Urban Block Design

KATANNING

September 26TH 2015

Terra Perma Design
permaculture education & design

Plan of Attack

- 9:30-11:00
  - Brief introduction to Permaculture (20 mins)
  - What are we hoping for from today? (10 mins)
  - Let's get orientated (30 mins)
  - Mapping our 'natural energies' (Sectors) (30 mins)
- 11:00-11:30 – Morning Tea / Discussion
- 11:30-1:00
  - Mapping our use of spaces (Pathways) (20 mins)
  - Breaking our garden space into similar spaces (10 mins)
  - Envisage your perfect yard (20 mins)
  - TP recap of key elements (objects) (20 mins)
  - What to put where and why (20 mins)
- LUNCH – 30mins….
- 1:30-4:00
  - Questions on the morning's topics? (20 mins)
  - Change – short term vs long term (20 mins)
  - OPTIONS: (60 mins)
    - More helpful information - Soil (options, tests, remedies), Reticulation, tree centric design, pest, predators and habitat.

    OR
    - Mentoring individual design
  - Revisit Permaculture Principles as Checklist (20 mins)
  - Q&A and afternoon tea (30 mins)

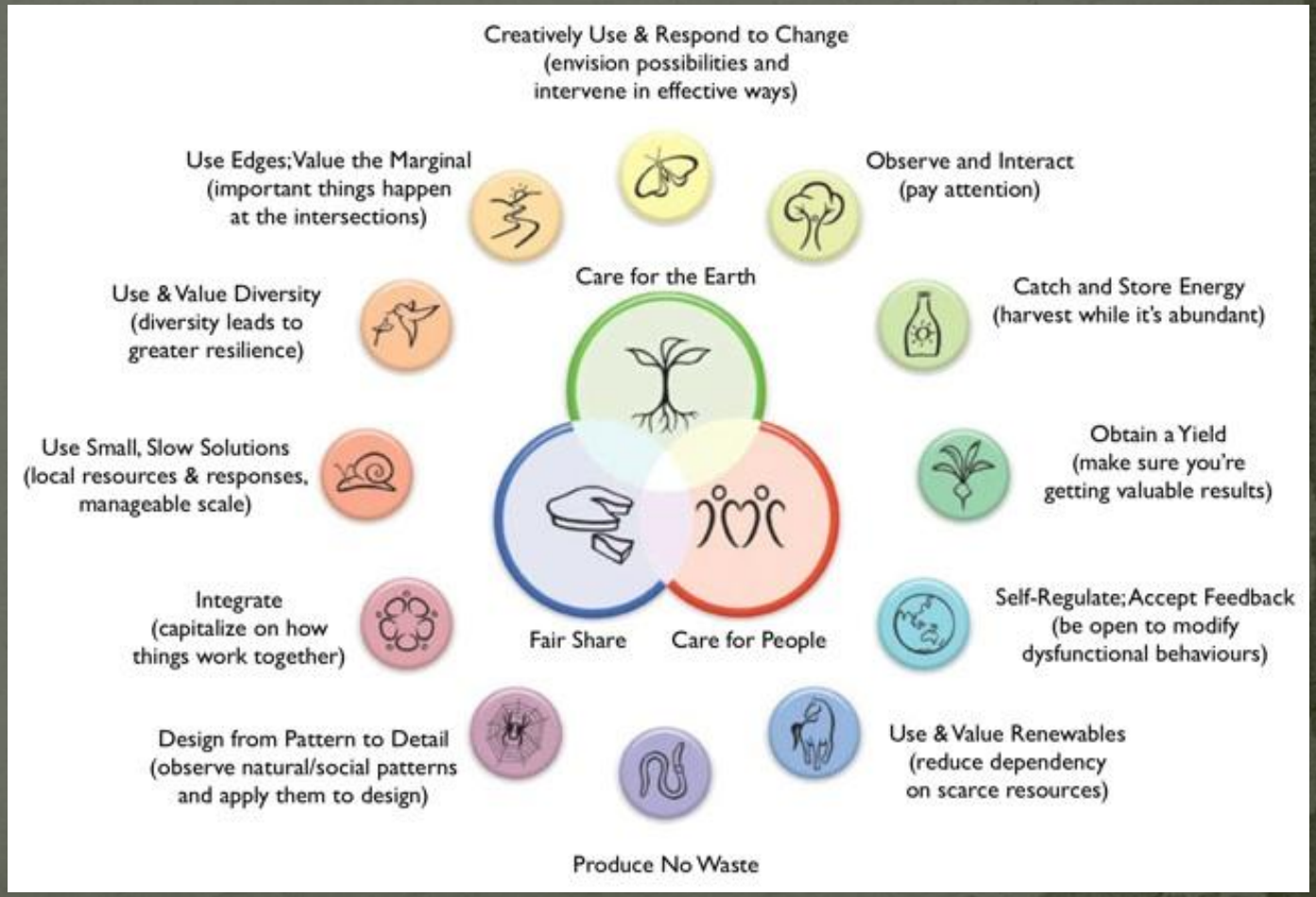
Introduction to Permaculture

Introduction to Permaculture

- Permaculture Ethics
  - Care for Earth
  - Care for People
  - Fair Share

Introduction to Permaculture

- Permaculture Ethics
- Permaculture Principles



Introduction to Permaculture

- Permaculture design deliberately works with and using nature's tried and tested methods to limit the long term work we need to put into a successful system.

- While nature will always be the master at developing complex living systems resilient to WA's harsh conditions, to create a Permaculture Design we must provide a skeleton that guides the system to meet our needs, but which allows for nature to then flesh it out.

What are we hoping for from today?

Workshop Goals?

Mind Map Objectives/Queries/Concerns

WHITEBOARD


HOPES FOR TODAY
Bare Bones Plan
Companion Planting
Drylands options
Chickens
Nutrient/Mineral Management
Crop Rotation
Dead Soil
Plant Species
Undesirable Uses
Dogs eating retic
Dealing with compacted Soil. Clay.
Killing Kikuyu Couch
Water sources use/Audits
Stray Cats
Garden Layout

Let's get Orientated

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- Mapping your Space – Review our Property Plans
  - FIRST
    - North
    - Scale confirmation
    - Existing permanent structures – house, power lines….
    - Hardscapes – Pathways, Driveways, Road

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  - SECOND
    - Desired retained structures - shed
    - Existing Trees (+ ~ht)
    - Shade producers.

Orientation

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    - Shade producers.
    - WHITEBOARD - example

Let's get Orientated

- Your Turn – we'll help, group activity
  - FIRST
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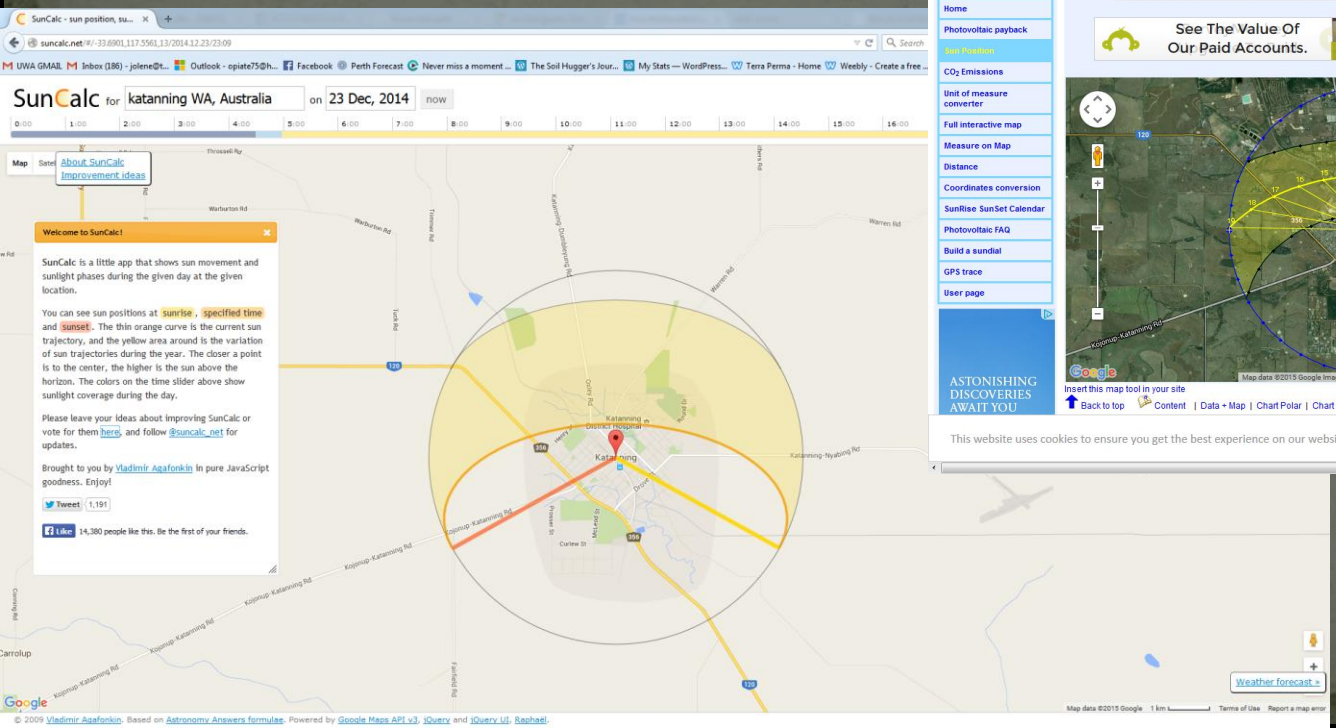
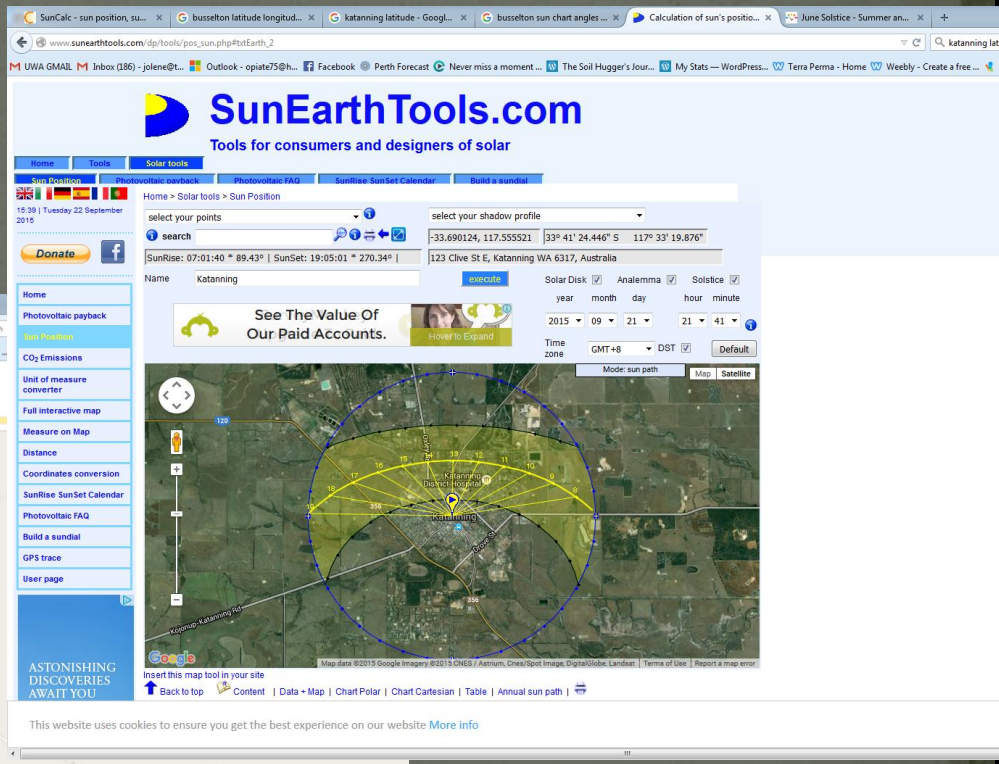
    - Significant Shade producers.

Mapping our ‘natural energies’ (Sectors)

Sectors

- Sun (Summer Vs Winter)
  - 33.6908° S, 117.5553° E





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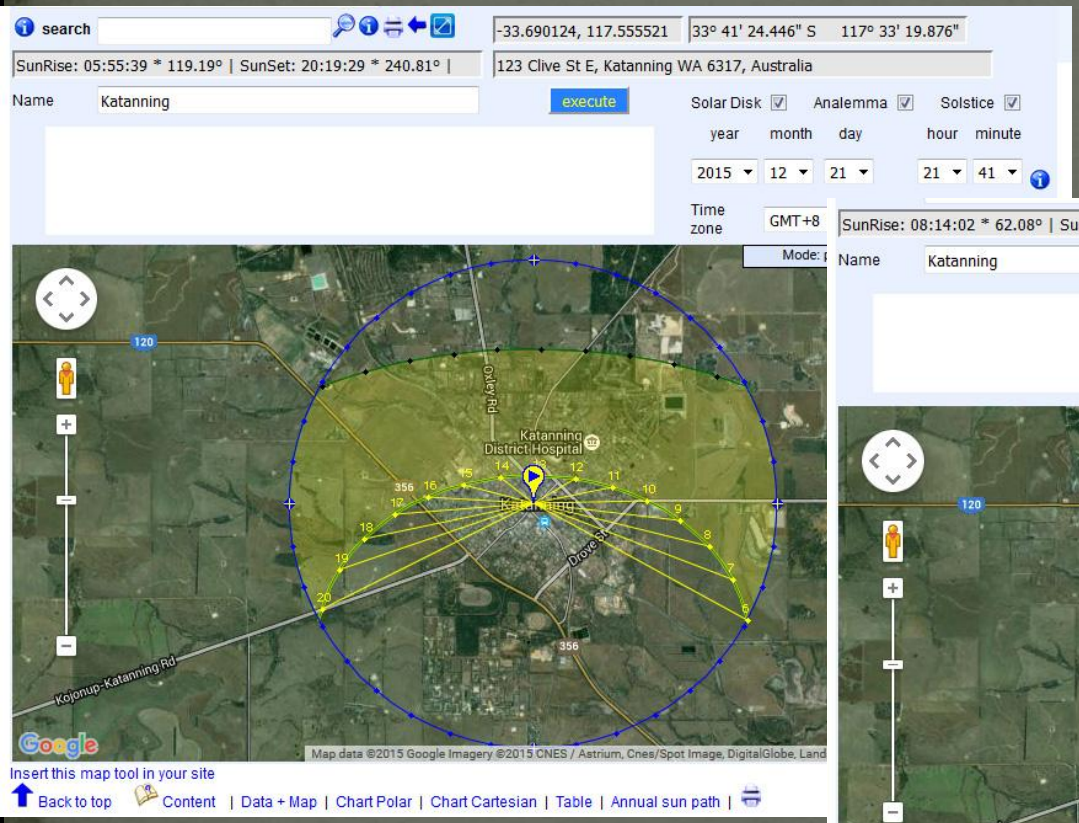

