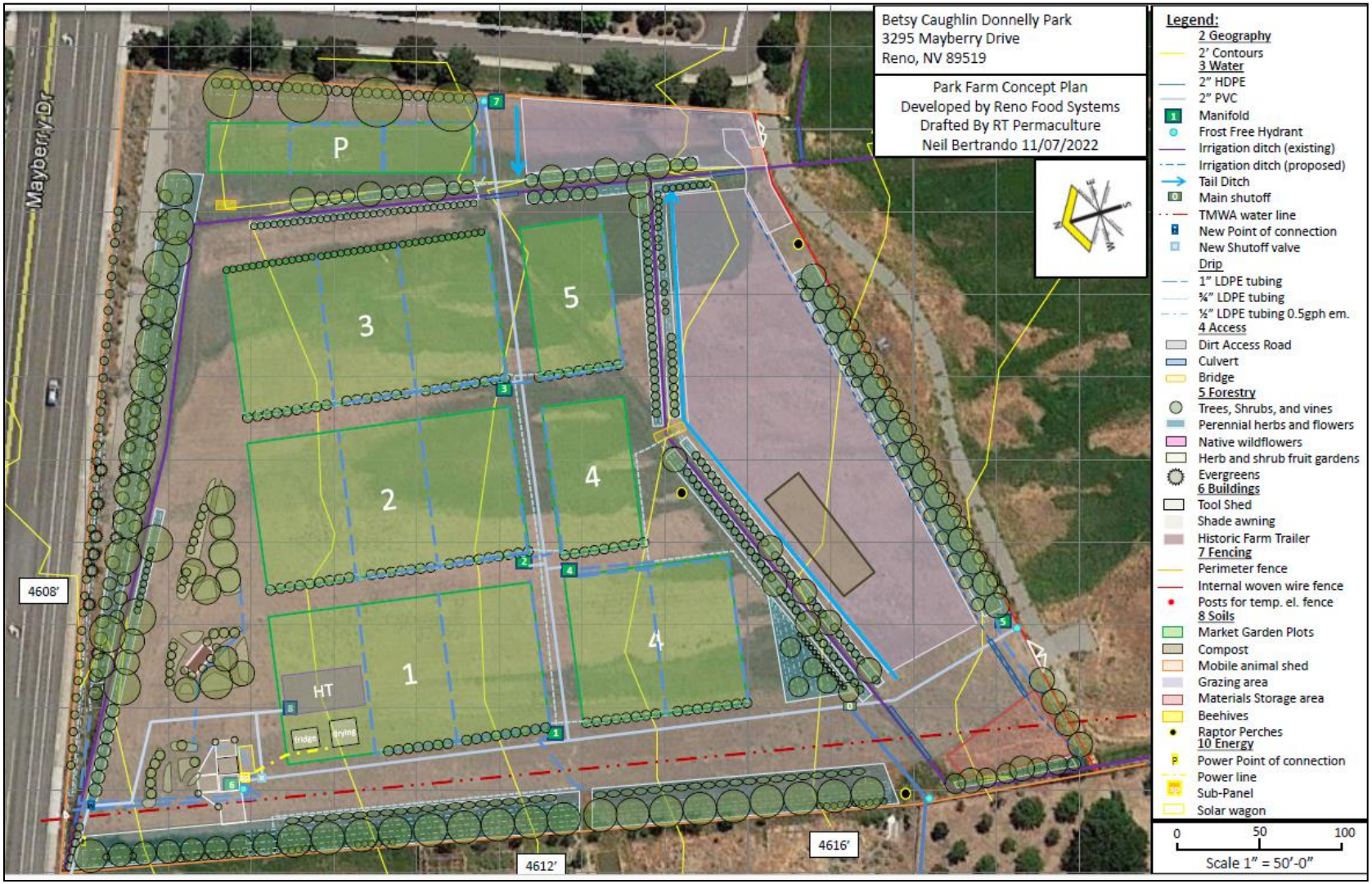
Growing Regenerative Diversity on Small Farms

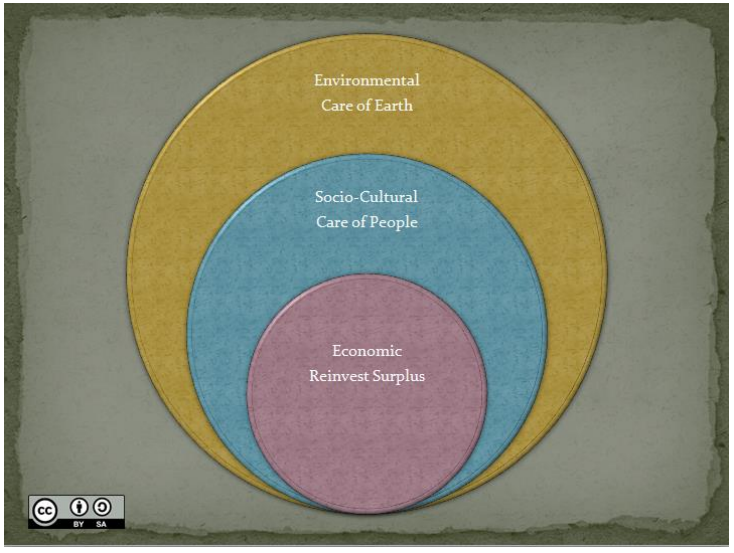


Neil Bertrando

RT Permaculture

Applying a Permaculture Lens

- Ethics: Earth Care, People Care, Reinvest Surplus
- Design Principles
  - Stacking Functions, Relative Locations, Integrate rather than Segregate, Use Edges and Value the Marginal, Catch and Store Energy, **Use and Value Diversity**
- Site and Context specific
  - Zone and Sector Analysis
- Soil Health, Community Oriented, Appropriate Scale



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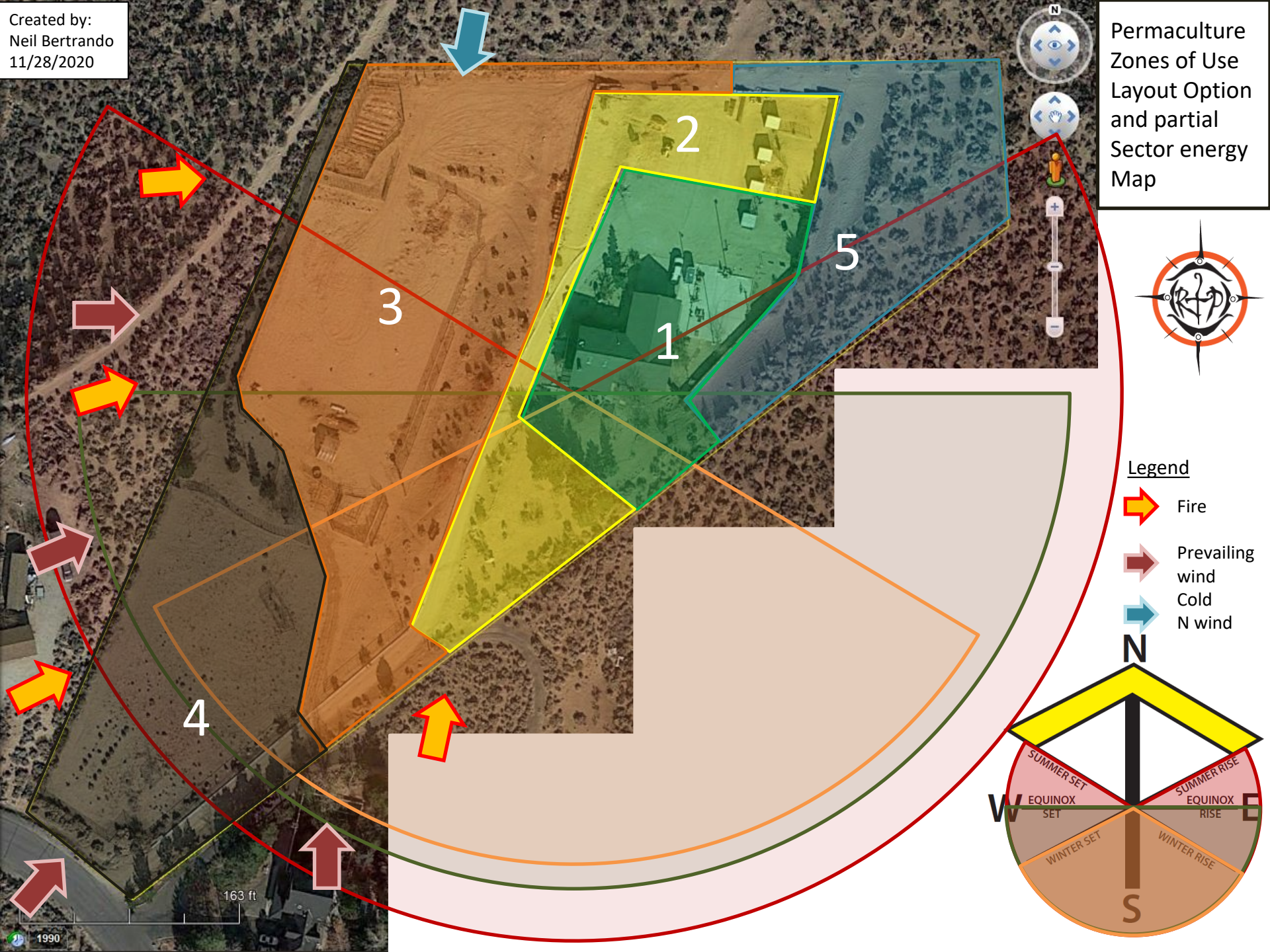
Neil Bertrando
11/28/2020

Permaculture Zones of Use Layout Option and partial Sector energy Map



Legend

- Fire
- Prevailing wind
- Cold N wind

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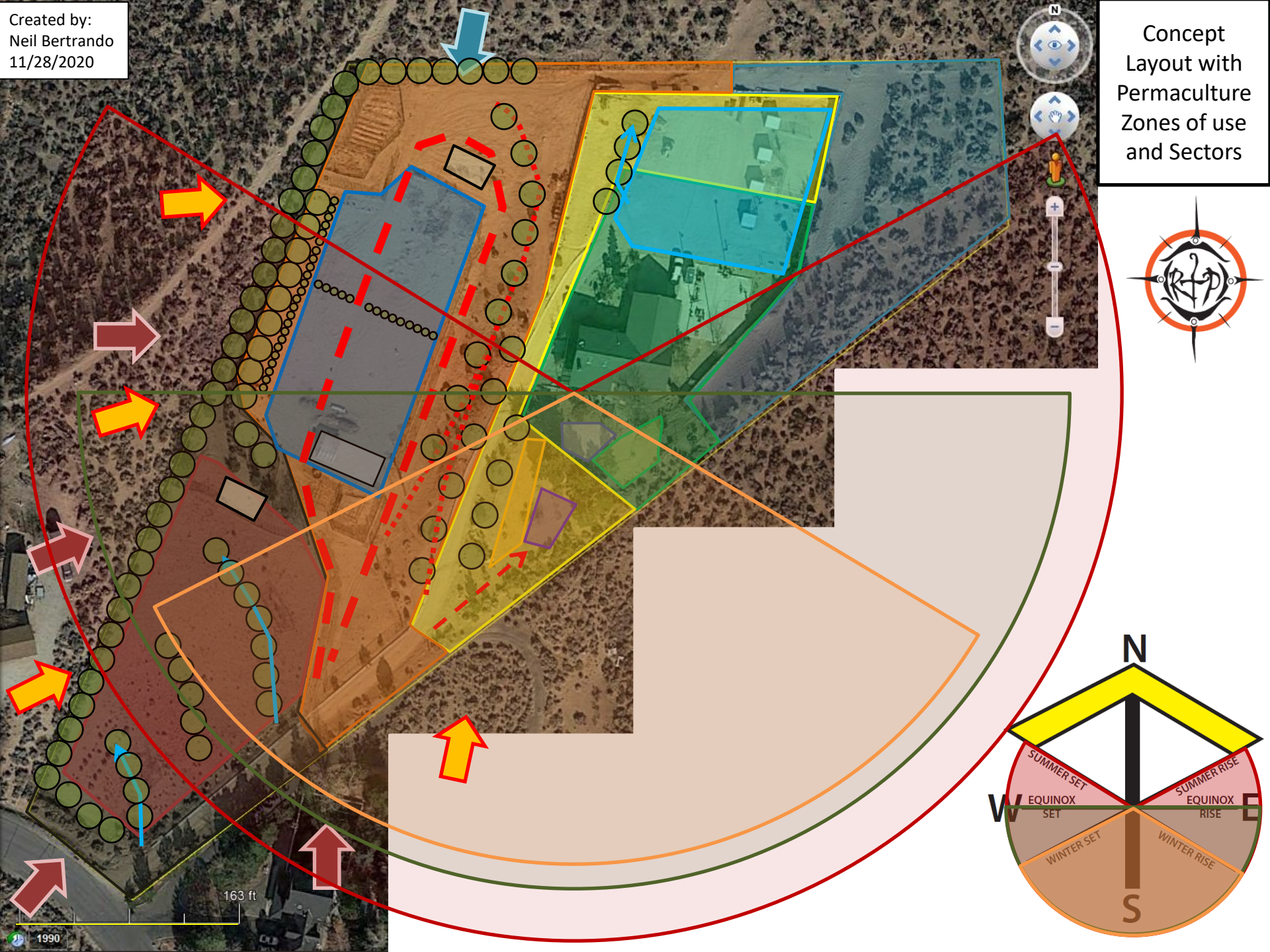
Concept Layout with Permaculture Zones of use and Sectors



Why Diversity?

