



MIDWEST PERMACULTURE PRESENTS:

A Permaculture Primer

by Emily Hahn

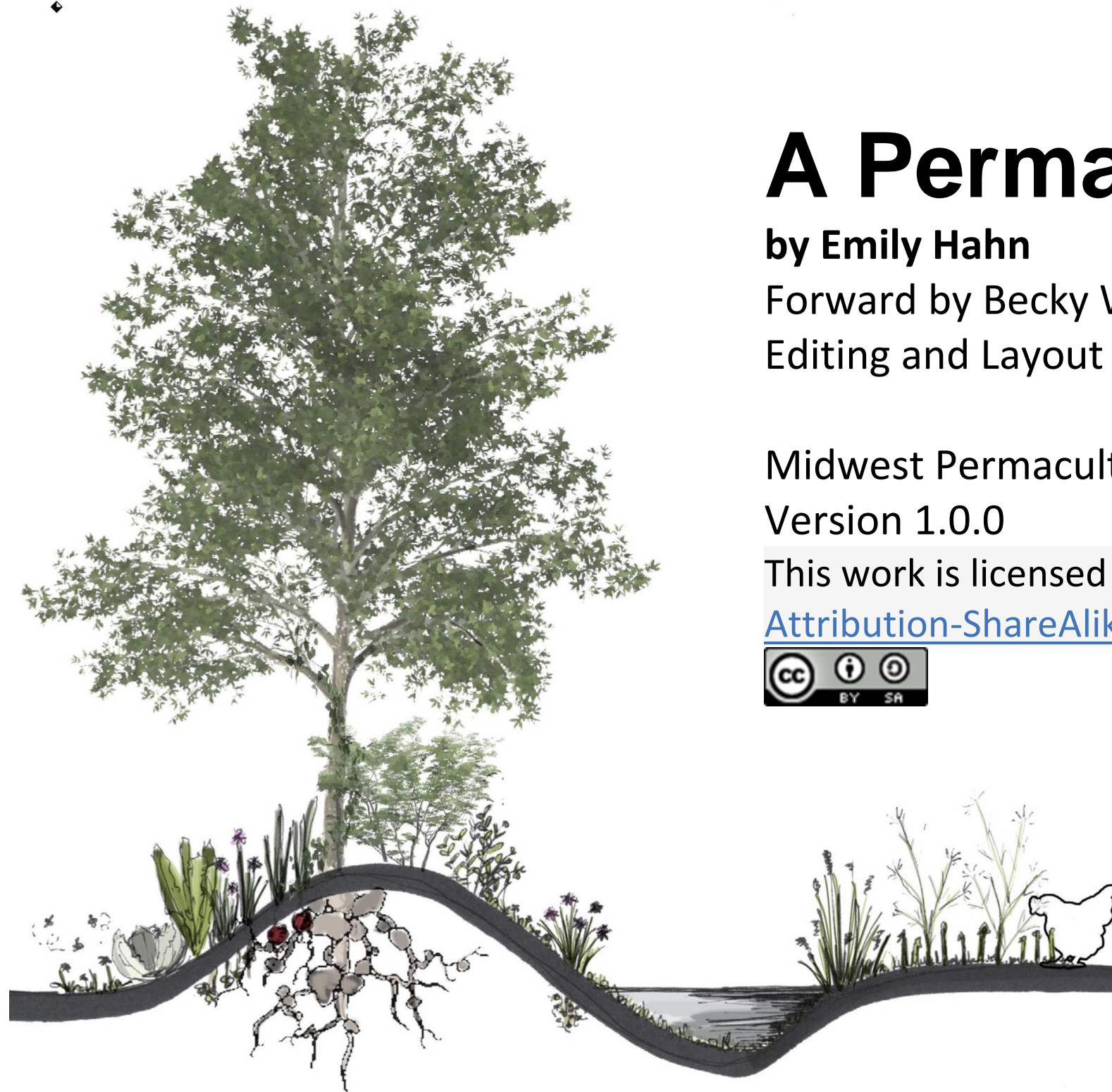
Forward by Becky Wilson

Editing and Layout by Milton Dixon

Midwest Permaculture – Stelle, IL

Version 1.0.0

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Forward

Earlier this year (2015) we received an email from a college student asking us for some statistics regarding a permaculture plan for a family of four. My response basically was “it depends”. When we begin our design work the first step includes a site assessment followed by honing in on the vision that our clients have. Next, we assess what they have that can contribute to a Permaculture project i.e. Do they have more time or more money? Are they hands on folks or will they hire help? Are they looking for income or are they offsetting the need for income? Are there any specific needs or challenges on the property? Emily was looking for something more general for planning purposes on a hypothetical property. After she completed her project, she sent us a copy. When we saw it, we realized that others might find her research project very helpful and informative. As such, with her agreement, we decided to make her illustrations and text more available to a wider public. With the assistance of Milton Dixon’s editing skills they are now in a public format that is easy to share on the internet. We hope that you find them practical, useful, and inspiring.

Becky Wilson – Cofounder, Midwest Permaculture
November 2015

Note: This publication is a gift from Emily Hahn and Midwest Permaculture. You may share, print, and copy it freely with attribution. May this booklet serve the greater good.

About the Author

Emily Hahn is a recently-graduated Landscape Architecture student from Penn State University. Her goals as a designer are to creatively shape spaces in unique, site specific ways, utilizing scientific process and beautiful form. She hopes to transform everyday spaces into new and extraordinary places which go above and beyond the social/ human needs of the space to create diverse and sustainable designs.