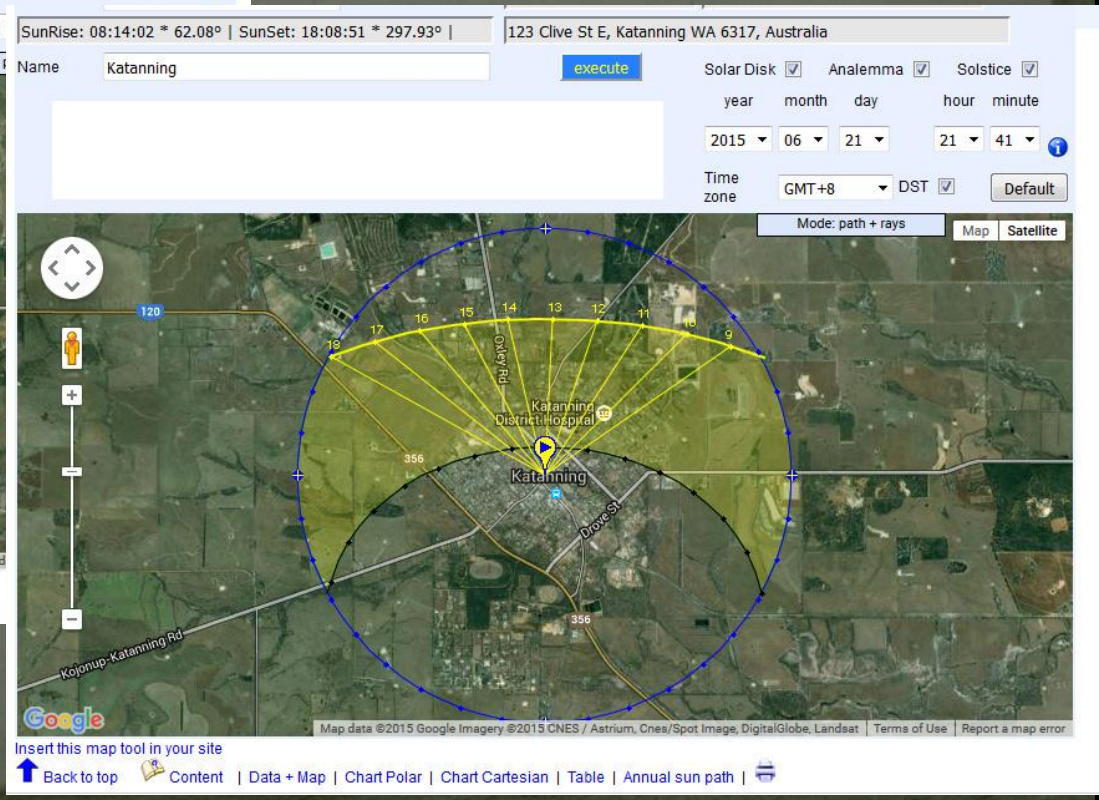

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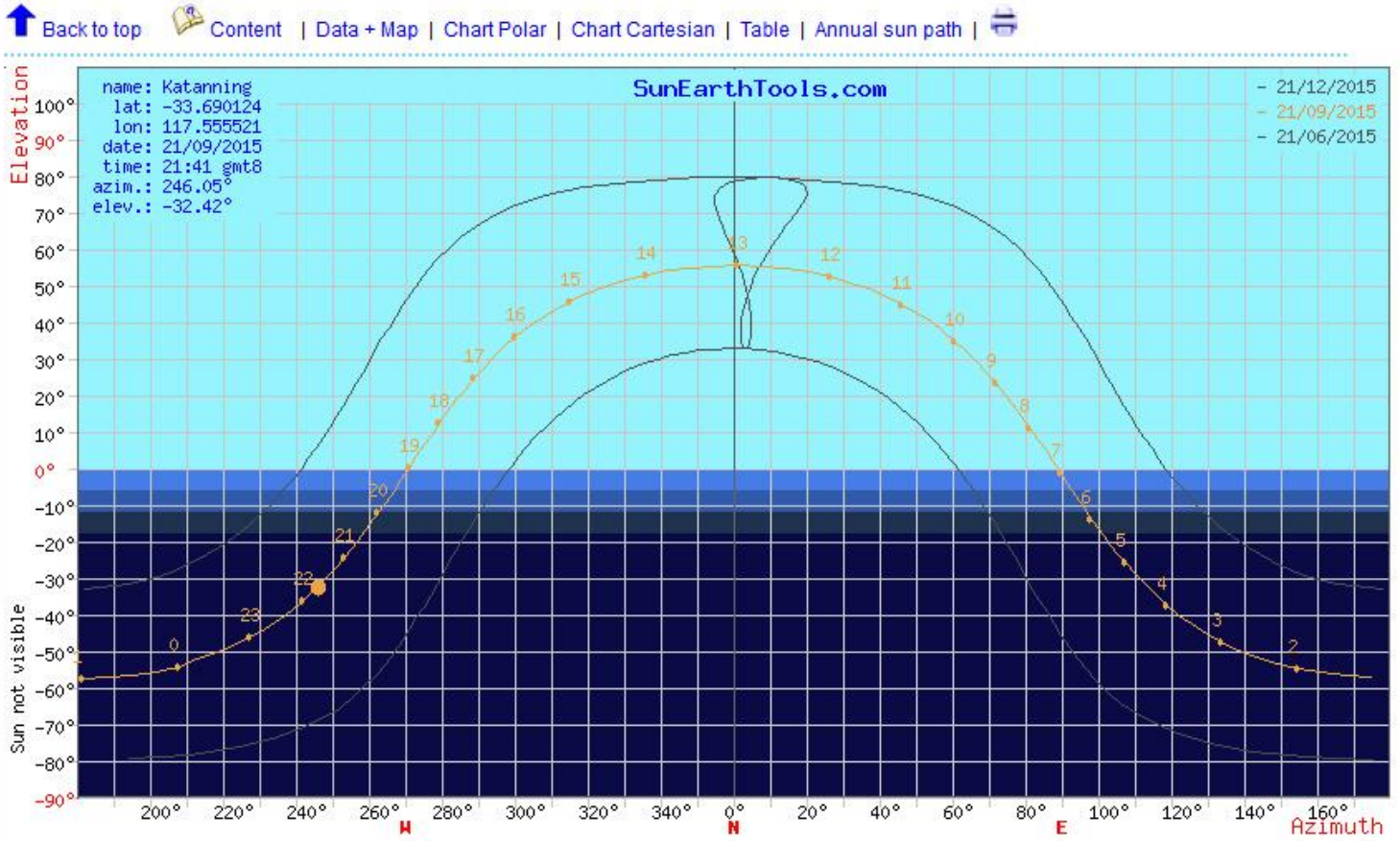
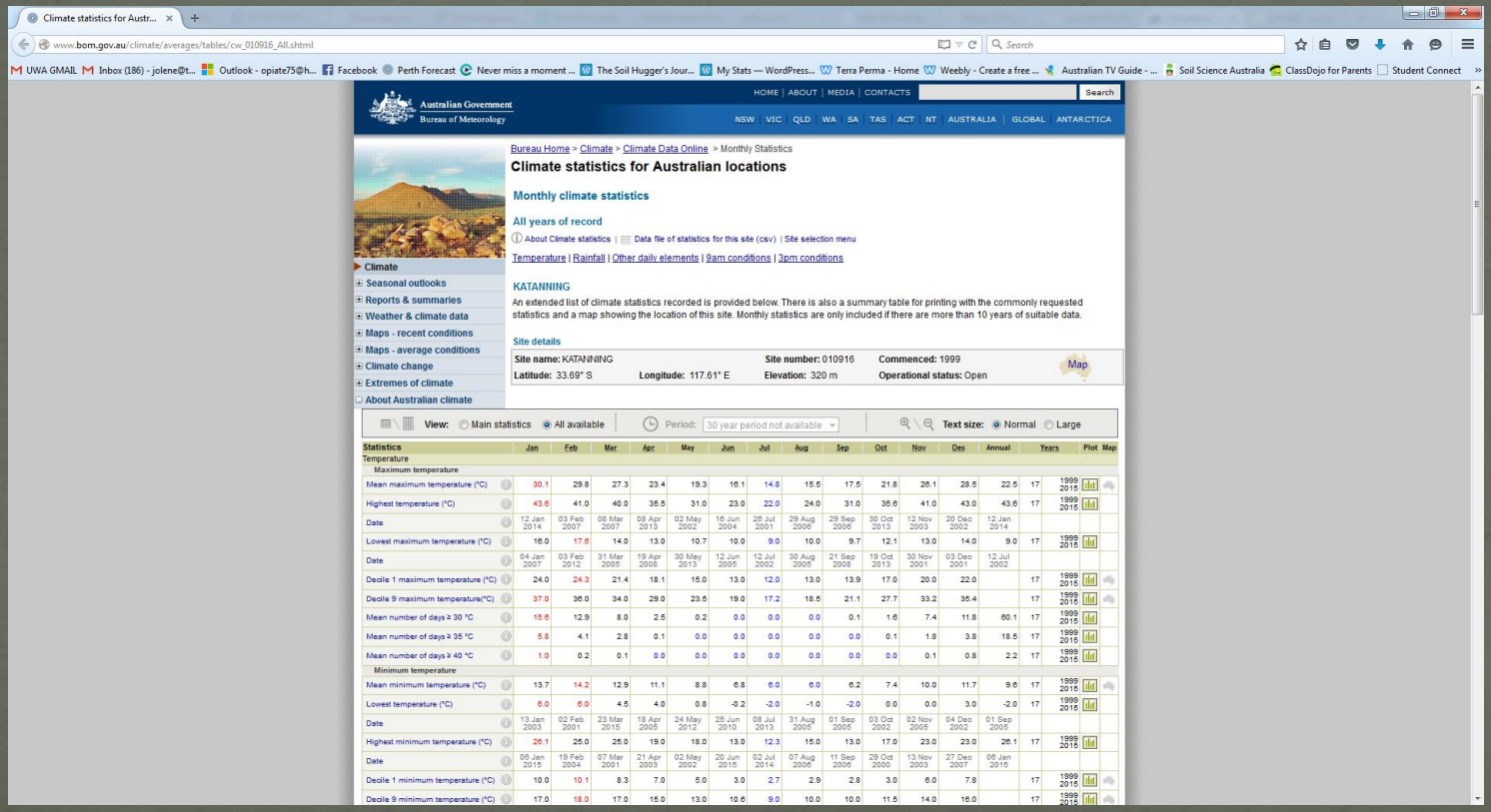


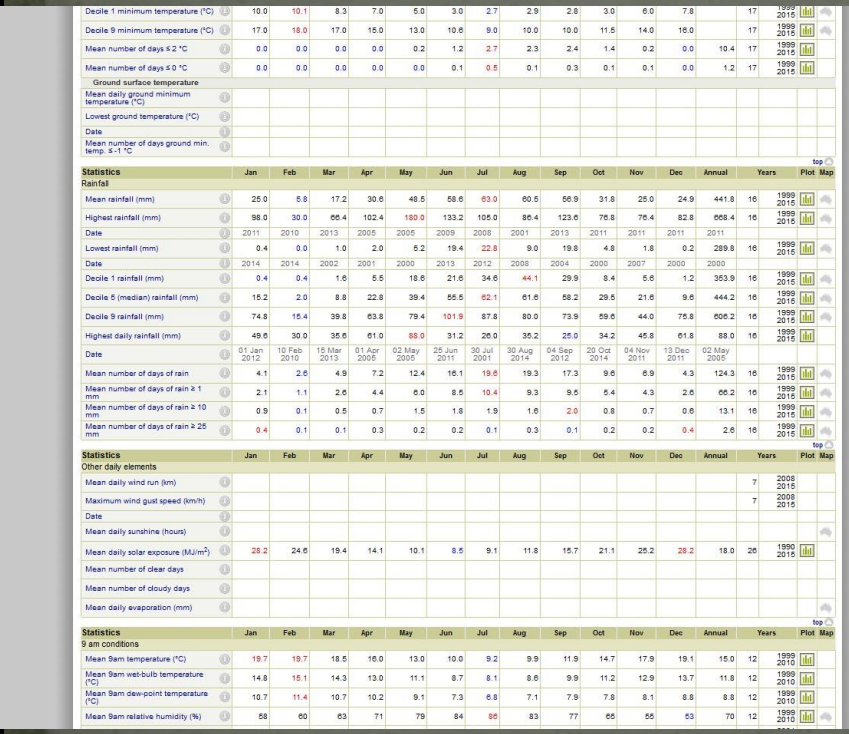
Sectors

- Sun (Summer Vs Winter)
- Water (Summer Vs Winter) – Rainfall, other water sources indicate importance.



Sectors

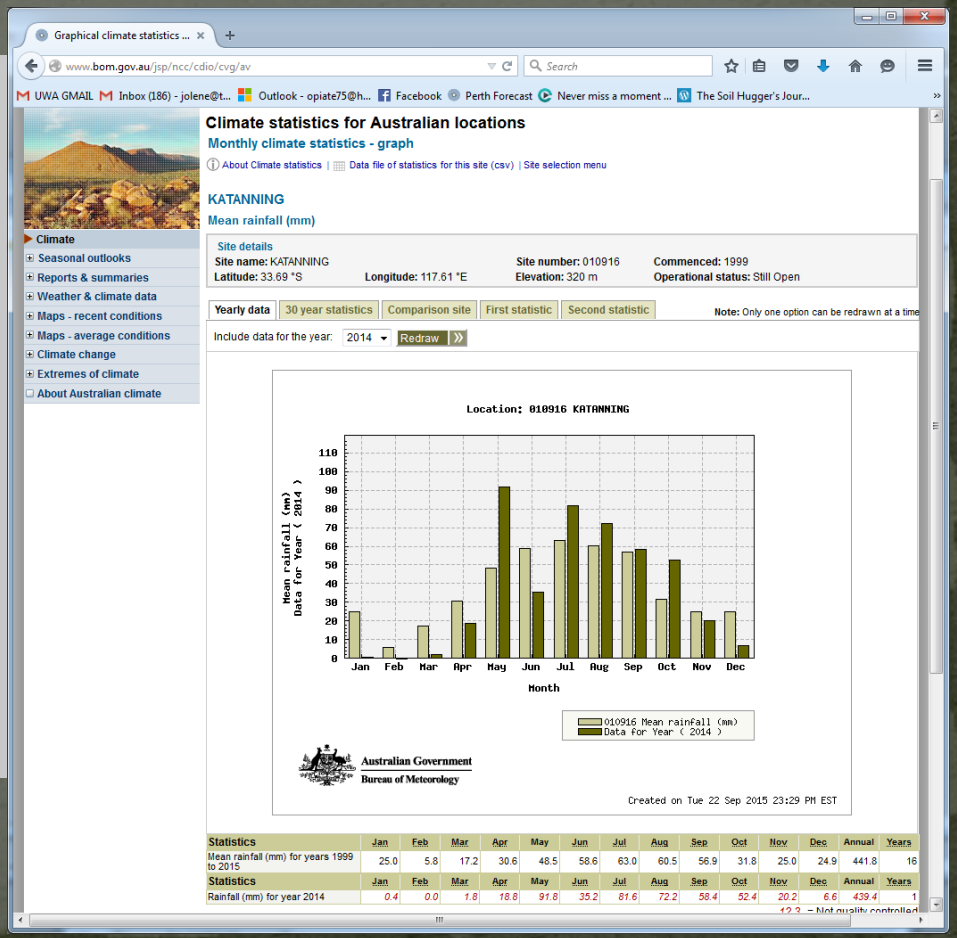
- Sun (Summer Vs Winter)
- Water (Summer Vs Winter) – frequent light showers, infrequent heavy downfall, long dry periods….?