- Increased resilience
- Improved soil health
- Increased ecosystem services
- Additional income
- Interest and Beauty
- The next generations

What Diversity?

- Annual plants
- Perennial and woody plants
  - Structural and Functional
- Soil microbiome and macrobiome
- Insect pollinator and parasitoid populations
- Livestock
- Wildlife
- Activities
- Revenue streams

Opportunities for Diversification

- Yield:
  - Short-, Medium-, and Long-term yields
  - Harvest timing spread throughout growing season
  - Products and markets
- Biodiversity
  - IPM and Disease management
  - Habitat, nutrient cycling, and ecosystem services
  - Photosynthesis
- Structural Diversity
  - 2-4 Layers based on mgmt system
  - Mitigate evaporation and runoff
  - Manage wind and sun, harvest water and snow

Examples of Systems that Increase Diversity

- Annual systems
  - Mixed species cover crops in rotation
    - Warm Season or Cool Season
    - ≥3 different species and functional groups
      - Grass, Legume, Forb/Broadleaf
  - Flower/pollinator rows or patches
  - Interplanting
  - Microgreens
- Perennial Systems
  - Pasture Cropping
    - Warm season pasture w/ cool season annual crop
    - Cool season pasture w/ warm season ann
  - Pollinator patches
  - Culinary and Medicinal Herbs
  - Windbreaks and Shelterbelts
  - Hedgerows
  - Entry Gardens
  - Perimeter plantings
  - Fruit Trees and Berries
- Livestock integration

Micro Greens

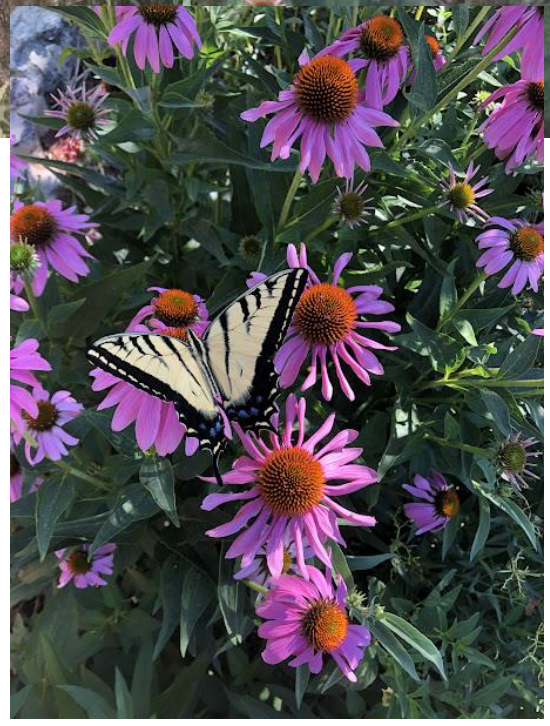
Pasture Cropping

Source https://regenerationinternational.org/2021/03/15/pasture-cropping-the-innovative-no-kill-no-till-system-developed-by-australian-farmers/

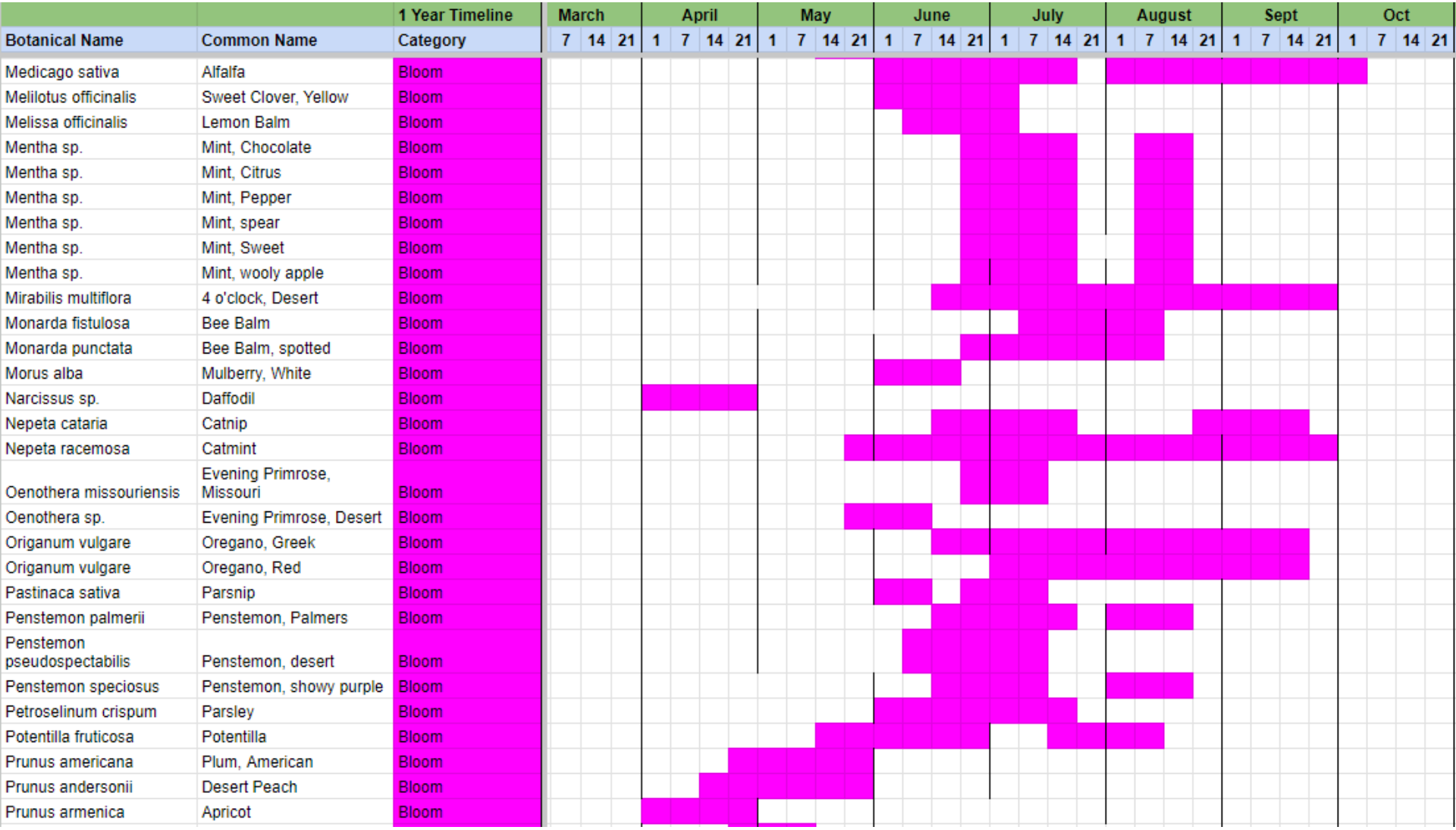
Source https://www.agproud.com/articles/33771-pasture-cropping-and-relay-cropping

Pollinators & Parasitoids Protection & Production

- Design and management considerations
  - Patches and rows
  - Clusters of 3-5+ of individual sp.
  - Herbaceous and woody
  - Native and imported species
  - Irrigation requirements
  - Season long flowering
  - Overwintering habitat
- Functions
  - Build soil health
    - Ground cover, living roots
  - Wind protection
  - Perennial erosion buffer on field edges
  - Crop pollination and pest control



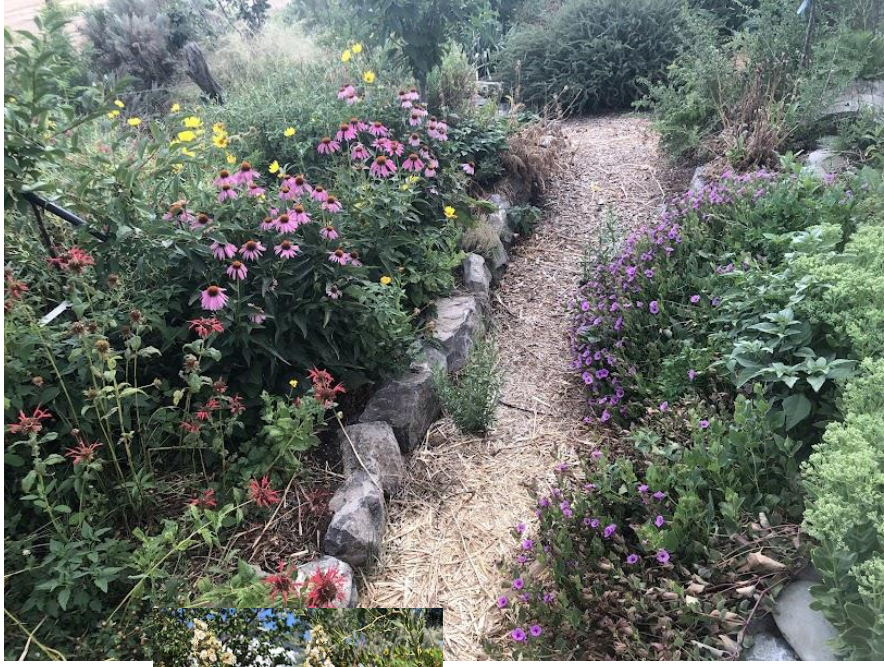
Bloom Chart

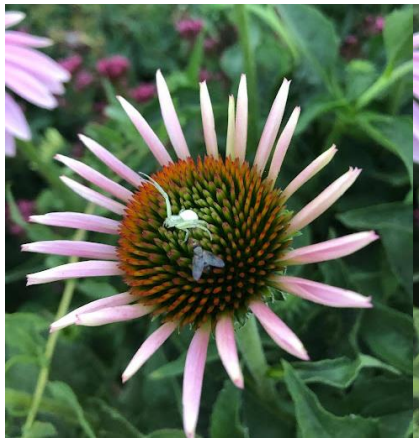


Botanical Name	Common Name	1 Year Timeline Category
Medicago sativa	Alfalfa	Bloom
Melilotus officinalis	Sweet Clover, Yellow	Bloom
Melissa officinalis	Lemon Balm	Bloom
Mentha sp.	Mint, Chocolate	Bloom
Mentha sp.	Mint, Citrus	Bloom
Mentha sp.	Mint, Pepper	Bloom
Mentha sp.	Mint, spear	Bloom
Mentha sp.	Mint, Sweet	Bloom
Mentha sp.	Mint, wooly apple	Bloom
Mirabilis multiflora	4 o'clock, Desert	Bloom
Monarda fistulosa	Bee Balm	Bloom
Monarda punctata	Bee Balm, spotted	Bloom
Morus alba	Mulberry, White	Bloom
Narcissus sp.	Daffodil	Bloom
Nepeta cataria	Catnip	Bloom
Nepeta racemosa	Catmint	Bloom
Oenothera missouriensis	Evening Primrose, Missouri	Bloom
Oenothera sp.	Evening Primrose, Desert	Bloom
Origanum vulgare	Oregano, Greek	Bloom
Origanum vulgare	Oregano, Red	Bloom
Pastinaca sativa	Parsnip	Bloom
Penstemon palmerii	Penstemon, Palmers	Bloom
Penstemon pseudospectabilis	Penstemon, desert	Bloom
Penstemon speciosus	Penstemon, showy purple	Bloom
Petroselinum crispum	Parsley	Bloom
Potentilla fruticosa	Potentilla	Bloom
Prunus americana	Plum, American	Bloom
Prunus andersonii	Desert Peach	Bloom
Prunus armenica	Apricot	Bloom