This Permaculture Primer was completed as a part of a 4th year interdisciplinary design studio project with Penn State’s Visiting Scholar Peter Lynch. A core component of the design project was determining sustainable approaches to suburban development in the State College, Pennsylvania area of the Ridge and Valley region. Through the integration of permaculture practices a sustainable model was created for an existing farmstead. The information in this booklet was gathered from various permaculture websites, blogs, articles and books including: *Sepp Holzer's Permaculture: A Practical Guide to Small-Scale, Integrative Farming and Gardening*, Bill Mollison’s *Permaculture Two*, and *Edible Cities* by Judith Anger, Dr. Immo Fiebrig and Martin Schnyder.

Editor's Note

Permaculture as a design science is unique among other systems because it makes use of ethics. What are ethics? On his website permaculturist David Holmgren states: "Ethics are culturally evolved mechanisms that regulate self-interest, giving us a better understanding of good and bad outcomes". Essentially, ethics are a tool that allows us to evaluate our actions and guide us toward a desirable end result. In permaculture, there are three ethics by which we design.

Earth Care – People Care – Future Care

These three ethics guide all permaculture designers and designs towards a future for people on this earth, the only acceptable outcome of any action we take.

Permaculture's principles, rather than being an evaluation tool, are patterns of the possible actions that can be taken in order to meet the test of the ethics. They're derived from the observation of natural ecosystems, being thoroughly time tested. Each is universally adaptable in its application and infinitely variable in its manifestation. Sometimes it may seem that there are many versions of the principles, for example [thirty-five from Mollison](#) versus [twelve from David Holmgren](#). What's important to remember is that whichever set one chooses to use, they all describe the same thing: patterns that successfully work within the limits of our planet.

I find Holmgren's principles offer a succinct and well-designed format for these patterns; more detailed information is available from his website [Permaculture Principles](#).

- | | |
|---|--|
| 1. Observe and Interact | 7. Design From Patterns to Details |
| 2. Catch and Store Energy | 8. Integrate Rather Than Segregate |
| 3. Obtain a yield | 9. Use Small and Slow Solutions |
| 4. Apply Self-Regulation and Accept Feedback | 10. Use and Value Diversity |
| 5. Use and Value Renewable Resources and Services | 11. Use Edges and Value the Marginal |
| 6. Produce No Waste | 12. Creatively Use and Respond to Change |