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Rainfall														
Mean rainfall (mm)	25.0	5.8	17.2	30.6	48.5	58.6	63.0	60.5	56.9	31.8	25.0	24.9	441.8	16
Highest rainfall (mm)	98.0	30.0	66.4	102.4	180.0	133.2	105.0	86.4	123.6	76.8	76.4	82.8	668.4	16
Date	2011	2010	2013	2005	2005	2009	2008	2001	2013	2011	2011	2011	2011	
Lowest rainfall (mm)	0.4	0.0	1.0	2.0	5.2	19.4	22.8	9.0	19.8	4.8	1.8	0.2	289.8	16
Date	2014	2014	2002	2001	2000	2013	2012	2008	2004	2000	2007	2000	2000	
Decile 1 rainfall (mm)	0.4	0.4	1.6	5.5	18.6	21.6	34.6	44.1	29.9	8.4	5.6	1.2	353.9	16
Decile 5 (median) rainfall (mm)	15.2	2.0	8.8	22.8	39.4	55.6	62.1	61.6	58.2	29.5	21.6	9.6	444.2	16
Decile 9 rainfall (mm)	74.8	15.4	39.8	63.8	79.4	101.9	87.8	80.0	73.9	59.6	44.0	75.8	606.2	16
Highest daily rainfall (mm)	49.6	30.0	35.6	61.0	88.0	31.2	26.0	35.2	25.0	34.2	45.8	61.8	88.0	16
Date	01 Jan 2012	10 Feb 2010	15 Mar 2013	01 Apr 2005	02 May 2005	25 Jun 2011	30 Jul 2001	30 Aug 2014	04 Sep 2012	20 Oct 2014	04 Nov 2011	13 Dec 2011	02 May 2005	
Mean number of days of rain	4.1	2.6	4.9	7.2	12.4	16.1	19.6	19.3	17.3	9.6	6.9	4.3	124.3	16
Mean number of days of rain ≥ 1 mm	2.1	1.1	2.6	4.4	6.0	8.5	10.4	9.3	9.5	5.4	4.3	2.6	66.2	16
Mean number of days of rain ≥ 10 mm	0.9	0.1	0.5	0.7	1.5	1.8	1.9	1.6	2.0	0.8	0.7	0.6	13.1	16
Mean number of days of rain ≥ 25 mm	0.4	0.1	0.1	0.3	0.2	0.2	0.1	0.3	0.1	0.2	0.2	0.4	2.6	16

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Other daily elements														
Mean daily wind run (km)														7
Maximum wind gust speed (km/h)														7
Date														
Mean daily sunshine (hours)														
Mean daily solar exposure (MJ/m²)	28.2	24.6	19.4	14.1	10.1	8.5	9.1	11.8	15.7	21.1	25.2	28.2	18.0	26
Mean number of clear days														
Mean number of cloudy days														
Mean daily evaporation (mm)														

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
9 am conditions														
Mean 9am temperature (°C)	19.7	19.7	18.5	16.0	13.0	10.0	9.2	9.9	11.9	14.7	17.9	19.1	15.0	12
Mean 9am wet-bulb temperature (°C)	14.8	15.1	14.3	13.0	11.1	8.7	8.1	8.6	9.9	11.2	12.9	13.7	11.8	12
Mean 9am dew-point temperature (°C)	10.7	11.4	10.7	10.2	9.1	7.3	6.8	7.1	7.9	7.8	8.1	8.8	8.8	12
Mean 9am relative humidity (%)	58	60	63	71	79	84	86	83	77	65	56	53	70	12



Sectors

- Sun (Summer Vs Winter)
- Water (Summer Vs Winter)
- Wind (Summer Cooling Vs Winter Storms)
  - Location, strength and orientation specific

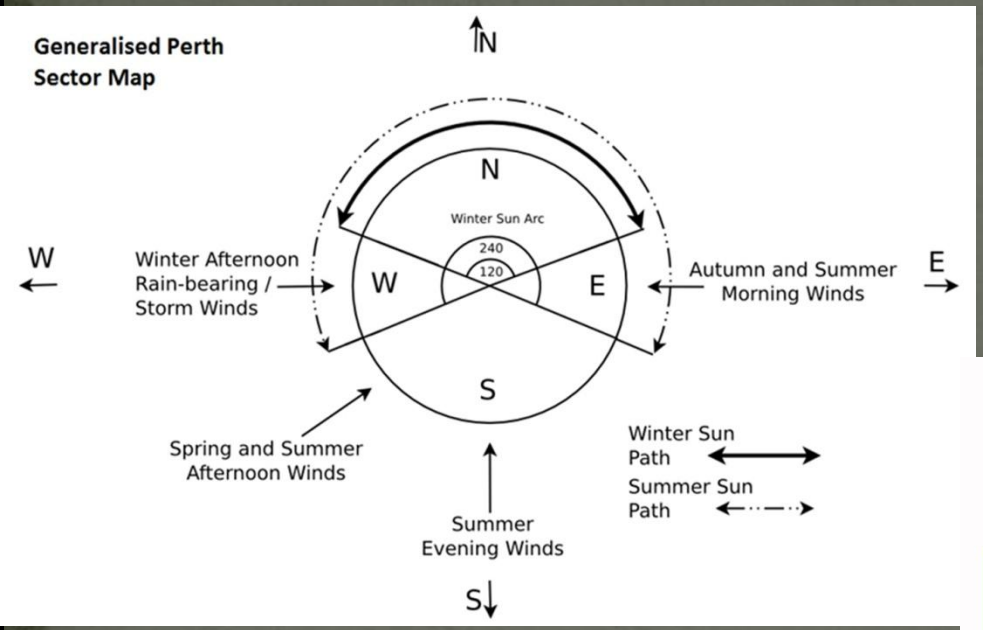
Sectors

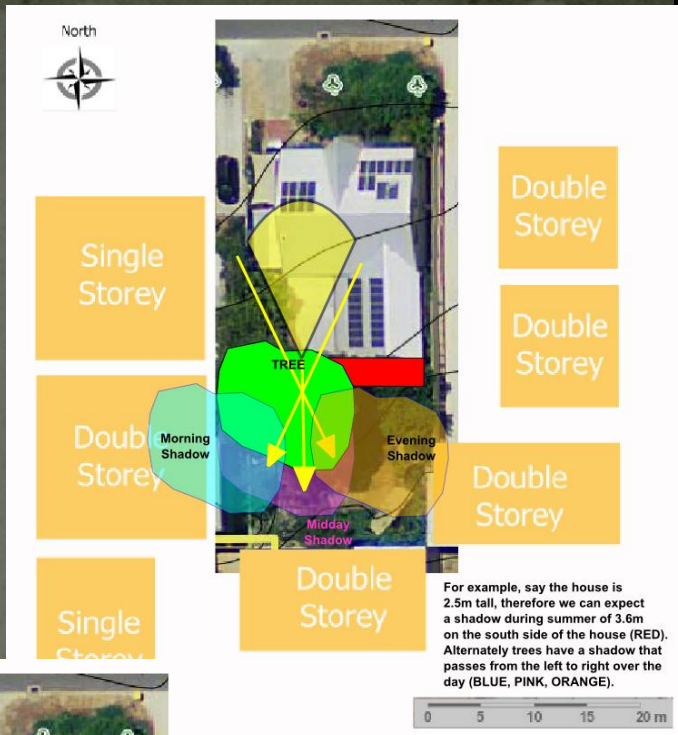
- Sun (Summer Vs Winter)
- Water (Summer Vs Winter)
- Wind (Summer Cooling Vs Winter Storms)
- Other
  - Noise,
  - View (Desirable vs Not so Desirable),
  - Wildlife corridor*
  - Fire front*

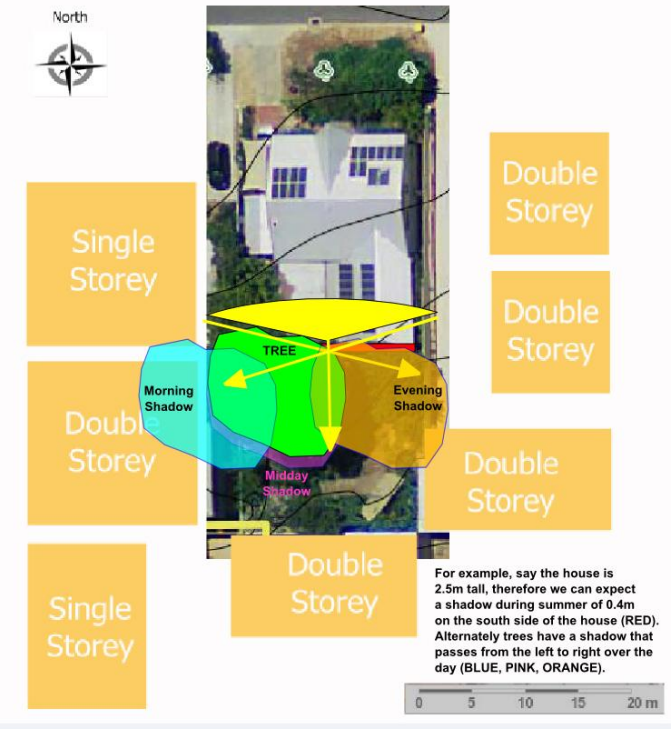
*Less likely influence in Urban Design

Sectors

- Some options for Drawing Sectors.....