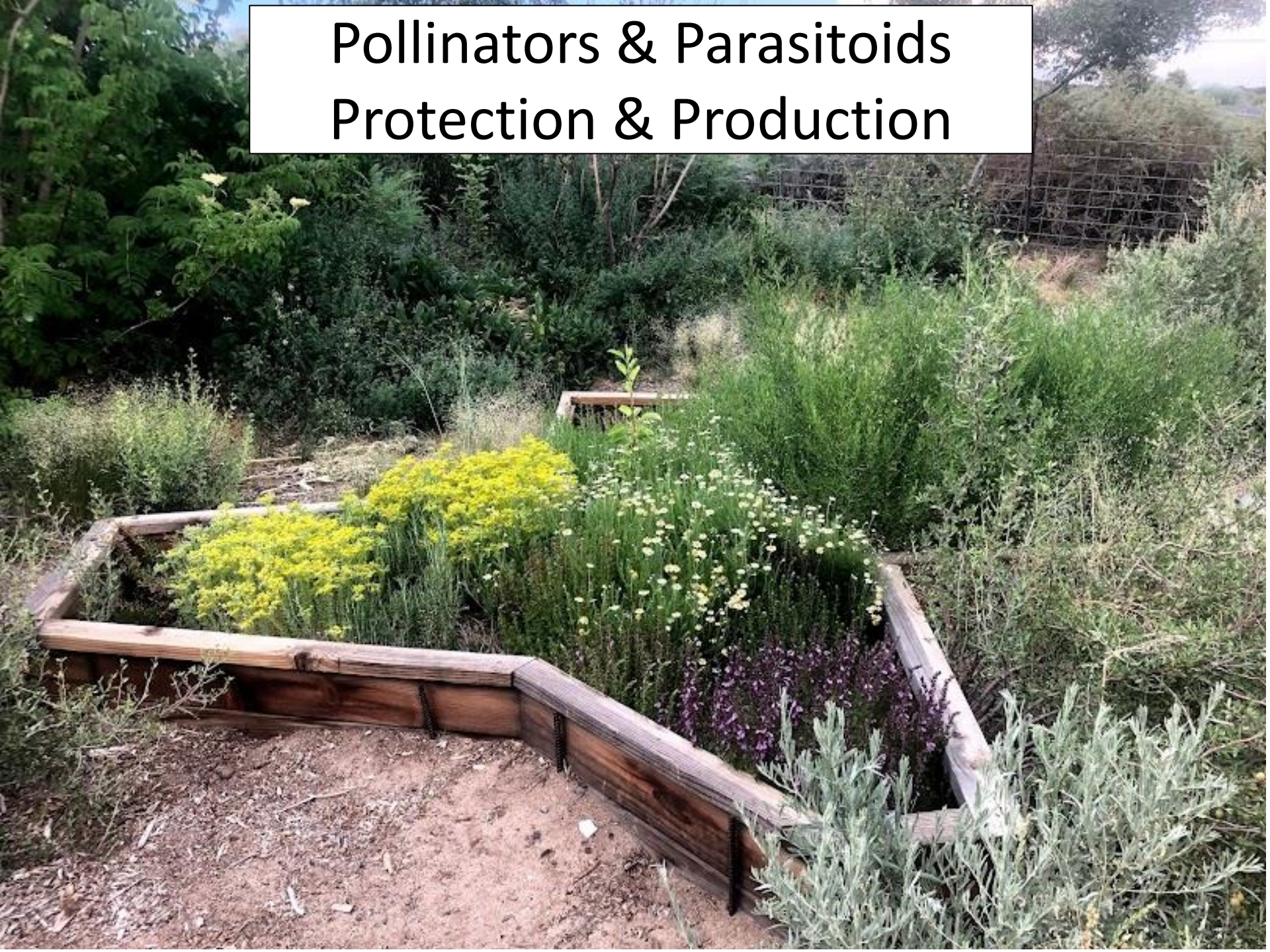
Pollinators & Parasitoids Protection & Production

- Crop types
  - Culinary and medicinal herbs
  - Flowers
  - Berries
  - Nursery
- Plant examples
  - Catmint, Ecinacea, Bee Balm, Maximilian Sunflower, Sage,Lavender, Oregano, Thyme, Stonecrop, Chives, Winter Savory, Elecampane, Alfalfa, Jupiter's Beard, Marshmallow, Yarrow
  - Native wildflowers (Penstemon, Blanket flower, Milkweed, etc.)
  - Golden currant, serviceberry, blackberry, raspberry, aronia, fernbush





Pollinators & Parasitoids
Protection & Production


Pollinators & Parasitoids
Protection & Production

Windbreaks and hedgerows

- Design and management considerations
  - Perpendicular to prevailing wind
  - Protected area 5-10x Height
  - Woody Shrubs and Trees
  - Single row or multi row
  - Evergreen and Deciduous
  - Understory planting or mulch
  - Irrigation requirements
  - Field and Farm edges
  - Growth Rate and longevity

Windbreaks and hedgerows

- Functions
  - Build soil health
    - Ground cover, living roots
  - Wind protection
  - Perennial erosion buffer on field edges
  - Crop pollination and pest control
  - Wildlife habitat and corridors
  - Livestock shelter and fodder

Windbreaks and hedgerows

- Crop types
  - Timber
  - Fruit and Berries
  - Flowers
  - Fodder and forage
  - Herbs
  - Firewood, fencepoles, basketry

Windbreaks and hedgerows

- Plant examples
  - Scots Pine, Austrian Pine, Ponderosa Pine, Blue Spruce
  - Rky Mtn Juniper, Narrowleaf Mtn Mahogany
  - Bur Oak, English Oak, Black Locust, Honey Locust, Lacebark Elm, Hybrid Poplar, Apple, Pear, Plum, Peach, Nectarine, Cherry, Quince, Chokecherry
  - Siberian Pea Shrub, Lilac, Golden/Clove Currant, Buffaloberry, Blue Elderberry, Autumn Olive, Indigobush, New Mexico Privet, Serviceberry, Oak-leaf sumac, 4 wing saltbush

Single Row Field Edge Windbreaks

Source:
http://www.teara.govt.nz/en/photograph/15594/trimmed-macrocarpa-hedge

Source: http://forestandrange.org/modules/windbreak/index.htm
Photo courtesy of Rich Straight, National Agroforestry Center

Source http://creating-a-new-earth.blogspot.com/p/important-hardscaping-terms-definitions.html

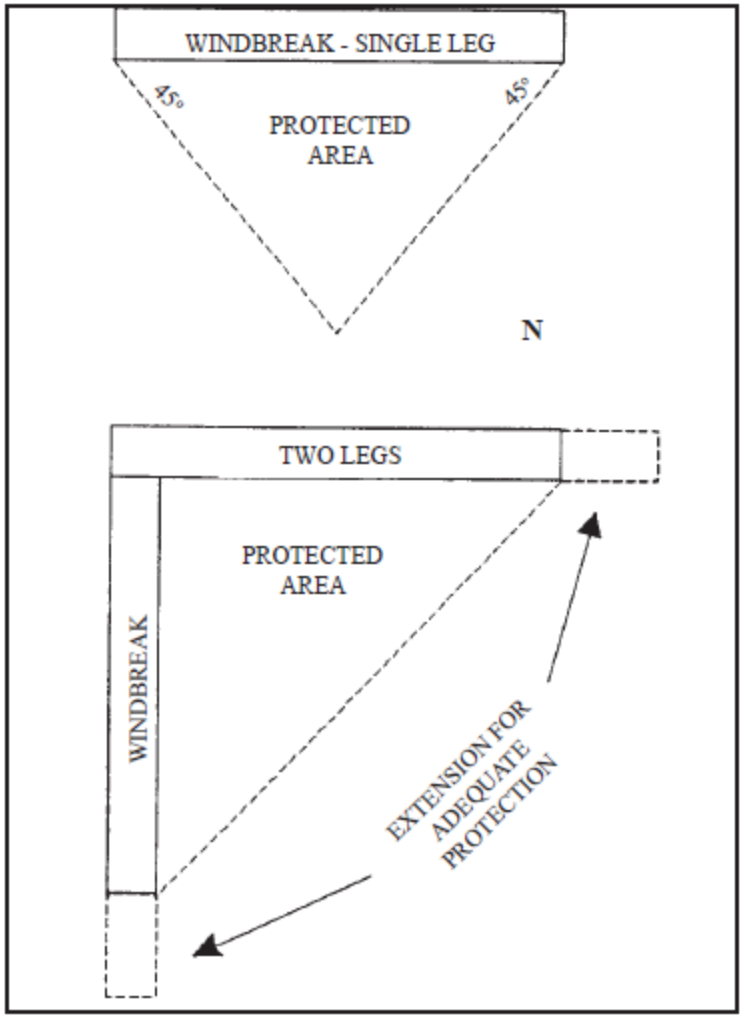


Figure 2. Windbreak design and corresponding zones of protection.

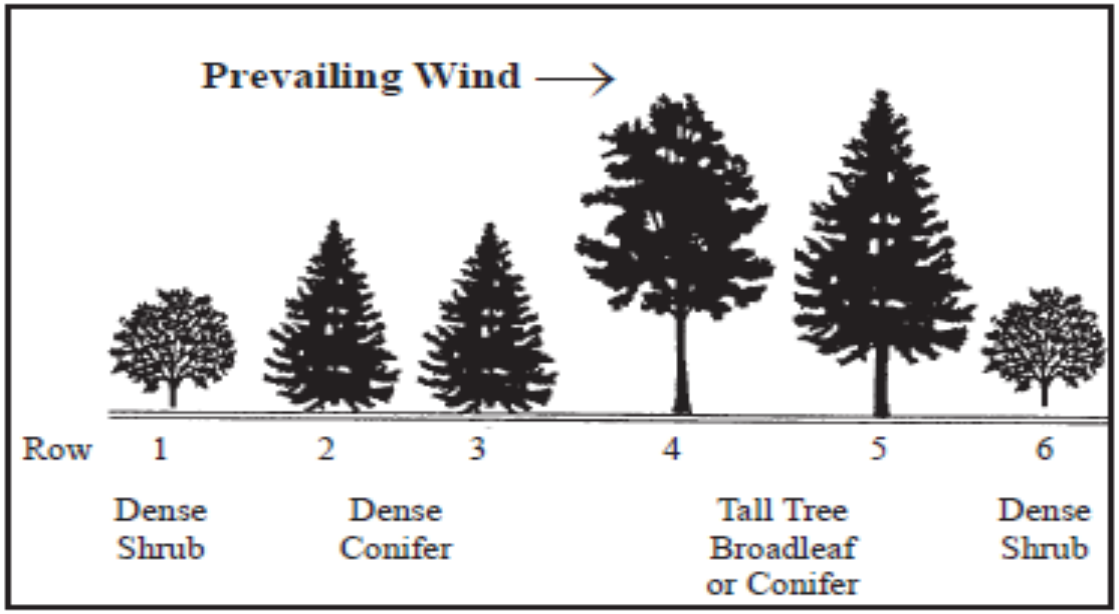
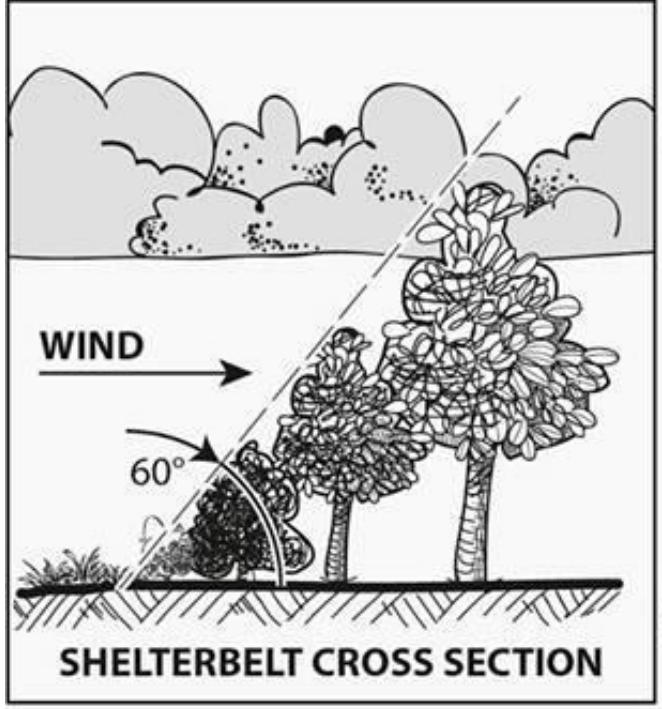


