

Depends on client:

- CCOF
- Napa Green Vineyard
- Certified California Sustainable Winegrowing
- Fish Friendly Farming

- CASE STUDY VII -

ESTATE VALLEY FLOOR

Vineyard area: 170 Acres in Carneros, St. Helena, Rutherford

Site Characteristics: Variable by site location, but generally flat

Tools/Equipment used:

- French Hoe Plow
- Disc Harrow
- Hand-work: shovels

Passes:

- 1 Early (Mar or Apr) pass with french plow
- 1 Later pass to disc back the soil and smother the next round of weeds
- 1 Spot shovel pass to address misses, end vines/posts, and aesthetics

Tillage? Yes. Standard practice is to disc in the alley. Small no-till experimental plot.

Aesthetics? Not of major concern away from the winery.

Undervine Weed Management Costs

Tractor, Hoe Plow:	380 hours/ 170 acres=	2.2 hours/Acre
Tractor, Disc:	290 hours/ 170 acres=	1.7 hours/Acre
Handwork, Shovels:	55 hours/ 170 acres=	.32 hours/Acre
Assuming $25/hr	Annual undervine costs =	$105.5/Acre/Year

Certification(s):

- CCOF

- CASE STUDY VIII -

ESTATE VALLEY

Vineyard area: ~20 Acres in the St. Helena area

Site Characteristics: Flat, benchland

Tools/Equipment used:

- Tractor: Clemens
- Handwork: Weed wackers - in-house
- Handwork: Shovels - both in-house and contracted

Passes: 2 with Clemens; 1 with weed wackers; 1 with shovels

Organic Herbicides? Yes, but seldomly. Only used as an early pass to manage weeds when the soil is too wet to avoid tractor compaction.

Grazing? No

Tillage? Standard practice is to till but there is also a small, long-term no-till trial.

Weeds of concern? Bermuda grass; Yellow Starthistle; Puncturevine

Aesthetics? Yes, ownership has strong feelings about visual weed management.

Undervine Weed Management Costs:

Tractor w/Clemens		
Labor: $800/pass		
Fuel: $500/pass	2x a year	= $163/Acre/Year
Handwork, Weedeater	4-5 Days	= $119/Acre/Year
Handwork, Shovel	12 Hours	= $18/Acre/Year
Handwork, Shovel, VMC		= $318/Acre/Year
Annual Total Undervine Management		**= $618 /Acre/Year**

Certification(s):

- CCOF
- Napa Green Vineyard
- Napa Green Winery

- CASE STUDY IX -

CAIN VINEYARD

Vineyard area: 40+ acres

Site Characteristics: Terraced vineyards with slopes of 10-35%. Recovering from 2020 fire. Steadily replanting to get back to 88 acres of vineyard.

Tools/Equipment used:

- Loved Sunflower (lost in fire). It was the main tool for under vine weed control. No longer in production.
- Perfect under vine mower (lost in fire)
- Hoe plow (didn't work well on terraces)
- Fischer Twister with a variable deck mower. We've only had it for one season so no strong opinions either way yet.
- Weed eaters
- Shovels

Passes: Number of passes really depends on the year.

Crew: Six full-time team members. Bring in extra help for weed-eating and planting.

Organic Herbicides? No

Grazing? Planning to start in 2024

Tillage? Almost no-till. Often before planting, but not always. Otherwise – every once in many years in a weak spot to add compost and increase fertility, and perhaps change cover crop.

Weeds of concern? Fluvellin, Bristly Oxtongue
Biggest concern is voles. Have to keep it clean undervine so they don't have cover. For baby vines, three shovel passes. Have owl boxes, raptor perches. Use mouse traps. Experimenting with different uses of grow tubes for baby vines.

Aesthetics? Want ground cover. Only concern is undervine for voles. "There needs to be a big shift in people's perceptions of beauty."

COSTS:

Pre-Fire farming costs/acre for producing vineyard: $11,000-$13,000
Depreciation of vineyard/acre: +/- $3000

Weed Management Costs:

Pre-fire weed control for producing vineyard: $1200-$1500/acre
This includes mowing, under vine mowing and slight under vine tillage (Sunflower, etc.), weed eating the entire terrace and under vine, some shoveling around vines in a couple blocks. Since the fire, things are so weird that the numbers just don't make sense.
Post-fire weed control for newly planted vineyard (first two years): +/-$2,600/acre
Includes two weed eating passes, 2-3 shovel passes. It's really all about the terraces. As we are replanting, we are eliminating the inside row on the terrace. This is for many reasons – one is that it will make weed eating a little easier, and I hope someone will invent my dream mower and this will improve weed control costs significantly.

Certification(s):

- CCOF
- Fish Friendly Farming