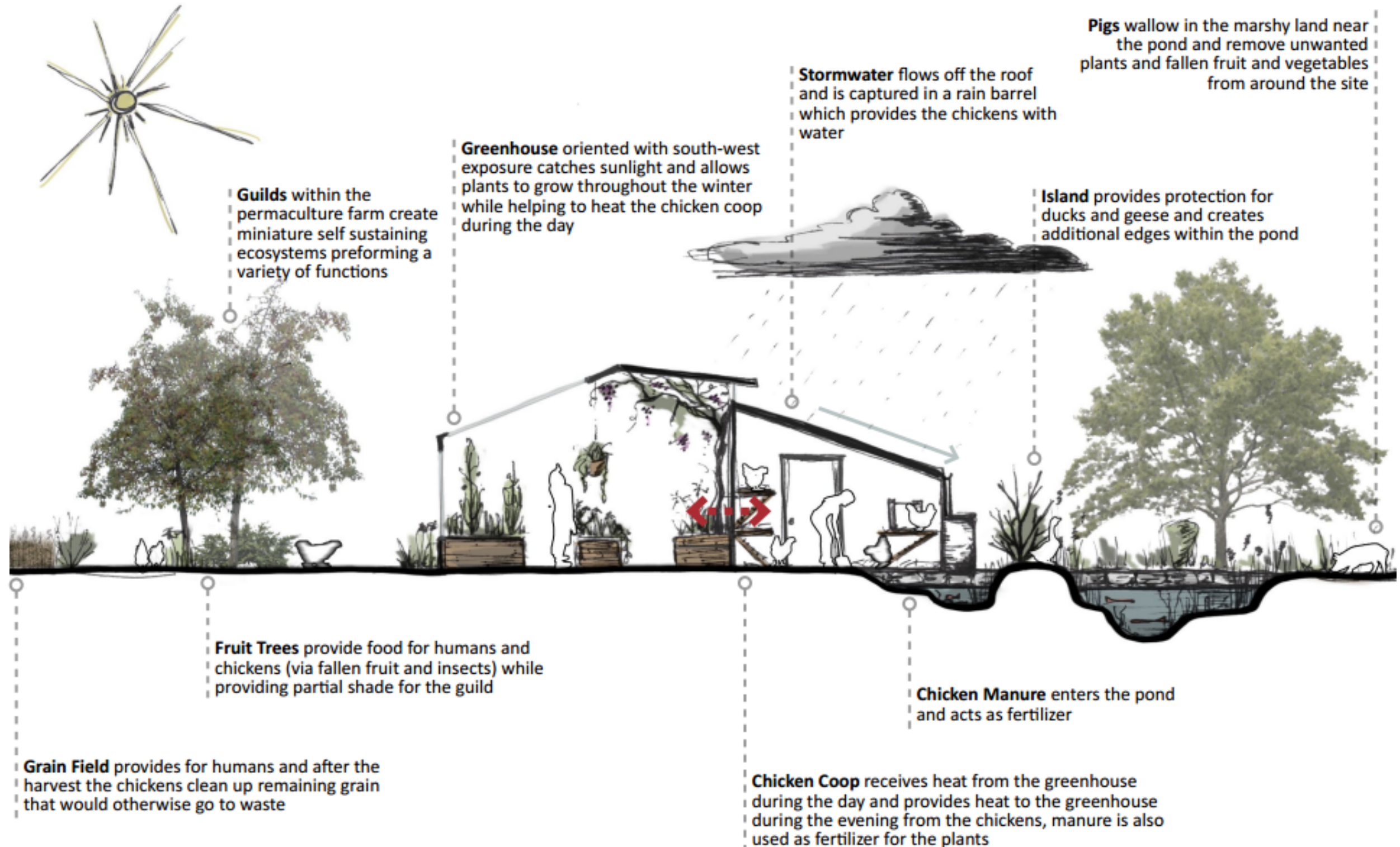
The ethics and principles, while at the core of permaculture, may also seem too theoretical as a starting point. That's where this primer comes in, giving examples of how they might play out in a given situation. The infographics give a sense of how these important tools can manifest in the world and how different elements in a design might fit together.