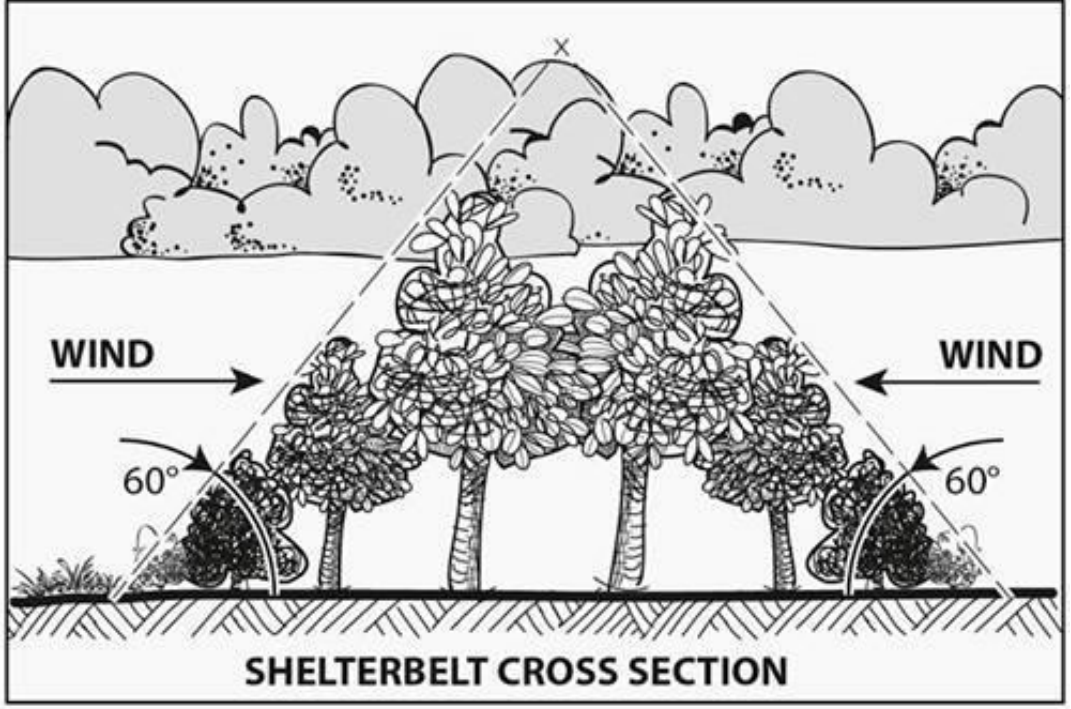
Figure 1. Typical windbreak profile.

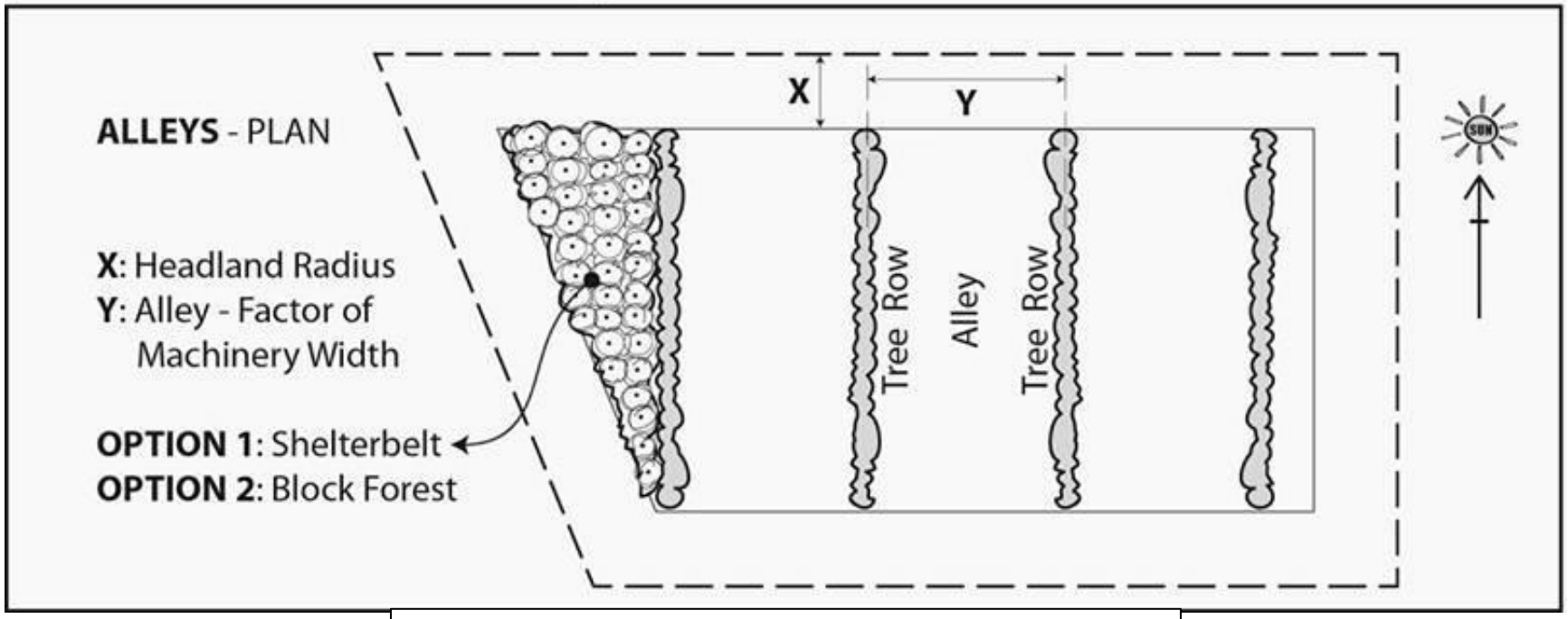
Table I. General Spacing Guidelines for Windbreak

Windbreak Position	*Windbreak Component*	*Spacing (ft.) Between Trees in the Row*	*Spacing (ft.)* Between Tree Rows*
Windward Rows (Rows 1 or 2)	Dense Conifer	6-12	12-20
Leeward Rows (Rows 3+)	Dense Conifer	8-12	14-20
Leeward Rows (Rows 3+) Broadleaf /Conifer	Medium Ht. Trees	10-18	14-20
Leeward Rows (Rows 3+)	Tall Trees	12-20	20-25
Windward or Leeward Rows	Shrubs	4-6	8-10

*A general guide would be to use a between-row spacing 4 feet wider than the largest piece of equipment to be used to maintain the windbreak or provide access.







Source: https://www.facebook.com/groups/Regrarians/photos/

Source: https://www.facebook.com/groups/Regrarians/photos/
Design By Darren Doherty Site in Southern Australia

Entry Gardens

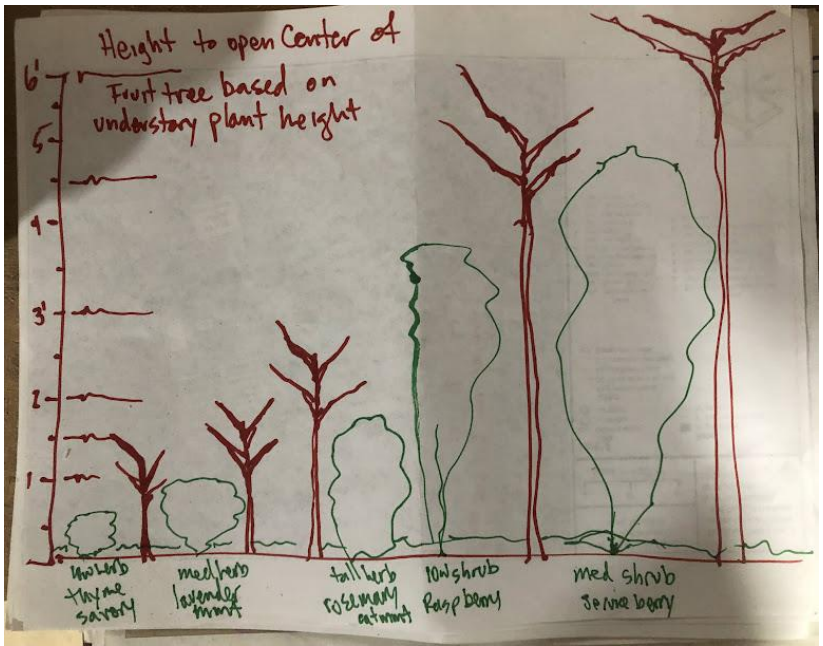
- Aromatic, textural, colorful
- Layered and dense
- Interactive, educational, exploratory
- U-pick


Entry Gardens

Entry Gardens

Tree Fruit

- Design and management considerations
  - Inconsistent bearing due to late frost – long Chill hours
  - Stack functions – windbreak, shelter/shade, multi-strata cropping, alleycrop, livestock
  - Pest control – coddling moth, birds
  - Variety and rootstock selection
  - Pruning and training
  - Bloom and Harvest Times



Tree Fruit

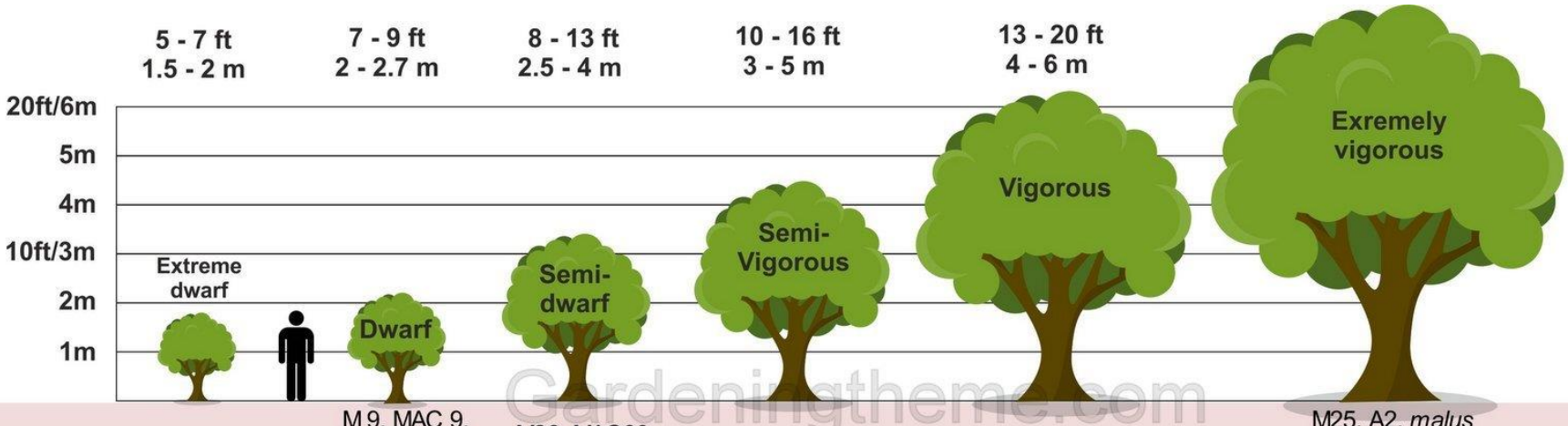
- Plant Examples
  - Pome Fruits – Apples, European Pear, Asian Pear, Quince
    - Bloom later, most reliable fruiting (1 out of 3 yrs)
    - Coddling moth particularly on Apple
  - Stone Fruits – Apricot, Peaches, Nectarines, European Plum, Japanese Plum, Hybrid Plum, Sweet Cherry, Pie Cherry
    - Pie Cherry, Plum -> Peach/Nectarine, Sweet Cherry -> Apricot
  - Others – Mulberry, Jujube
  - Nuts – Yellowhorn, Walnut, Hazelnut, Almond, Oaks

Tree Fruit: Rootstocks

Tree Species	Size Class / Rootstock	Space Between Trees	Space Between Rows	Approximate Height of Mature Tree
Apple	**Dwarf** = B.9, G.11, G.214, G.16, G.41, M.9 NAKB337	8'	16'	8-12'
Apple	**Semi-Dwarf** = G.202, G.210, G.222, G.890, G.935, G.969, M.26	10'	18'	10-14'
Apple	**Half-Standard** = M.7, G.30	14'	20'	12-16'
Apple	**Semi-Standard** = MM.106, MM.111	18'	25'	15-20'
Apple	**Standard** = B.118, P.18, Seedling	30'	40'	16-30'
Pear	**Dwarf** = Quince, Pyro 233	8'	15'	11-15'
Pear	**Semi-Standard** = OHxF 87	12'	18'	16-22'
Pear	**Standard** = OHxF 97, Seedling	18'	22'	18-25'
Tart Cherry	**Dwarf** = Gisela, Krymsk 5,6,7	12'	18'	14-18'
Tart Cherry	**Standard** = Mahaleb, Krymsk 99	18'	24'	18-25'
Sweet Cherry	**Dwarf** = Gisela, Krymsk 5,6,7	14'	20'	12-16'
Sweet Cherry	**Standard** = Mahaleb, Mazzard	20'	28'	18-25'
Peach, Apricot, and Plum	Seedling, Nemaguard, and Guardian	12'	18'	12-13'

Source: https://www.cumminsnursery.com/learn-trees/choosing-trees/fruit-tree-height-and-spacing/