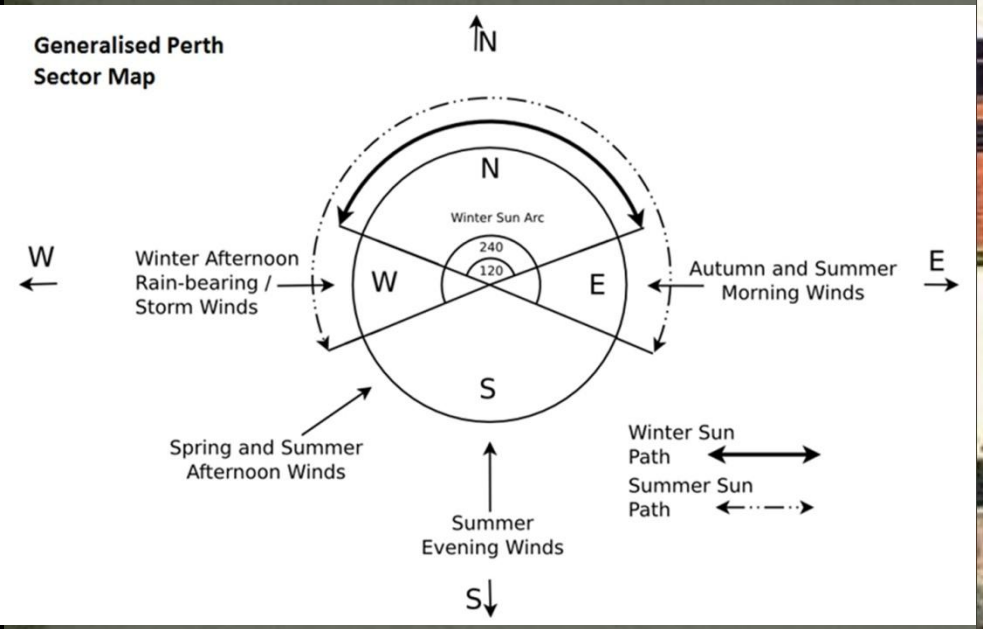


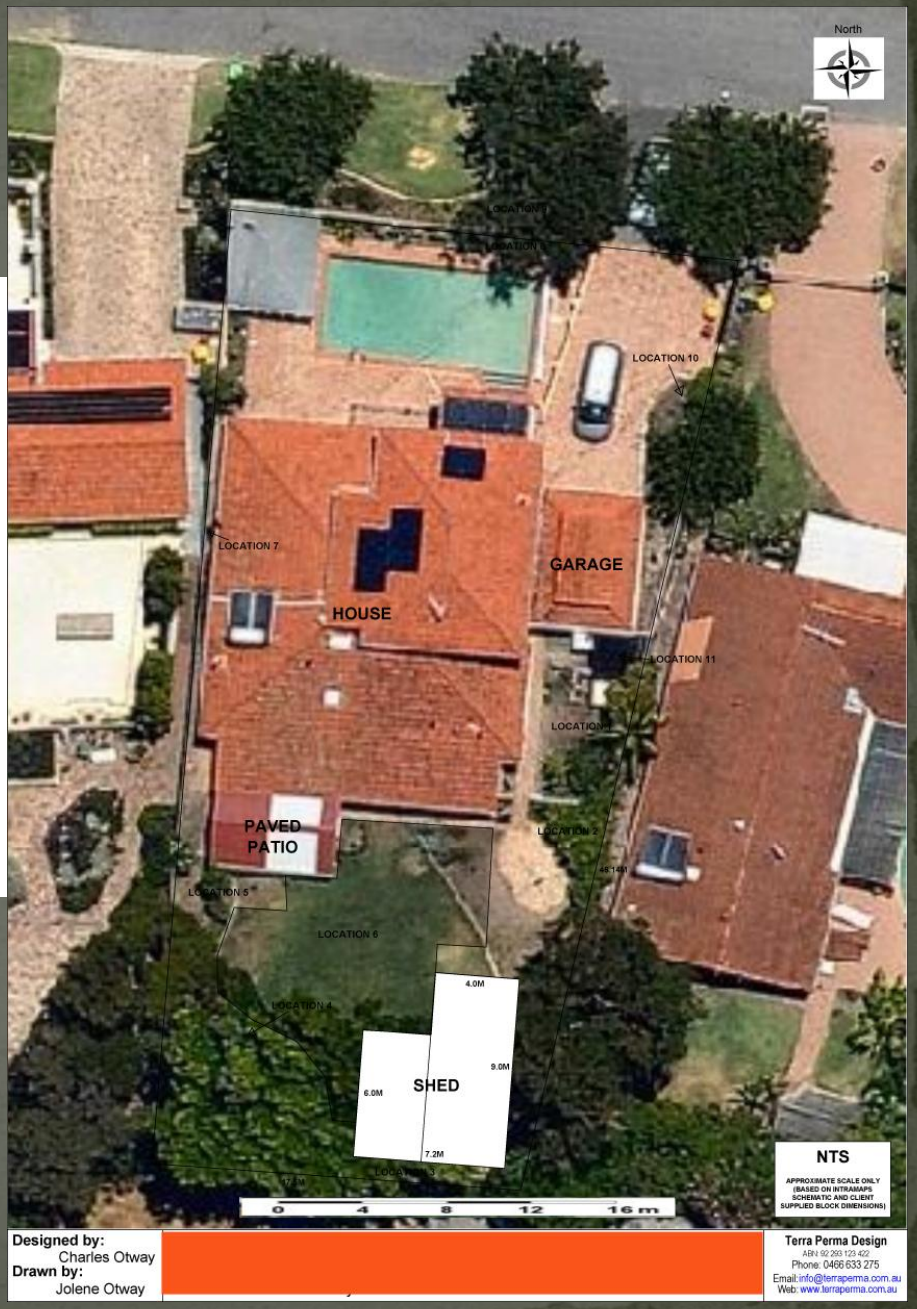




Sectors

- WHITEBOARD - example





Sectors

- Your Turn – we'll help, group activity
- SUN - Map the daily change in Summer of sunny and shady areas
- Sun is both the energy source of life and the destroyer.
  - Morning summer sun (good for plants)
  - Morning summer shade (ok for plants)
  - Midday summer sun (bad for plants)
  - Midday summer shade (good for plants)
  - Afternoon summer sun (bad for plants)
  - Afternoon summer shade (good for plants)

Sectors

- Now consider daily change of Winter sunny and shady areas
  - Morning winter sun (good for plants)
  - Morning winter shade (bad for plants)
  - Midday winter sun (good for plants)
  - Midday winter shade (bad for plants)
  - Afternoon winter sun (good for plants)
  - Afternoon winter shade (bad for plants)
- These daily and seasonal niches are naturally better or worse for different functions, activities and items in the garden (the example given is for an 'average' plant).
- Working with or at least designing for these characteristics is eco-logical design.

Sectors

- Sun (Summer Vs Winter)
- We've done the Sun, what about the others….
  - Water (Summer Vs Winter)
  - Wind (Summer Cooling Vs Winter Storms)
  - Other
    - Noise,
    - View (Desirable vs Not so Desirable),
    - Wildlife corridor*
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MORNING TEA

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- LUNCH – 30mins….
- 1:30-4:00
  - Questions on the morning's topics? (20 mins)
  - Change – short term vs long term (20 mins)
  - OPTIONS: (60 mins)
    - Staging of attack – setting up for success, Soil (options, tests, remedies), Reticulation considerations, cycles of systems (nutrient, water, seeds to trees, pests/predator….)

    OR
    - Mentoring individual design
  - Revisit Permaculture Principles as Checklist (20 mins)
  - Q&A and afternoon tea (30 mins)

Mapping Pathways

Pathways

- Mapping Pathways and Access
  - NOTE : Gardening is most peoples hobby, not habit.

  - So first we look at the path taken to and from work, school kids delivery or your daily destination (i.e. even if busy).

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  - The pattern you are mapping highlights the frequently accessed spaces.
- Putting things that need frequent attention in arms length of these paths is good design.
- People will always get busy at times - an inherently easy design will survive, poor design will fail.

Pathways

- Mapping Pathways and Access
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  - Let's now consider less frequent paths – what might they be?
    - Every Day – Done
    - 2-3 times per week
    - Weekly
    - Monthly
    - Never

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- Bear in mind for future reference that habitual pathways can change – every so often take time to note your pathways and consider its impact on your evolving design.
  (e.g. adding chooks, switching to electronic bills rather than mail....)

Grouping Areas
(of similar characteristics / function / need)

Grouping Areas

- Similar Sector patterns
- Similar Frequency of access
- Similar Needs items can be placed in these locations

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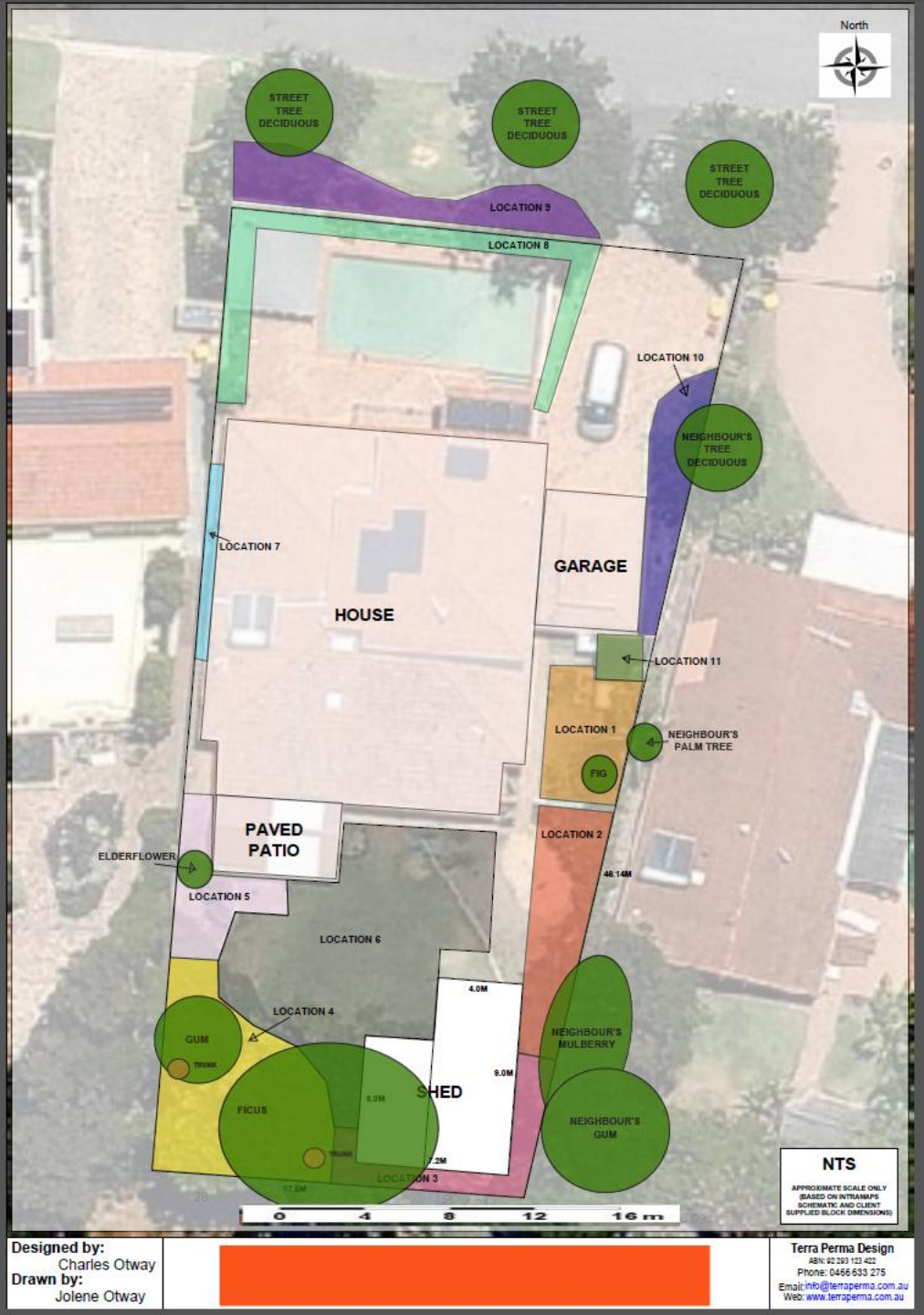

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- Your Turn – we'll help, group activity

Patterns Define Design

Nature's Patterns Vs Our Patterns

- By acknowledging several patterns acting on our yard, we've identified:
  - how we can see the difference between areas of Nature's energy versus her wrath,
  - whilst minimising our daily effort and chance of failure by fitting into existing routines.

Envisage Your Perfect Yard

Mind Mapping - What Will be in it?

Needs / Wants / Dreams

WHITEBOARD

Elements

- Things in a Permaculture Design are called Elements.
- Any design will have a number of fixed elements that we can't or won't be moving. We mapped these earlier on
  - Existing permanent structures – house, power lines….
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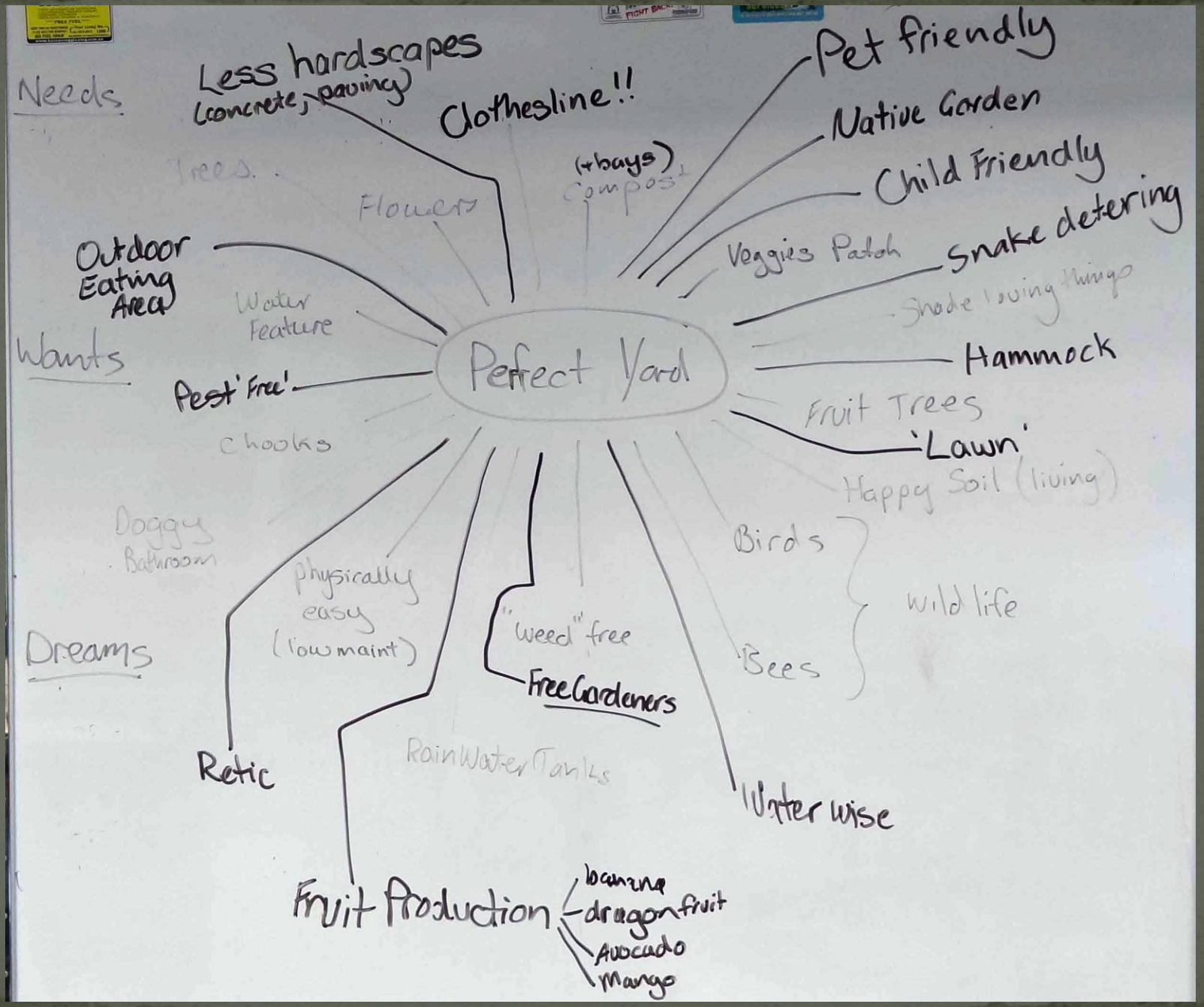
  - Significant Shade producers.
- We've now brainstormed a communal element wish list for the Perfect yard.
- Good backyard design also has a list of recommended best bang for buck elements which we'll now explore in more detail.


Needs
Less hardscapes
(concrete, paving)
Clothesline!!
Pet friendly
Native Garden
Child Friendly
Snake detering
Trees
Flowers
(+bays)
Compost
Outdoor Eating Area
Water Feature
Veggies Patch
Shade loving things
Wants
Perfect Yard
Hammock
'Pest' Free'
Chooks
Fruit Trees
'Lawn'
Happy Soil (living)
Doggy Bathroom
Birds
Bees
wild life
physically easy (low maint)
"weed" free
Free Gardeners
Dreams
Retic
Rain Water Tanks
Water wise
Fruit Production
banana
dragon fruit
Avocado
mango

TP Key Elements for Starting Your Urban Garden

Trees:

- weeds/plant evolution,

- stacking, annual /perennial

- trees for trees

-all benefits

Starting Your Urban Garden

Trees:

- weeds/plant evolution,
- stacking, annual /perennial
- trees for trees
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Ponds

-Habitat
-Edibles
-Water

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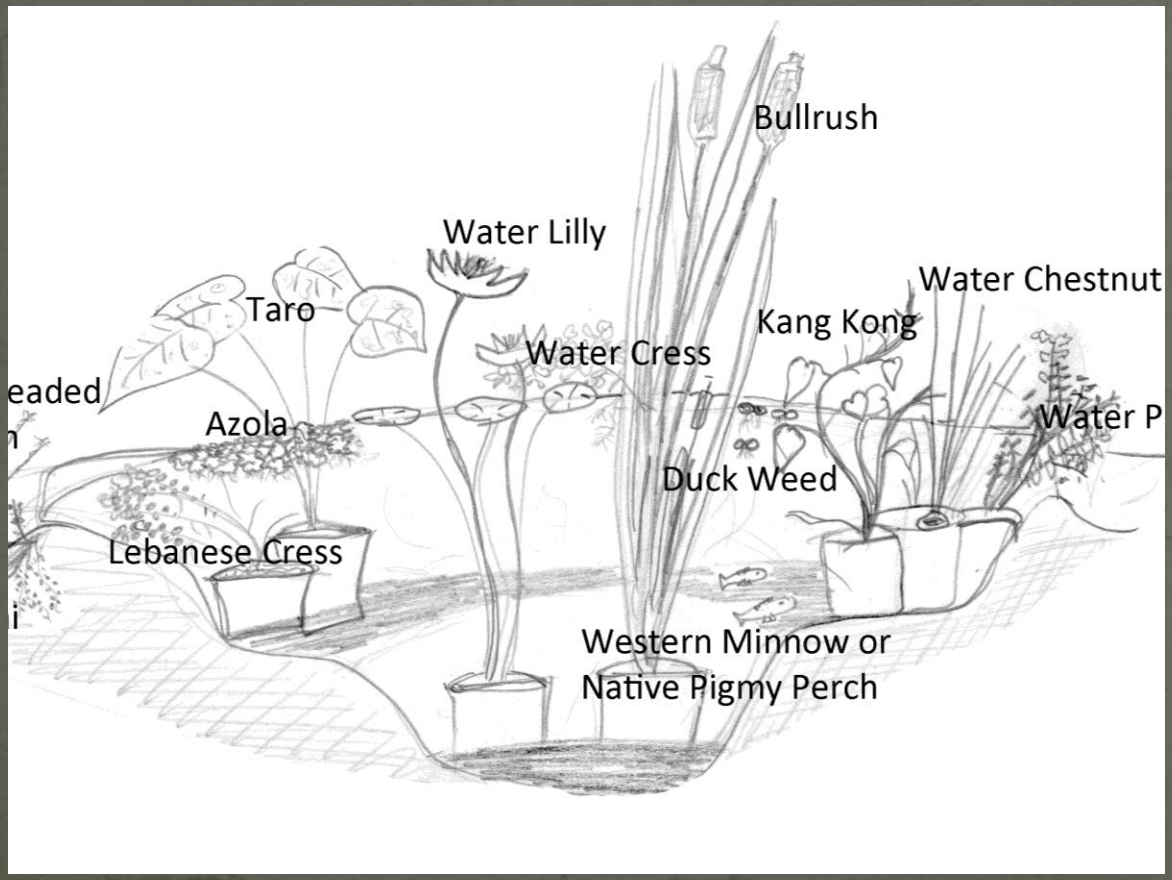

Missing from this picture is all the of the unseen natural elements, dragon fly breeding, wasp drinking, frogs/ tadpoles, birds drinking.....

Starting Your Urban Garden

Trees:
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Ponds
-Habitat
-Edibles
-Water

Nutrient Cycling Systems
-Animals
-Compost
-Mulch

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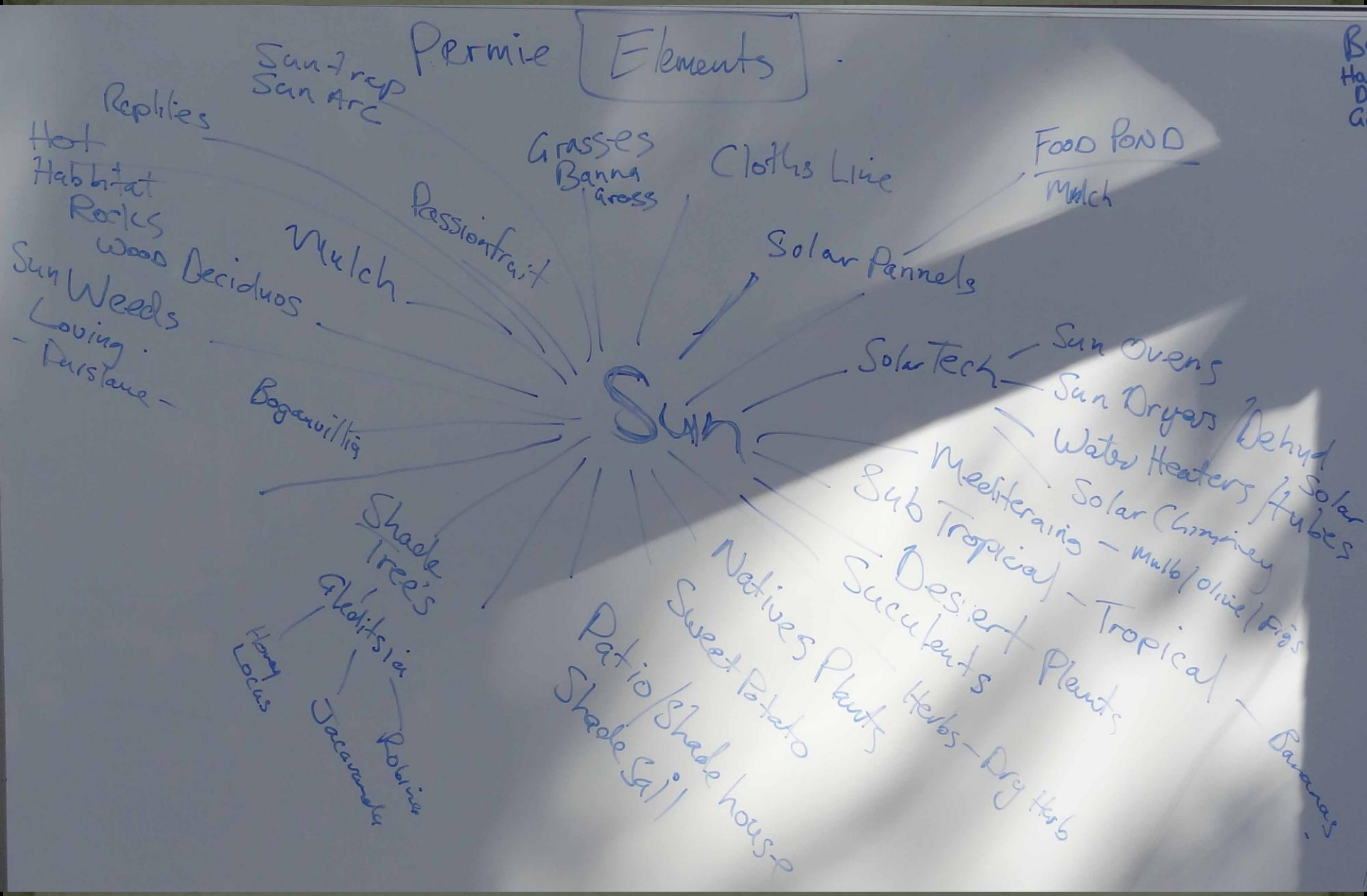
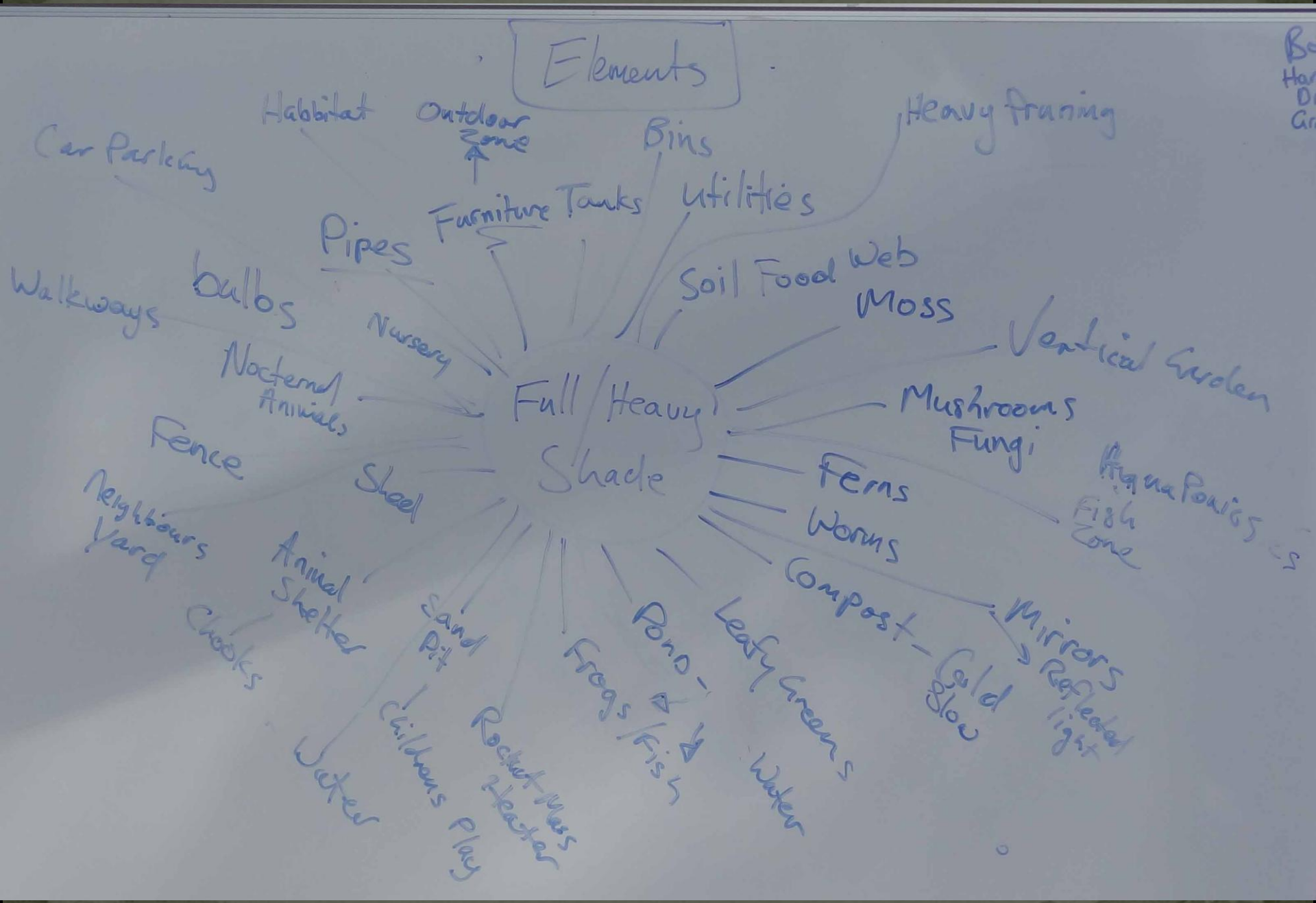
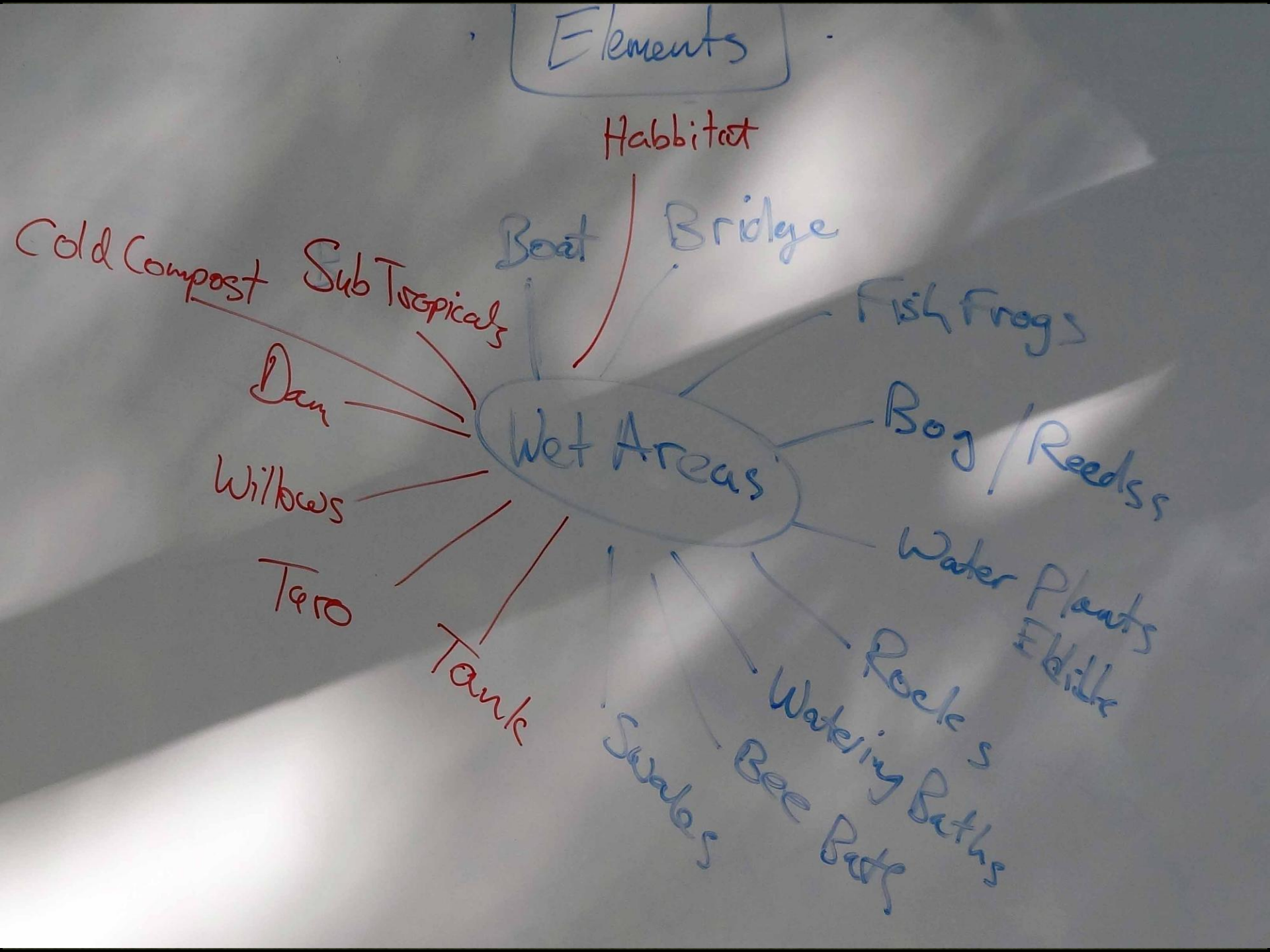
Ponds
-Habitat
-Edibles
-Water