Tree Fruit: Rootstocks



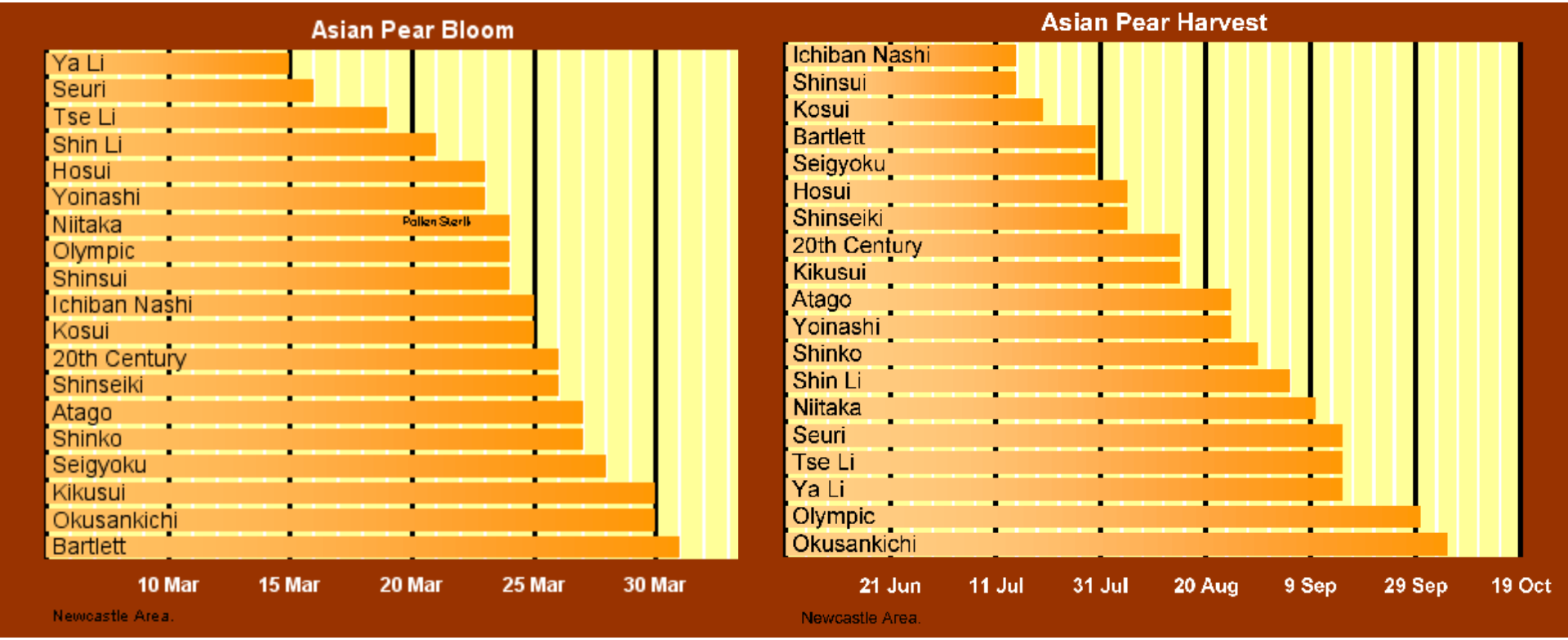
Apple	M 27, J-TE-G	M 9, MAC 9, Jork9, P-2 J-TE-E	M26, MAC39, V 1, P-14	MM106, M116, M4	MM111, P18	M25, A2, *malus domestica* seedling (antonovka, dolgo)
Pear			Quince C, Quince Eline	Quince A, OHF 333, Fox 11	OHF 97	*Pyrus communis* seedling (Wild pear, Bartlett, Winter nelis), Pyrus betulifolia seedling
Plum/Gage			Pixy, VVA-1, Plumina	St. Julien A, Wavit, Krymsk 86, Jaspi	Myrobalan, Brompton	
Peach/Nectarine			VVA - 1	St. Julien A, Wavit, Krymsk 86	GF677, Myrobalan, Brompton	*Prunus persica* (Guardian, Nemaguard, Nemared, Lovell, Montclar, Rubira, BSB 1)
Apricot			Torinel, VVA - 1	St. Julien A, Wavit, Apricor, Krymsk 86	Myrobalan, Brompton	Apricot seedling (*Prunus armeniaca*)
Cherry			Gisela 5	Colt, Gisela 6, Krymsk 5	Mahaleb seedling	wild cherry seedling (*Prunus avium)*, Mazzard (F12)

Source: https://gardeningtheme.com/theme/how-to-choose-a-rootstock-for-a-fruit-tree

Tree Fruit: Rootstocks

- Apple
  - Dwarf – B9, EMLA 26
  - Semi-Dwarf – M.7
  - Semi-Standard – M.111, B118
- Pear
  - Dwarf – Quince A, Provence Quince
  - Semi-Dwarf – OHxF 333
  - Semi-Standard – OHxF 87
  - Standard – OHxF 97, P. calleryana
- Quince
  - Quince A, Provence Quince
- Apricot
  - Semi-Dwarf – Citation
  - Standard – Seedling, Manchurian
- Cherry
  - Semi-Dwarf – Colt, Maxma14
  - Standard – Mahaleb, Mazzard
- Peach/Nectarine
  - Dwarf – Citation
  - Semi-Dwarf – Nemaguard, Seedling
- Plum
  - Dwarf – Krymsk 5
  - Semi-Dwarf – Citation, St. Julian A
  - Semi-Standard – Myrobalan

Tree Fruit: Varieties Bloom and Harvest Times



Source: https://fowlernurseries.com/commercial-asian-pears/
Newcastle California

- https://www.grandpasorchard.com/page/Maturity-Charts
- Picking and Storing Apples and Pears OSU

Tree Fruit: Varieties
Harvest, processing and storage

Table 2.—Maturity dates for pears.

Variety	Dates	Cold storage before ripen
Clapps Favorite	Early Aug.	None
Bartlett	Aug. 10–20	None
Seckel	Late Aug., Sept.	None
Bosc	Early to mid-Sept.	None
D'Anjou	Early to mid-Sept.	2 mo
Comice	Late Sept.	1 mo
Packham's Triumph	Late Sept., Oct.	1 mo
Forelle	Late Sept.	1 mo
Winter Nellis	Early Oct.	1 mo

Source: https://smallfarms.oregonstate.edu/sites/agscid7/files/fs147.pdf
Corvallis, Oregon

Table 3.—Approximate storage life of apples and pears.

Variety	Days storage life at: 30–32°F	40–42°F
Pears		
Bartlett	30–45	15–20
Bosc	50–70	30–40
D'Anjou	120–140	70–80
Comice	79–90	45–55
Winter Nellis	160–180	90–100
Apples		
Gravenstein	60–80	40–50
Tydeman's Red	60–80	40–50
McIntosh	*	60–80
King	120–180	90–105
Golden Delicious	130–150	75–85
Delicious (red strains)	120–180	90–105
Rome Beauty (red strains)	120–180	90–105
Yellow Newtown	120–180	90–105
Melrose	120–180	90–105

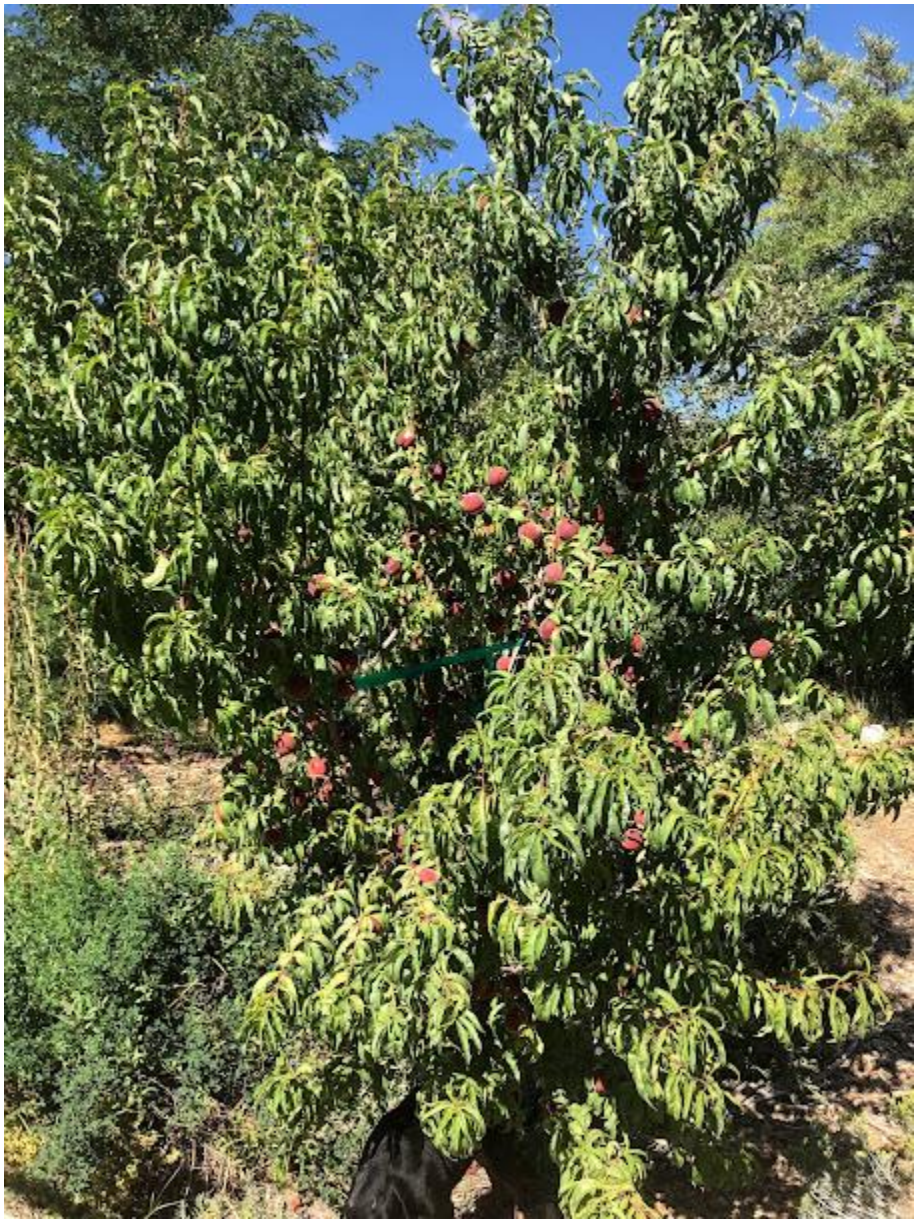
*Subject to cold temperature injury. Hold at 38 to 42°F.

Tree Fruit: Varieties Examples

- Apple
  - Arkansas Black, Black Twig, Esopus Spitzenberg, Golden Delicious, Fuji, Honeycrisp, Mutsu, Smokehouse, Zestar!
- Asian Pear
  - Ichiban, Nashi, Nijiseiki, Raja, Shinseiki, Shinko
- European Pear
  - Bartlett, Clapps Red, Clara Frijs, D'Anjou, Harvest Queen, Moonglow, Rescue, Seckel
- Quince
  - Aromatnaya, Kaunching, Krymskaya/Crimea, Kuganskya, Orange, Pineapple, Smyrna

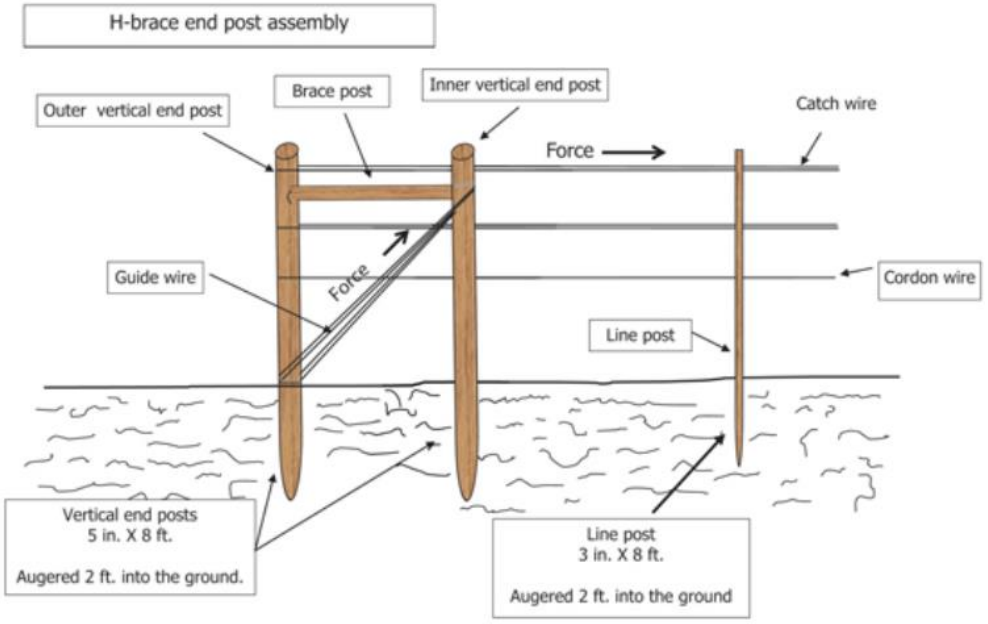
Tree Fruit: Varieties Examples

- Apricot
  - Chinese/Mormon, Harcot, Hargold, Tomcot
- Pie Cherry
  - Montmorency, Northstar
- Sweet Cherry
  - Bing, Black Tartarian, Rainier, Stella, Utah Giant, Van
- Nectarine
  - Arctic Glo, Harko, Mericrest
- Peach
  - Contender, Early Elberta, Polly White, Reliance, White Lady
- Asian/Japanese Plum
  - AU Rosa, Elephant Heart, Emerald Beaut, Methley, Santa Rosa, Satsuma, Shiro, Vanier
- European Plum
  - French Improved, Green Gauge, Italian, President
- Hybrid Plum
  - Lavina, La Crescent, Purple Heart, Toka/Bubblegum,



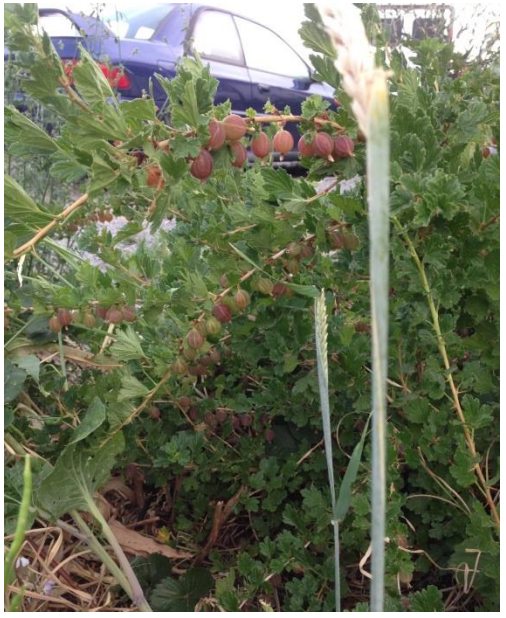
Berries

- Design and management considerations
  - Growth Habit and Trellis
  - Stack functions – Hedgerow, Fenceline, windbreak
  - Pest control – birds
  - Variety and rootstock selection
  - Pruning and training
  - Harvest Times and Method
  - Packaging and Processing



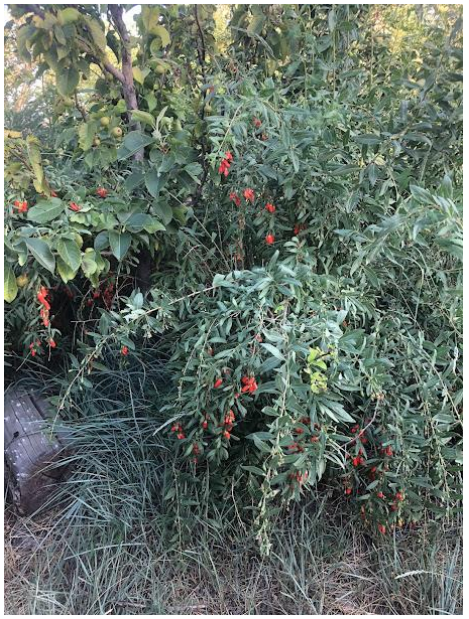
Types of Berries to Consider

- Canes
  - Rubus sp.: Raspberries and Blackberries
  - Lycium sp.: Goji Berries
- Bush
  - Aronia sp.: Aronia melanocarpa
  - Amelanchier sp.: Serviceberry
  - Ribes sp.: Gooseberries, Black and Golden/Clove Currants
  - Sambucus sp.: Blue and Black Elderberry
- Vine
  - Vitis sp.: Grapes



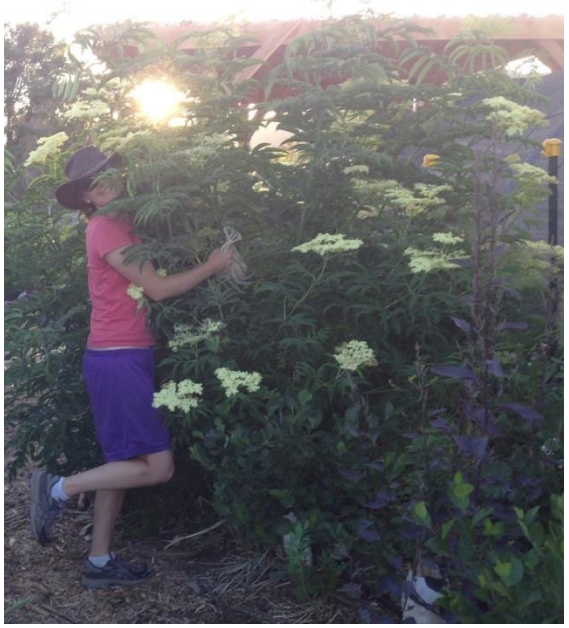
Berries: Varieties

- Canes
  - Red and Gold Raspberries
    - Fall – Anne, Caroline, Heritage, Fall Gold
    - Summer – Boyne, Canby, Nova
  - Purple Raspberries
    - Royalty
  - Black Raspberries
    - Black Hawk, Jewel, Mac Black, Niwot
  - Blackberries, Thornless
    - Triple Crown, Chester
    - Apache, Arapaho, Navaho
  - Goji Berries
    - Crimson Star



Berries: Varieties

- Bush
  - Aronia
  - Serviceberry
    - Regent
  - Gooseberries
    - Invicta, Orus 8, Pixwell, Poorman, Red George
  - Black Currant
    - Consort, Titania
  - Golden/Clove Currants
    - Clove – Crandall, Missouri Giant
  - Black Elderberry
    - Black Lace, Goldbeere, Korsor, Samdal
  - Blue Elderberry
- Vine
  - Grapes, seedless
    - Canadice, Concord, Glenora, Himrod, Mars, Reliance, Somerset Red, Venus



Elderberry associates

- Associated Species: Blue elderberry tends to grow as individual plants among other woody plants [44,87]. Some common associates are serviceberry (Amelanchier spp.), chokecherry (Prunus virginiana), rose (Rosa spp.), gooseberries (Ribes spp.), big sagebrush (Artemisia tridentata), bromegrass (Bromus spp.), and wheatgrass (Agropyron spp.)

http://www.fs.fed.us/database/feis/plants/shrub/samnigc/all.html

Livestock Integration

- Consider which classes of livestock are a good fit for your farm and system
  - Bees, Worms, Poultry, Pigs, Sheep, Goats, Cattle
  - Infrastructure, management, labor, sales
- Identify low risk, safe to fail trials
- Can you partner with another farm / livestock operator?

Source: https://www.facebook.com/groups/Regrarians/photos/

Source: http://brownsranch.us/

Source: http://www.oli-de-mallorca.com/cultivation-olive-grove-majorca.html

Source: http://www.hoyfregenal.es/fotografia/fotos-delgadoexposito/hoyfregenal/dehesa-cuesta-agosto.-721015.html

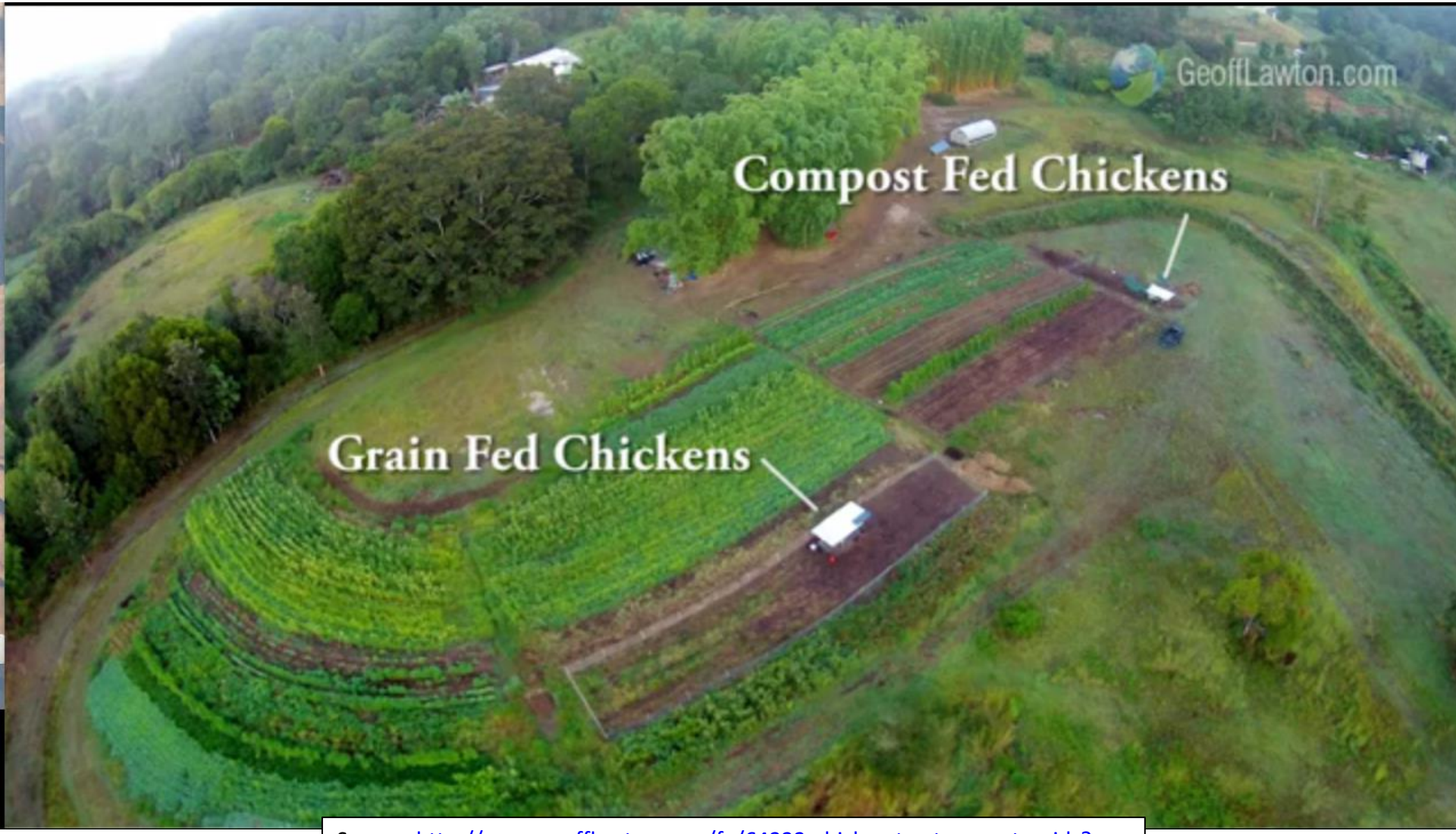
Source: https://www.flickr.com/photos/baalands/2216308884/

Source: http://www.alqueva-ibericos.com/dehesa_eng.html

Mobility and Flexibility

- Mobile Animal Structures
  - Dairy
  - Coop and chicken tractor on steroids
  - Pig sheds
  - Livestock Guardian Dogs
- Temporary paddocks
  - Allow increased # of paddocks and variable size based on changes in production
  - Improve utilization based on high density, short duration
  - Forage Stockpiling: temporal production, strip grazing, ‘haystacking’,
- Mobile slaughterhouses, etc.