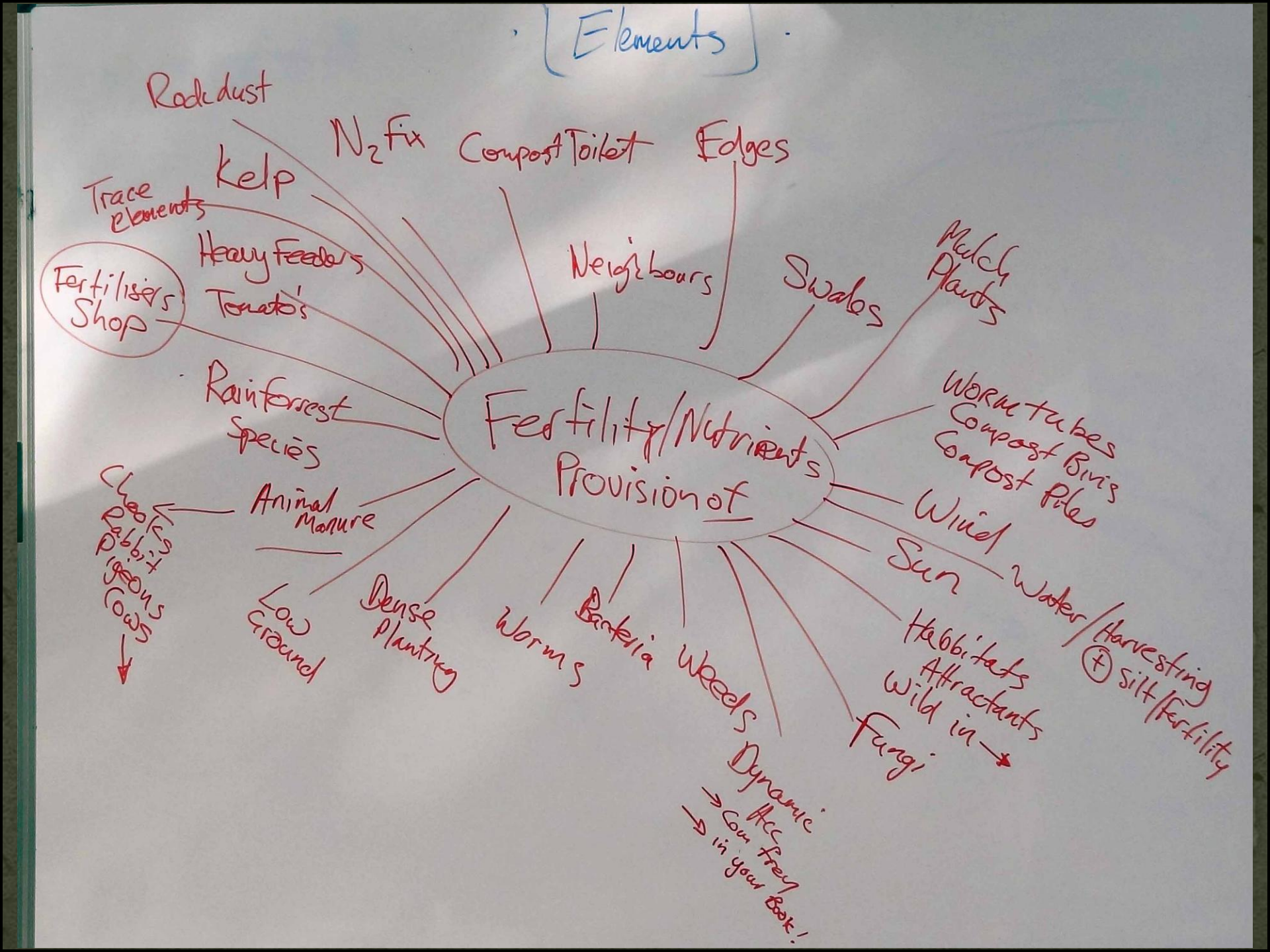
Nutrient Cycling Systems
-Animals
-Compost
-Mulch

Fauna
- Pets / Wild Life
- Insects / Birds
- Reptiles


Permie Elements
Sun Trap
Sun Arc
Reptiles
Hot
Habitat
Rocks
Wood
Sun Weeds
Loving
- Purslane -
Deciduos
Mulch
Passionfruit
Bogainvillia
Grasses
Banna
Grass
Clothes Line
Food Pond
Mulch
Solar Pannels
Sun
SolarTech
Sun Ovens
Sun Dryers
Water Heaters
Solar Chimney
Dehyd
Solar
Tubes
Meditterains - Mulb/olive/figs
Sub Tropical - Tropical - Bananas
Desiert Plants
Succulents
Herbs - Dry Herbs
Natives Plants
Sweet Potato
Patio/Shade house
Shade Sail
Shade
Tree's
Gleditsia
Honey
Locus
Jacaranda
Robinia


Elements
Habbitat
Outdoor zone
Bins
Heavy framing
Car Parking
Furniture
Tanks
Utilities
Pipes
Soil Food Web
Moss
Bulbs
Walkways
Nursery
Vertical Garden
Nocternal Animals
Full / Heavy
Mushrooms Fungi
Fence
Shade
Ferns
Shed
Worms
Aquaponics
Fish Zone
Neighbours Yard
Compost
Animal Shelter
Mirrors
Reflected light
Chooks
Sand Pit
Pond
Leafy Greens
Cold Glow
Frogs / Fish
Water
Rocket Mass Heater
Childrens Play
Water


Elements
Habbitat
Boat
Bridge
Cold Compost
Sub Tropicals
Dam
Willows
Taro
Tanks
Fish Frogs
Bog / Reeds
Water Plants Edible
Rocks
Watering Baths
Bee Bath
Swales
Wet Areas

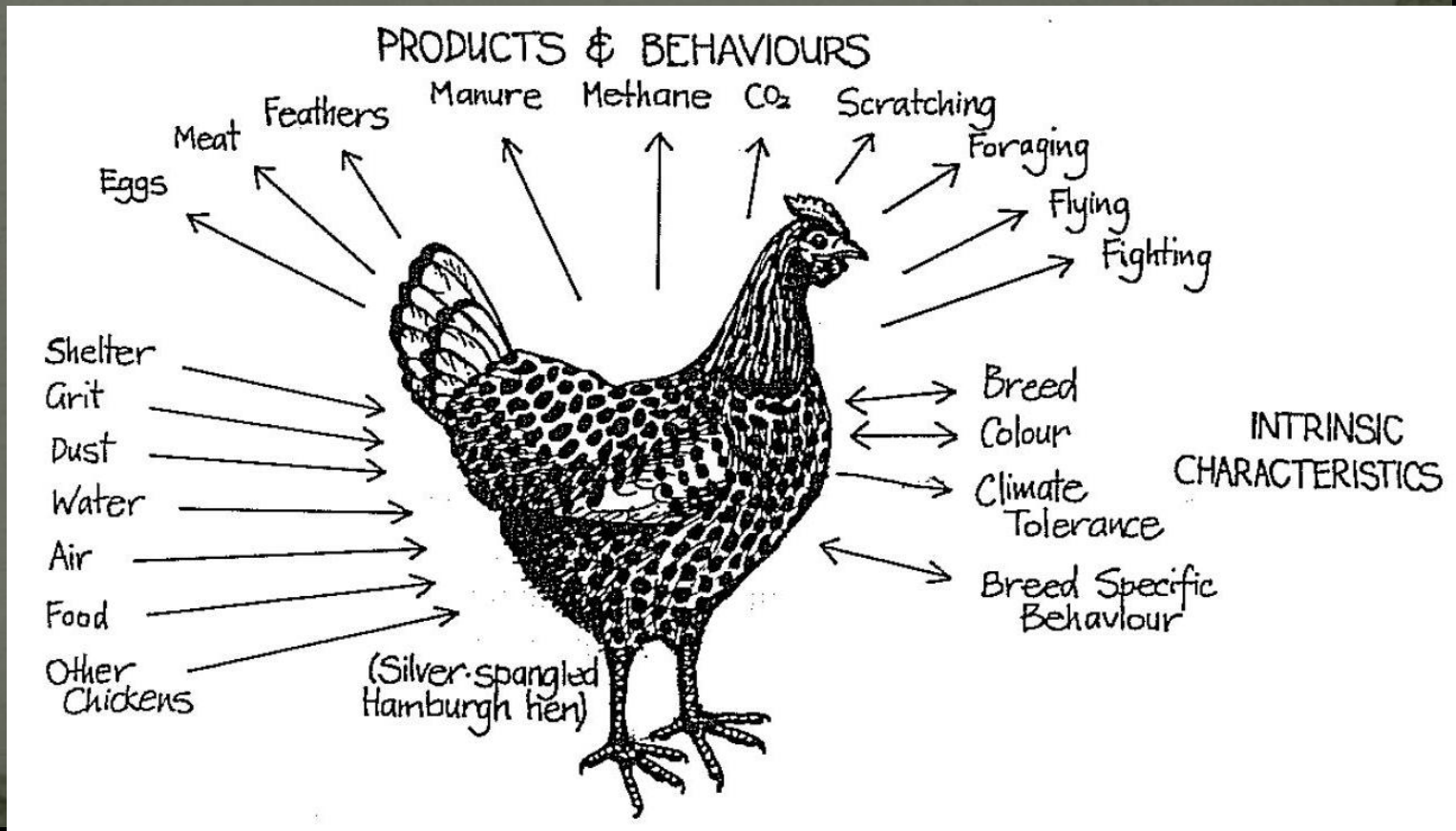

Elements
Rockdust
Kelp
N_2 Fix
Compost Toilet
Edges
Trace elements
Heavy Feeders
Tomato's
Fertilisers Shop
Neighbours
Swales
Mulch Plants
Rainforrest Species
Fertility/Nutrients Provision of
Worm tubes
Compost Bins
Compost Piles
Animal Manure
Chooks
Rabbits
Pigeons
Cows
Wind
Sun
Water/Harvesting
(+) silt/fertility
Low Ground
Dense Planting
Worms
Bacteria
Weeds
Dynamic Acc
→ Con Frey
→ in your Book!
Fungi
Habitats
Attractants
Wild in →

What to put where and why?

(Element Selection and Placement)

Element Analysis

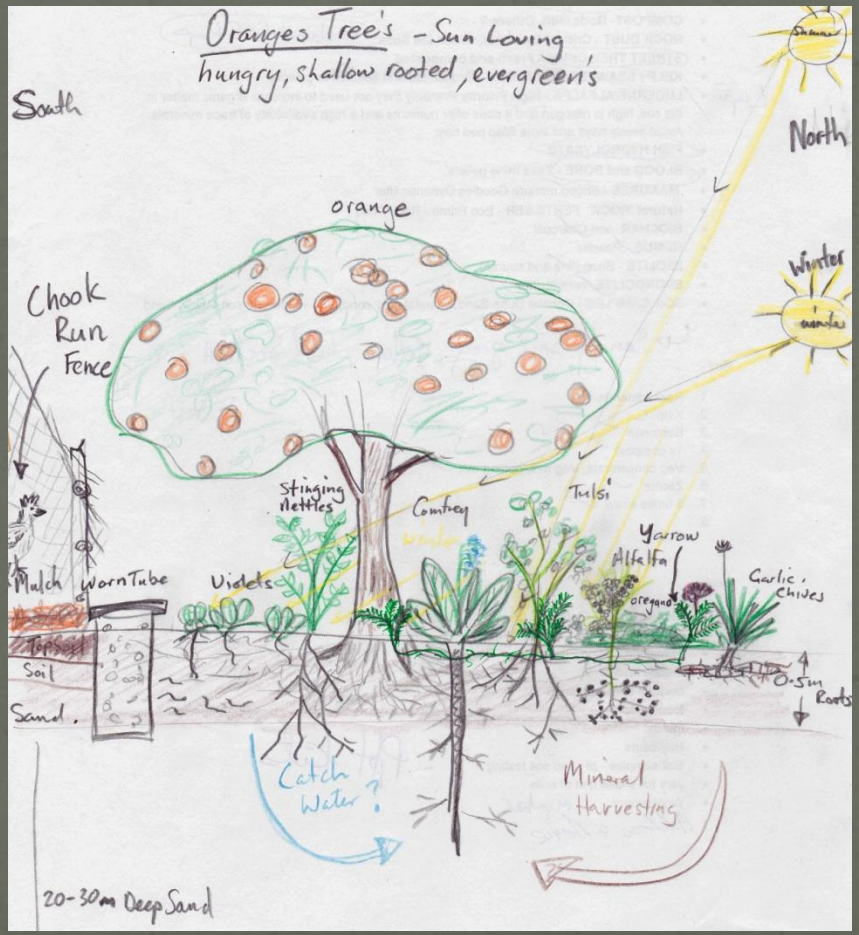
- Each element has:
  - Needs
  - Products
  - Characteristics