Source: http://permaculturenews.org/2014/03/14/building-chicken-tractor-steroids/



Source: http://www.geofflawton.com/fe/64322-chicken-tractor-on-steroids?r=y

Mobile Dairy

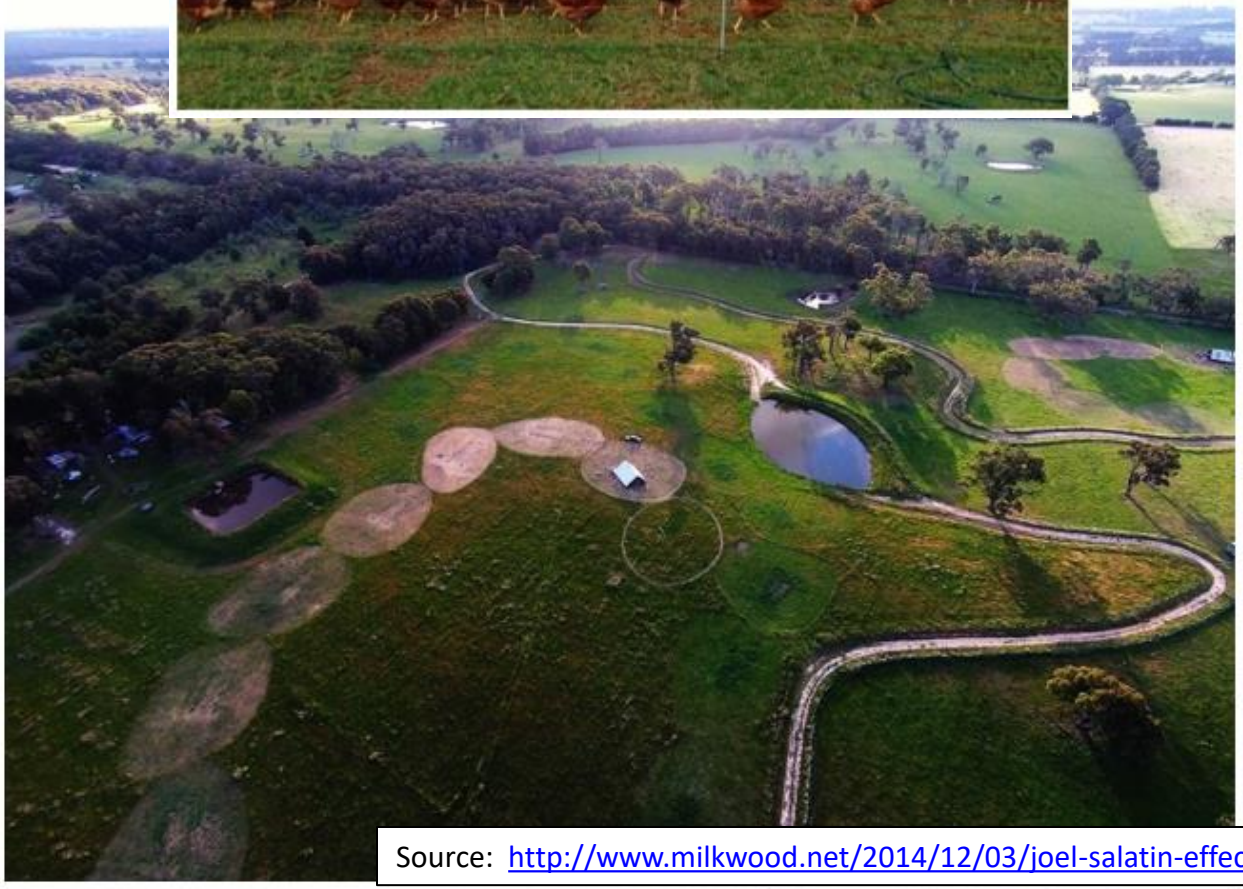
Source: http://citygardencountrygarden.blogspot.com/2012/10/a-day-at-taranaki-farm.html

Source: https://www.facebook.com/TaranakiFarm

Source: http://milkingonthemoove.blogspot.com/2012/10/the-mobile-milking-system.html

Sequence and Timing

Source: https://www.facebook.com/TaranakiFarm



Source: http://www.milkwood.net/2014/12/03/joel-salatin-effect-australia/

Source: https://www.facebook.com/TaranakiFarm

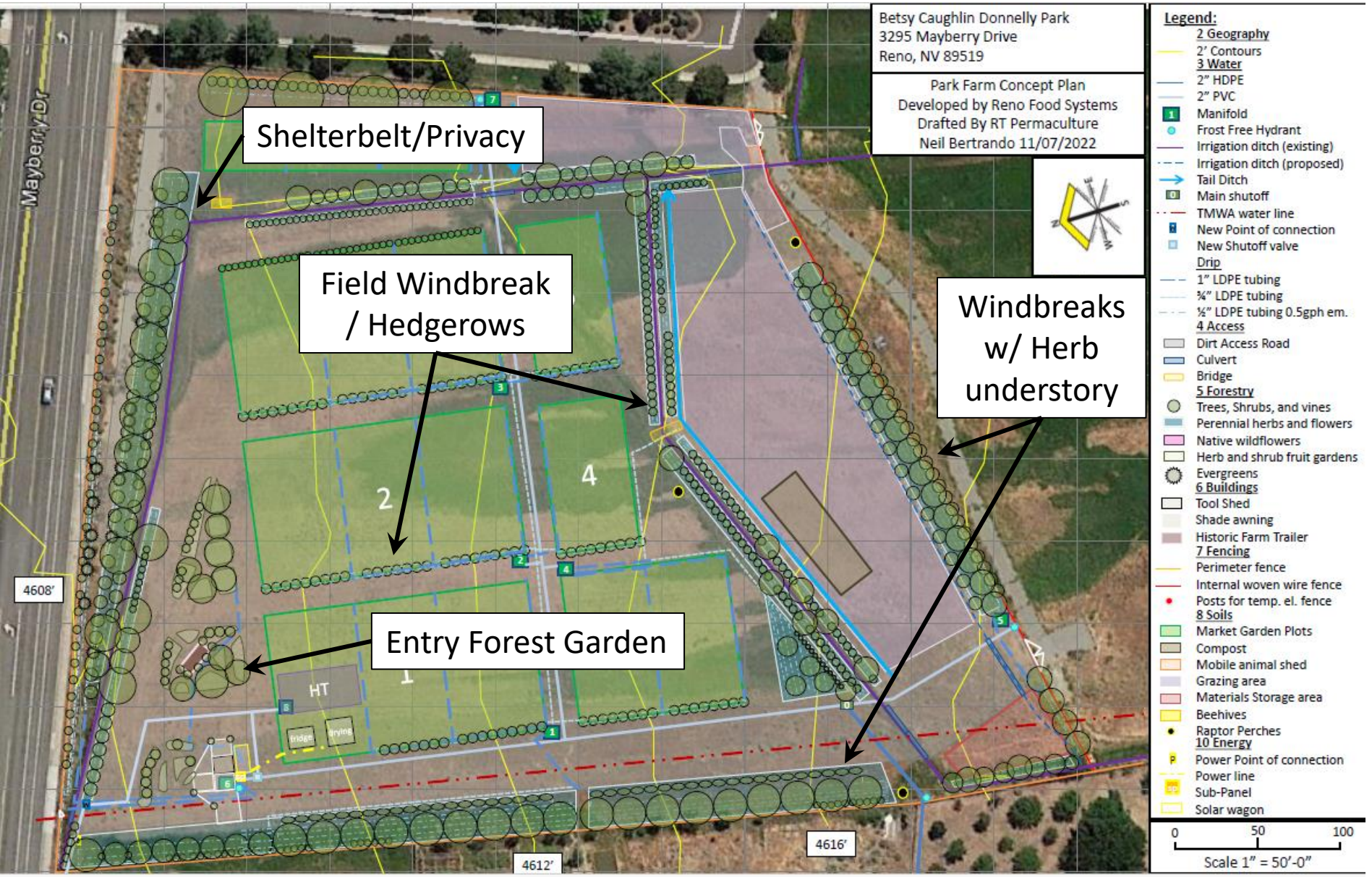
Source: https://www.facebook.com/TaranakiFarm

Source: https://www.facebook.com/groups/Regrarians/photos/

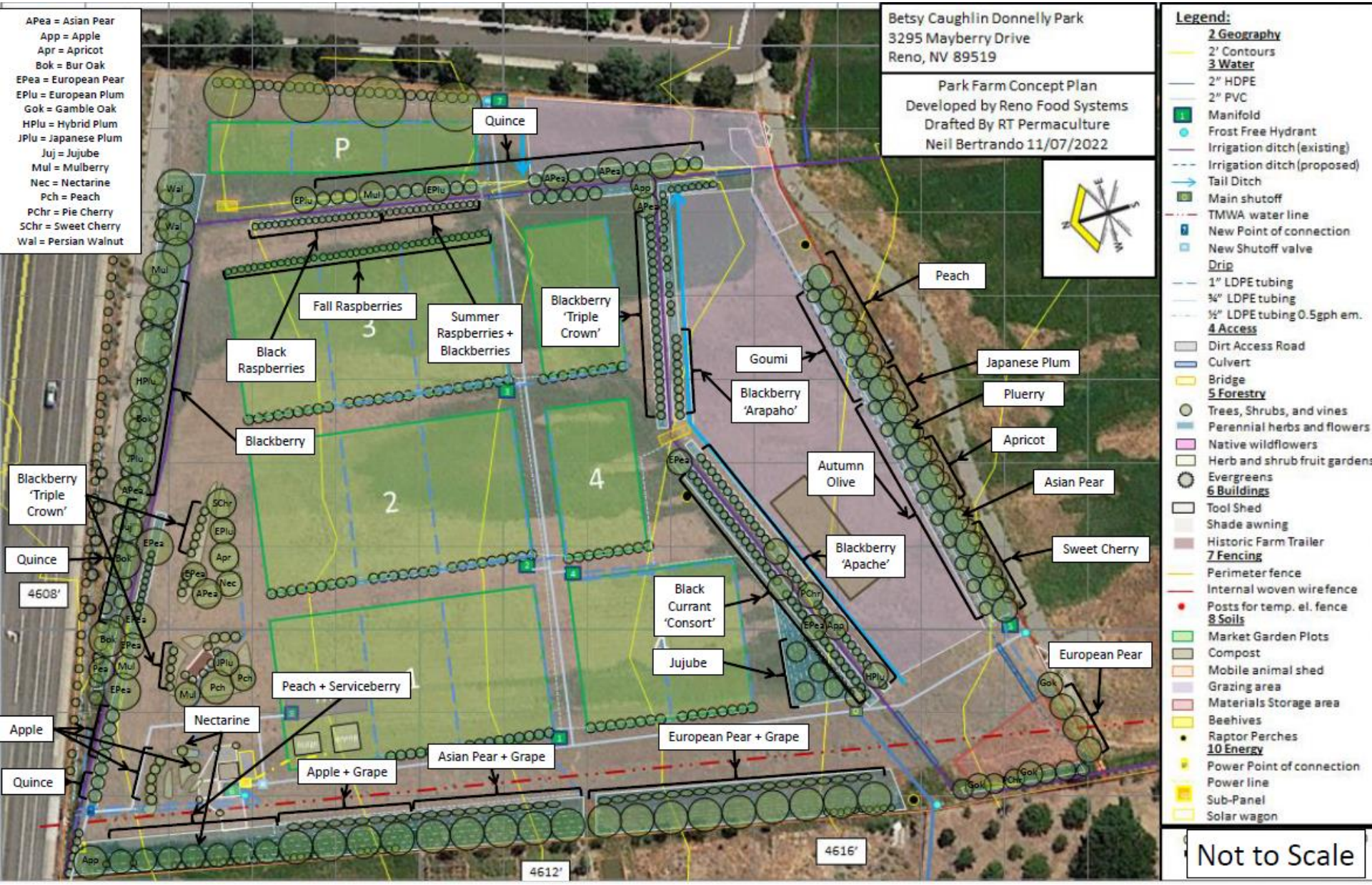
Shade Mobile

Source: https://www.facebook.com/TaranakiFarm

Integrated Design

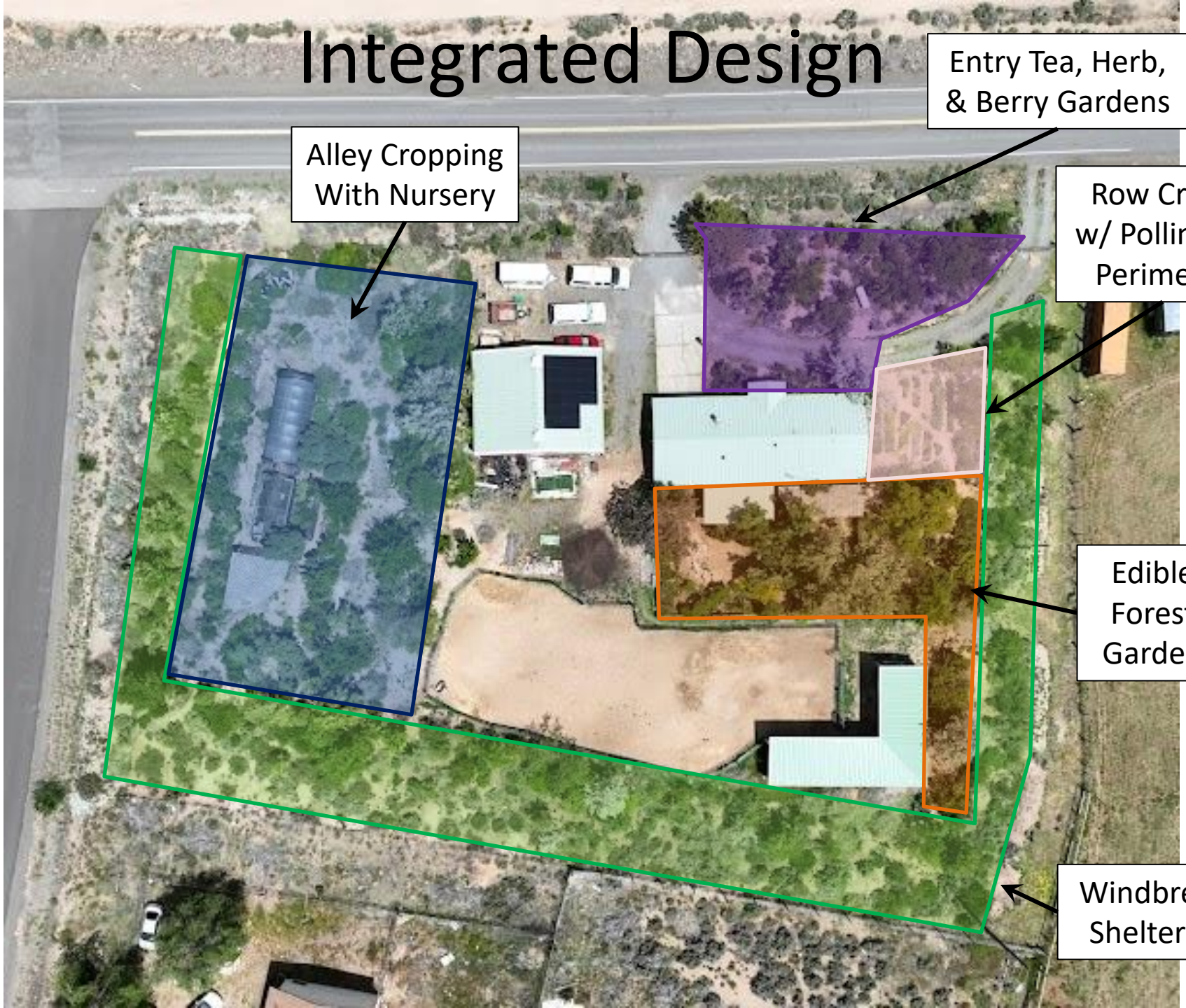


Integrated Design



Integrated Design

Integrated Design



Alley Cropping

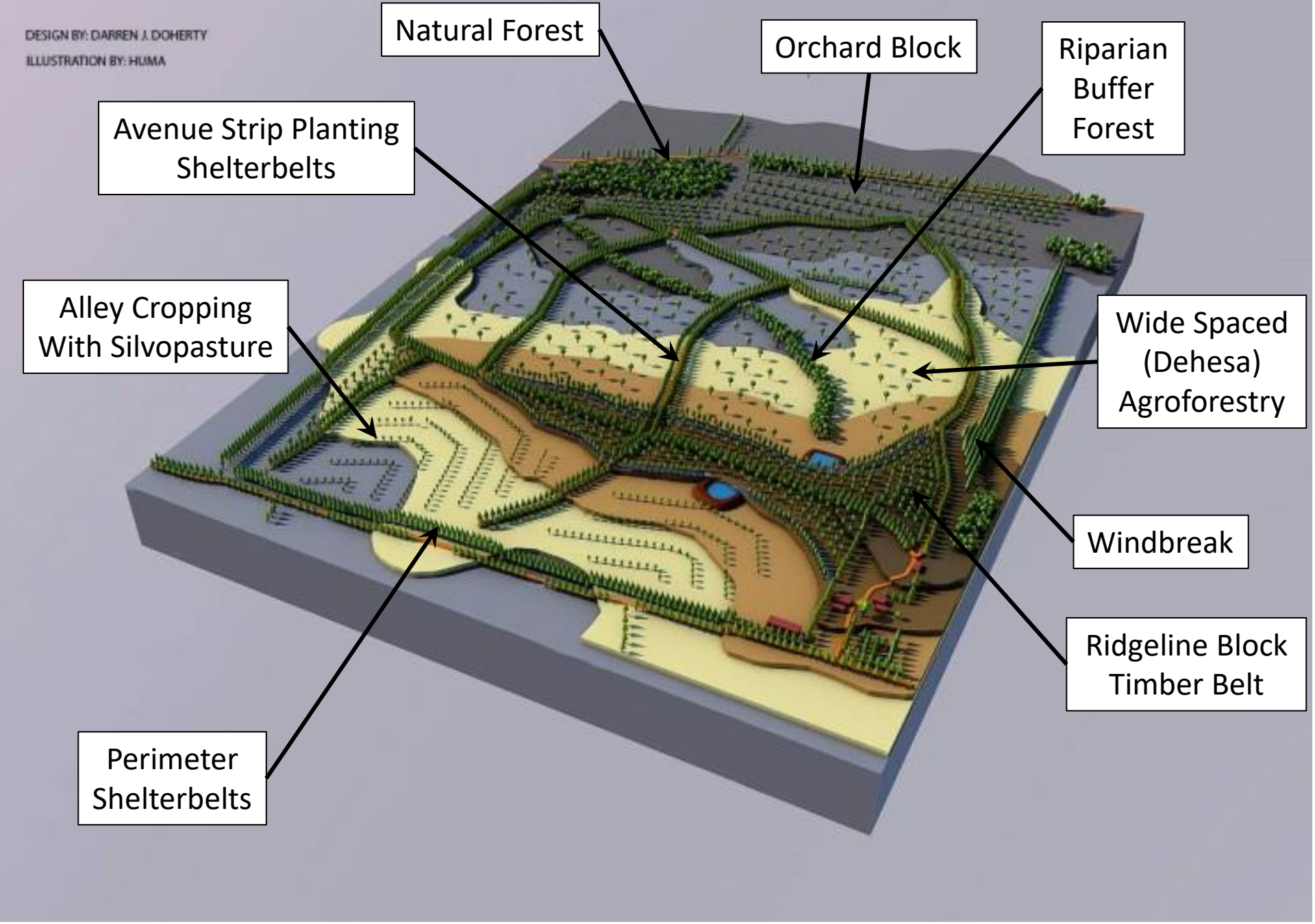
Mark Shepard's Restoration Agriculture Agroforestry System

Source: New Forest Farm
http://www.newforestfarm.net/

Source: New Forest Farm
http://www.newforestfarm.net/


Alley Cropping
New Forest Farm USA
Trees with roots
trimmed regularly
to force
them to dive deep
Perenial
vegetables
ie. asparagas
PermacultureVisions.com

Source: http://thefruitnut.com/home-scale-alley-cropping-trial/
New Forest Farm



Integrated Mainframe design developed by Darren J. Doherty and Georgi Pavlov using Keyline® Design and the Regrarians Platform ®.
Source: http://www.regrarians.org/services/farm-planning/


Avenue Strip Planting Shelterbelts
Timber Block
Riparian Buffer Forest
Natural Forest
Wide Spaced (Dehesa) Agroforestry
Orchard Block
Silvopasture
Alley Cropping With Silvopasture
ORELLA RANCH
1. FARM FORESTRY
2. ORCHARDS
3. SHELTERBELTS
4. REVEGETATION
5. OAKS
6. MARKET GARDEN
7. WATER RETICULATION
8. WATER TANKS
9. FENCES
10. GATES
11. SILVOPASTURE
WOOD PROCESSING/ SAWMILL
QUONSET HUT/ WOOD DRYING BUILDING
FARM STAND
POWER
WELL
WATER TROUGHS
0 FEET 500
REGRARIANS
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Planning and Establishment

- Apply sector and zone planning:
  - consider the sunpaths and wind directions, property and use area boundaries, flows of people and vehicles through the site
  - Identify resource concerns, marginal/underutilized areas, challenges and opportunities
- Assess funding and revenue potential alongside costs of establishment and management (including harvest, marketing, sales, etc)
- Identify and select appropriate systems for diversification
- Start small and build on success

Planning and Establishment

- Plan implementation in phases over several seasons or years and integrate it into your farm planning
- Do an initial layout onsite to clarify understanding of the project
- Organize labor, equipment, and materials, order as needed
- Begin Site preparation appropriate to your plan and site conditions
  - Ensure water/irrigation access for establishment
  - Prepare soil (i.e. tarp, loosen, etc)
  - Build irrigation system
  - Seed cover crop for a season or two if possible and appropriate
  - Grow out or order plant materials
  - Terminate cover crops if necessary (grazing, mowing, tarping, etc)

Sources of Seeds and Plants

FEDCO SEEDS
Garden • Farm • Orchard

NEVADA DIVISION OF FORESTRY
RANGE FOREST WATERSHED PROTECTION

Strictly Medicinal SEEDS

HIGH MOWING Organic Seeds

Peaceful Valley EST. 1976
FARM & GARDEN SUPPLY
WWW.GROWORGANIC.COM

NORTHWOODS NURSERY
Growers of Unique Fruiting Plants Since 1979

ONEGREENWORLD

NATURE'S SEED

CUMMINS NURSERY
"FRUIT TREES FOR EVERYONE."

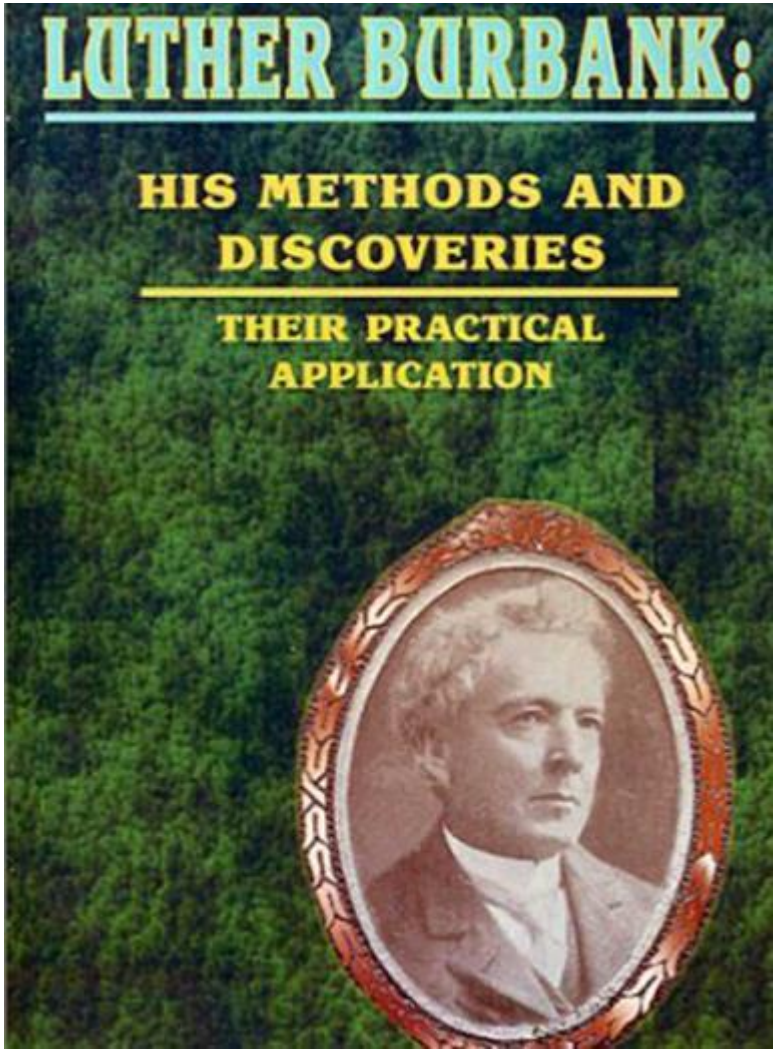
GREENCOVER

Raintree Nursery
fruit trees • nut trees • berries • vines • unusuals • citrus
subtropicals • rootstocks • mushrooms • ornamentals

Schumacher
Tree & Shrub Seeds

Seeds and Mass Breeding

Source:
http://sustainableseedco.com/education/luther-burbank.html



Source:
http://www.rodhandeland.com/Energy%20Food%20Water%20Technology/Food%20Solutions.htm

Planting and Establishment

- Revisit system layout and adjust as needed
- Do initial planting of medium & long term plants
- Protect plants for establishment – Fence or tree wraps/cages as needed
- Build appropriate training and trellising systems
- Manage plants and adjust/maintain irrigation
- Integrate livestock as appropriate

Photo: Neil Bertrando

Photo: Neil Bertrando

Photo: Neil Bertrando

Management and Sales

- Begin marketing and Sales
- Begin harvest, processing, and sales/distribution
- Plan for growth of the system over time
- Accept and respond to feedback
  - Evaluate successes and challenges to identify opportunities for improvement and adjustment
  - Replace plants that die (or decide not to)
  - Observe changes in soils, plant health, insects and pests, wildlife, and other factors

Thank You