Citrus Tree Element Analysis

CHARACTERISTICS

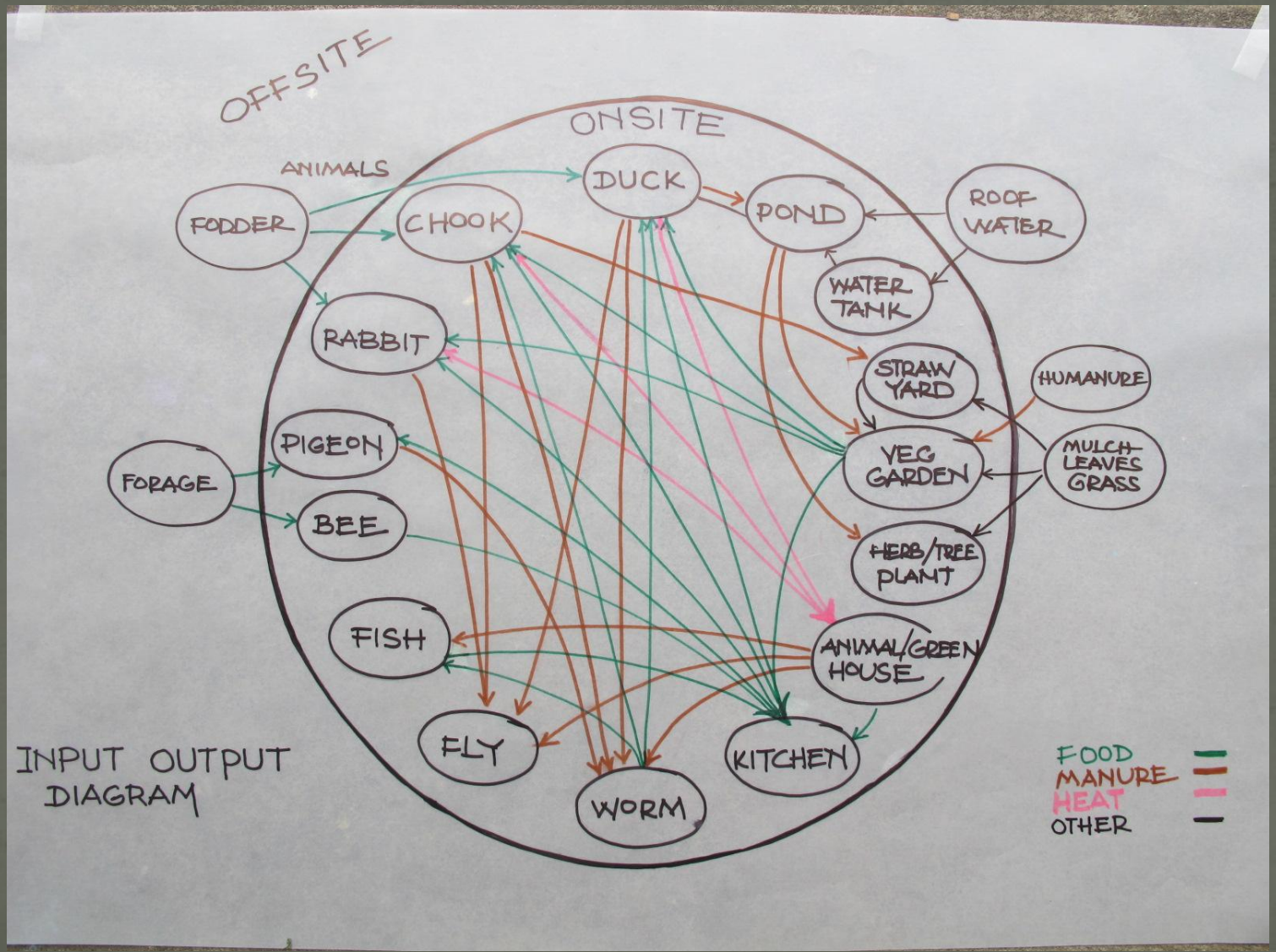
NEEDS



WHITEBOARD - example

PRODUCTS

Element Analysis Activity



Element Placement

- Grouping elements and fitting them to a space is done on the basis of:
  - Element common needs and
  - One element's products fulfill another's needs.
- Grouping may be exemplified by:
  - Sun Path / Shade needs
  - Similar water demand (e.g. reticulation zones)
  - Complimentary actions reducing work (e.g. chickens under fruit tree – minimise pests + manure)
  - Direct need/product – pond and water plants

Element Placement

- Some strategies which may help you group and place elements:
  - Make element analysis cards (place like ‘dominos’ need to product) - grouping
  - Key words – Under, over, through, behind … - placement
  - Talk to and observe local examples – neighbours, parks, waterways….

Elements for Your Location

- If the bones are the connections between elements and the joints are the elements our best guess needs to create the bare bones skeleton we need.
- Nature may have evolved slime to humans but we don't have that long to wait. The closer we are to creating to a natural system the quicker it will grow to meet our needs.

- Ultimately this design is for you - you are the client.
- So the elements and individualities you need and want must be worked into the space.

Change

Change

- The only certainty in life is quoted to be death and taxes….. change is the third.
- Nature like gardens has dynamic stability, like when riding a bike moving forward creates stability, slowing down and stopping instability.
- Nature does not stay still, forcing it to makes work for us.
- Instead we should guide nature to meet our needs – replacing our work with hers.

Creating Planned Change

- Adjusting a space not suitable for elements – grow trees early for long term benefit – shade modification.
- Adjusting a space to suit an element that is desired but does not yet fit in any location.
- Evolving the system to support itself – ultimate goal.

Responding to Change

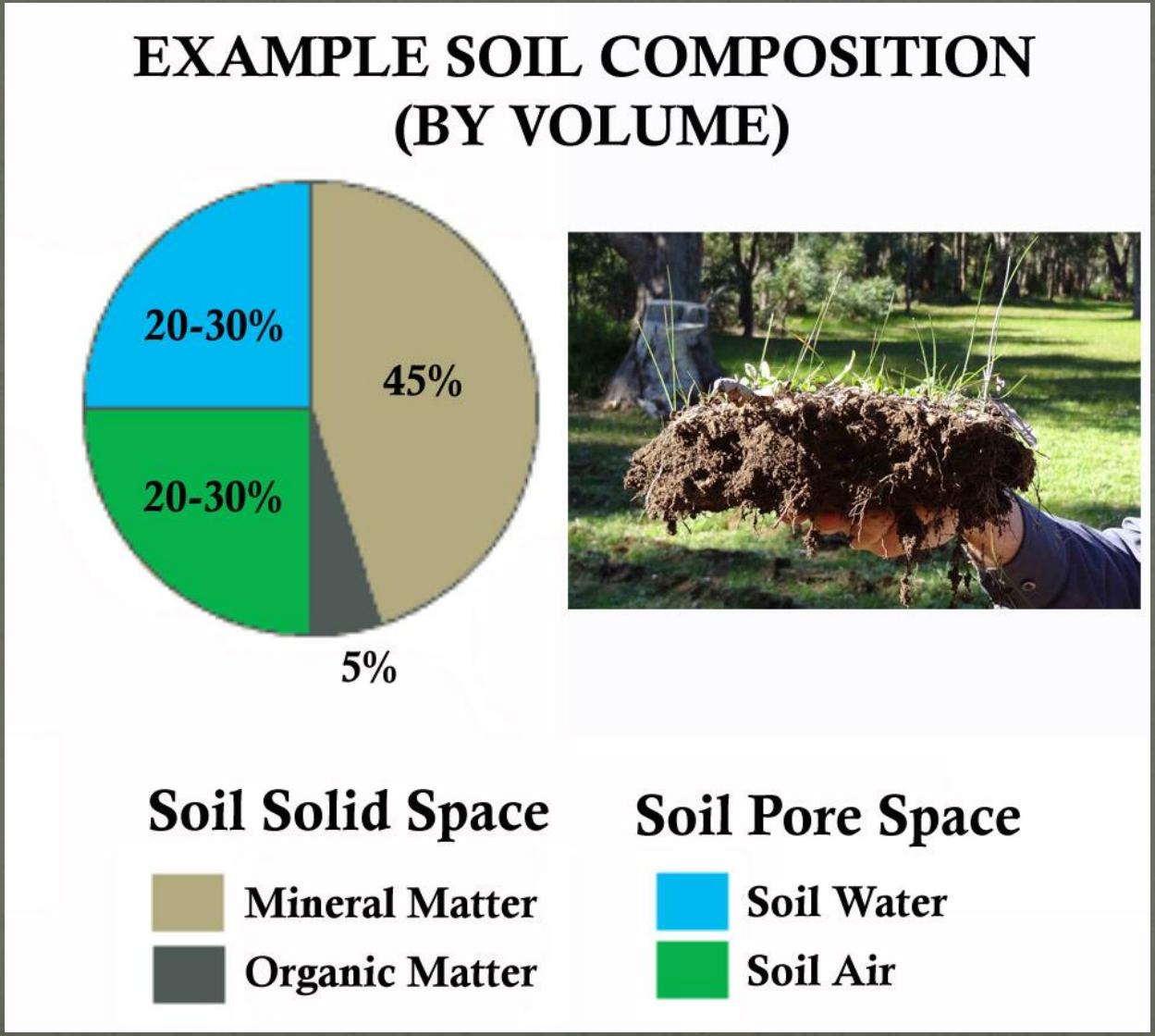
- We should welcome change, change is feedback, without feedback we cant improve our best guess.
- Natures connections are infinitely complex so we will never plan change perfectly. Recognising, accepting and enjoying this interaction makes for embracing change.
- Observation of this change will allow you to intelligently adapt.
- Interaction will allow you to learn.

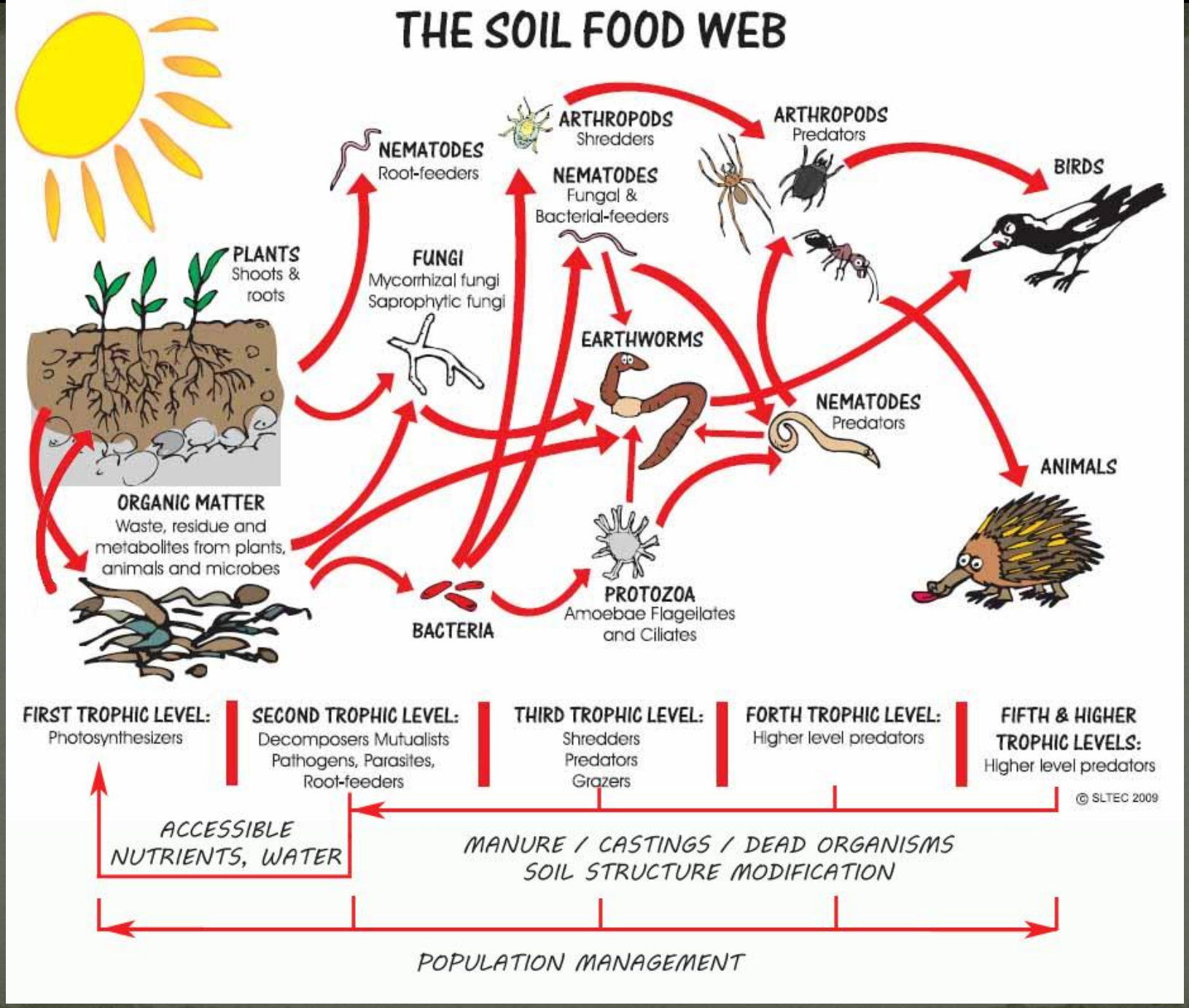
Setting up for Success

Realities of Katanning Food Gardening

- **Sun – we've discussed this.**
- Busy Lives – **we've discussed this.**
- Soil
- Watering and Fertilisers
- Pests and Weeds

Soil Composition - Overview





(Reference: http://sltec.com.au/sustain-gro/, Soil Hugger's adaptation)

Katanning Urban Block Soil

Typically for urban block it's sandy on the surface due to the building sand brought in for block leveling and house building. If no work has been done to improve the "soil" it's likely that sand will be the dominant texture present. This may or may not be the case for you.

Several of the Katanning Native soils are described as loam and comments have been made that you have sand over clay at varying depths, so you may be in a much better starting place than the folks in the Perth area.

Different areas of your garden may also reveal different characteristics, so testing it simply and cheaply, in multiple spots can help you determine where you are starting and what might help you reach a more balanced soil texture.

We'll go through the jar shake test later as one option of testing in our practical session.

Soil Resuscitation
- What can we do? -

Soil Resucitation – Talk the Tork

- T Texture – develop texture aspiring to loam
- O Organics – Fine (compost) and Coarse (Mulch)
- R Rock Dust – Longterm Macro- & Micro-Nutrients
- K Kelp – Introduce Sea Minerals

- Chose locally available, ethical, economical substitutes to fulfill same function.

Soil Resucitation – Talk the Tork

- **R** Rock Dust – Longterm Macro- & Micro-Nutrients
  - It is usually a mixture of granite and basalt rocks.
  - Is applied at 1-2 handfuls per square metre
  - Contains: Nitrogen, Phosphorous, Potassium, Calcium, Carbon, Magnesium, Sulphur, Silicon, Iron, Copper, Zinc, Manganese, Boron, Cobalt, Molybdenum and Selenium in a balanced, slow release form. (The Green Life Soil Company)
  - Some producers bond it with beneficial microbes (bacteria & fungi -VA Mycorrhizae) to innoculate the soil and help establish healthy microbial populations.
  - Supply Options - The Green Life Soil Company (we use), but other more local sources may be found - e.g. No Frills Fertilisers (multiple south west stockists), or local seller / granite quarry (brick factory?)....

Soil Resucitation – Talk the Tork

- **K** Kelp – Introduce Sea Minerals

- enhances plant productivity and quality – root and foliage growth, flowering, fruiting (evenness of fruit set, sugar content, etc).
- improves tolerance to heat, drought and frost conditions.
- assists a plants natural resistance to insect and fungal attack.
- optimises balanced plant nutrition with a broad range of trace elements and minerals.
- Supply options – Eco-seaweed, Seasol, etc

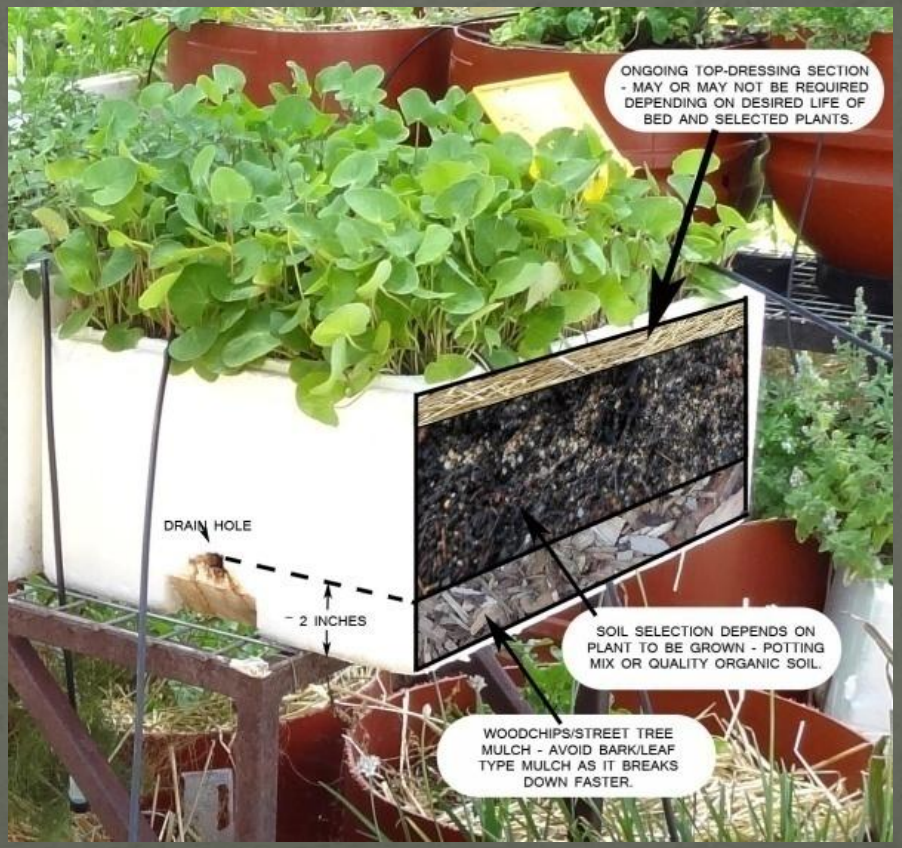
CHEMICAL ANALYSIS OF SEASOL LIQUID SEAWEED

The analysis below has been compiled from several sources including analyses carried out by the Department of Agriculture, Mt. Pleasant Laboratories, Launceston, The Government Analyst in Hobart, Tasmania and the Research School of Chemistry, Australian National University, Canberra.

Tri Indole Acetic Acid (IAA)	154 micrograms per lt	Magnesium (Mg)	0.04% w/w
Trans-Zeatin-Riboside (Zr)	7.0 micrograms per lt	Sulphur (S)	0.2% w/w
Isopentenyl Adenosine (IPA)	2.0 micrograms per lt	Cobalt (Co)	0.40 p.p.m
Trans-Zeatin (Z)	0.7 micrograms per lt	Boron (B)	13 p.p.m
Isopentenyl Adenine (IP)	16.0 micrograms per lt	Iron (Fe)	300 p.p.m
Bacterial Activity	8 x 107 cells/g	Flouride	24 p.p.m
Ash (Mineral Content)	10.2% w/w	Manganese (Mn)	5.4 p.p.m
Organic matter (Solids minus Ash)	10% w/w	Zinc (Zn)	32 p.p.m
Water Content	76.8 %w/v	Copper (Cu)	0.64 p.p.m
Total Nitrogen	0.22% w/w	Nickel (Ni)	2.0 p.p.m
Ammonia Nitrogen	156 mgm/kg	Molybdenum (Mo)	3 p.p.m
Nitrate Nitrogen	46 p.p.m	Aluminium (Al)	30 p.p.m
pH Value	9.5 – 10.5	Selenium (Se)	0.02 p.p.m
Specific Gravity 20°C	1.08	Silver (Ag)	0.02 p.p.m
Free Alkalinity (as KOH)	0.06% w/w	Vanadium (Vd)	0.08 p.p.m
Phosphorus	0.58% w/w	Iodine (I)	120 p.p.m
Potassium (K)	4.3% w/w	Mercury (Hg)	0.008 mgm/kg
Sodium (Na)	0.9% w/w	Polychlorinated Biphenyls	<0.001 mgm/kg
Chloride (Cl)	0.33% w/w		
Calcium (Ca)	0.098% w/w		

Gardening Options - Soil

- What to garden in - Inground or Containers



Water and Reticulation

- Soil Water = Underground rainwater tanks.
- Carbon can hold 40 times it weight in water
- Clay 6-10 times.
- Passively refills via rainfall or retic and waters plants.

Water and Reticulation

- Water Audit - What sources, how much and what to use it for ?
- Rainwater
- Scheme Tap
- Bore
- Greywater

Water and Reticulation

Tree-centric Gardening

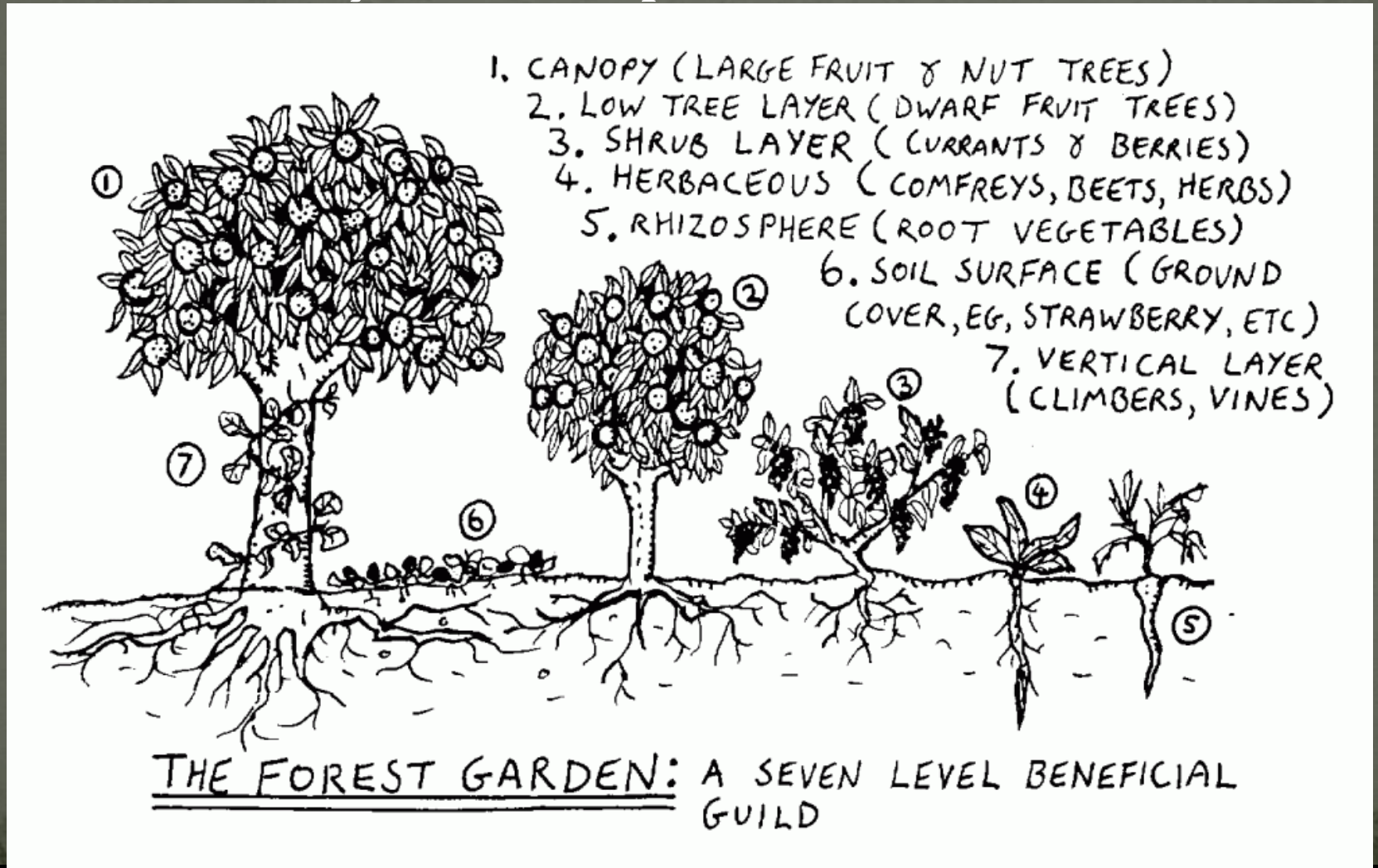
- Sustainable Gardens on weak soils should be tree centric.

Tree-centric Gardening

- Pioneer Trees and Natural Succession
- Use the weeds you have an know local pioneer plants to do the work moving system fertility and succession forward.
- Local Nitrogen Fixers ?
- Local Weeds ?
- Purpose of Weeds ?

Tree-centric Gardening

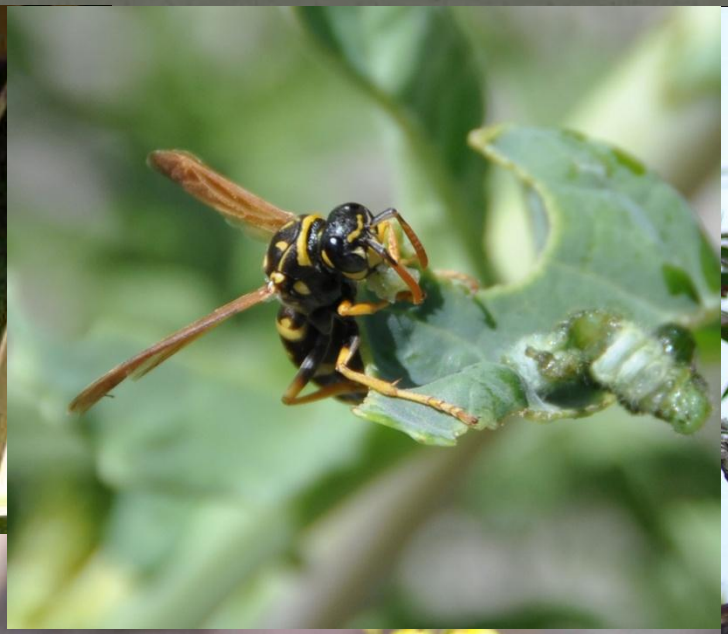
- How to stack your small space full of lots of food -



Tree-centric Gardening

- F

Embraced and Enabled wildlife



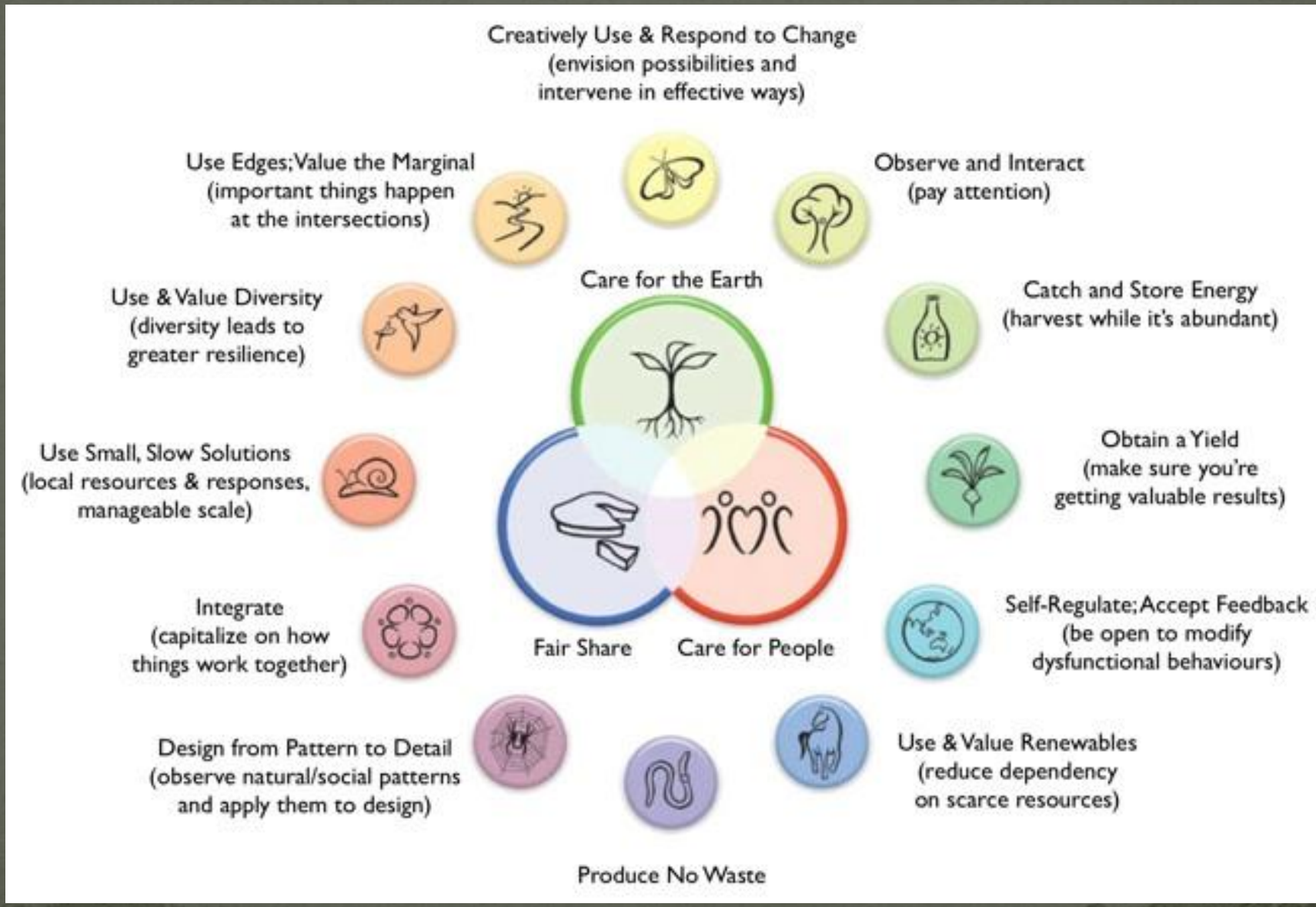
Deliberatly Creating Habitats and food for predators

- If everything has a niche and every niche is a home and diversity is a key ecological principal, we must actively create diversity.
- Diversity of habitat - Piles of sticks, Rocks, Cool and Hot, Water (mud bogs and open water), Low dense bushes, Tall Open Trees, Nesting boxes, etc.
- Diversity of Food – Weeds, pests, pollen, nectar, insects and all the things that our helpful predators need can be deliberately introduced to your garden to kickstart these connections.
- Diversity creates dynamic stability.

Introduced Animals

Revisiting the Permaculture Principles as a Designer's Checklist

Permaculture Principles / Checklist



Q&A

+

Afternoon Tea