Milton Dixon

Editor

Permaculture

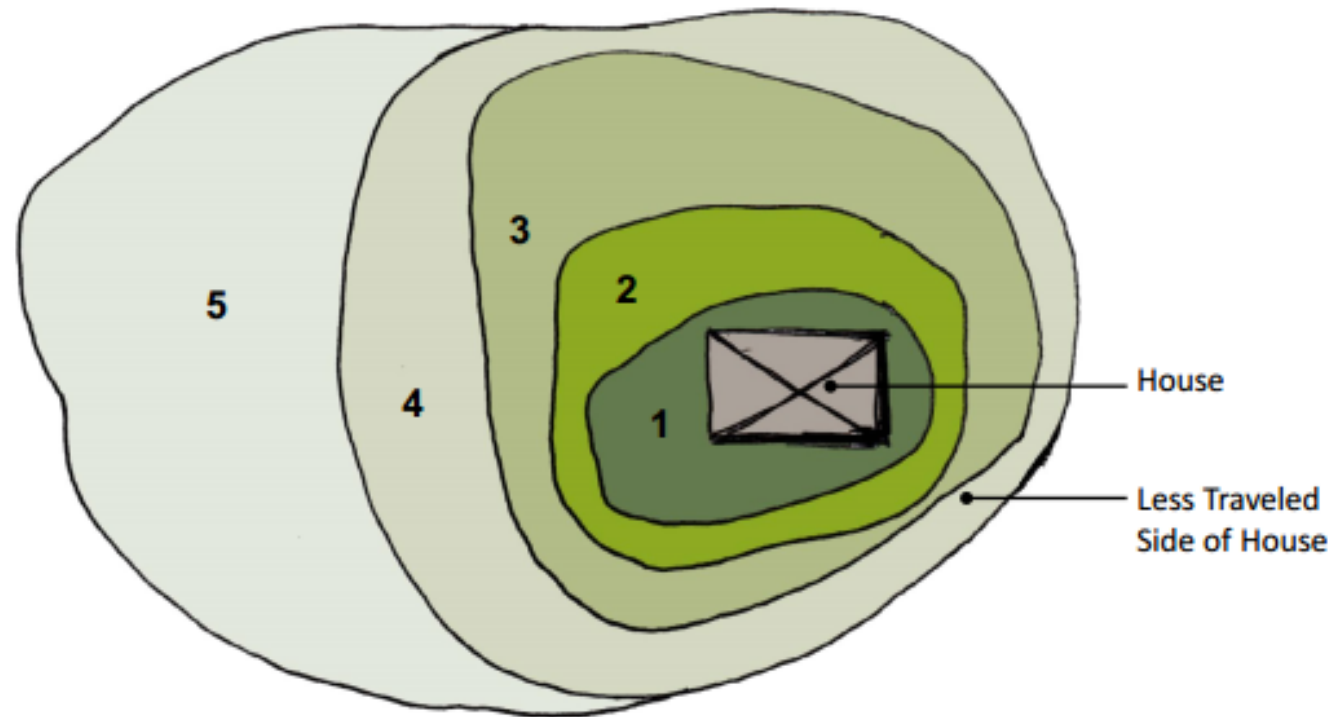
a philosophy of permanent agriculture systems utilizing natural patterns and ecosystem biodiversity to maintain productive and relatively low maintenance food producing landscapes



Components and Design Strategies

PERMACULTURE ZONES

areas within a permaculture design arranged based on how often each space is visited and how much maintenance is required



ZONES

1. Closest to the house and along frequently traveled paths
 - Seedlings in need of frequent watering
 - Salad Vegetables
 - Favorite Flowers
 - Commonly Used Herbs
 - Compost Collection
2. Also frequently visited but less often than zone 1
 - Small Fruit Trees
 - Shrubs
 - Trellised Fruit
 - Bramble Berries
 - Ponds
 - Windbreaks
 - Vegetables that only fruit once
 - Unruly Rambling Vines
3. Large, low maintenance trees and crops
 - Large Fruit/ Nut Trees
 - Main Crop Areas
 - Large Pastures
4. Utilized for gathering wild foods and growing timber
5. Unmanaged brush (like a wildlife preserve)

ECO TONES

the edge condition or transition zone between two different ecosystems; known for hosting a diverse range of species

Less Diverse with Minimal
Edge Conditions



More Diverse with
Greater Edge Area



Components and Design Strategies

GUILD

a grouping of plants, animals and insects working together to ensure the survival of the whole system

COMPONENTS OF A GUILD

1. Food for Us

fruits, vegetables, staples, legumes, nuts, fats and animals

2. Food for the Soil

nutrients, nitrogen (legumes), organic matter

3. Diggers and Miners

reach into the soil to pull up minerals (trees, root crops, ants, termites, worms, beetles, mice)

4. Groundcover

plants that keep the soil from drying out and prevent weeds taking over

5. Climbers

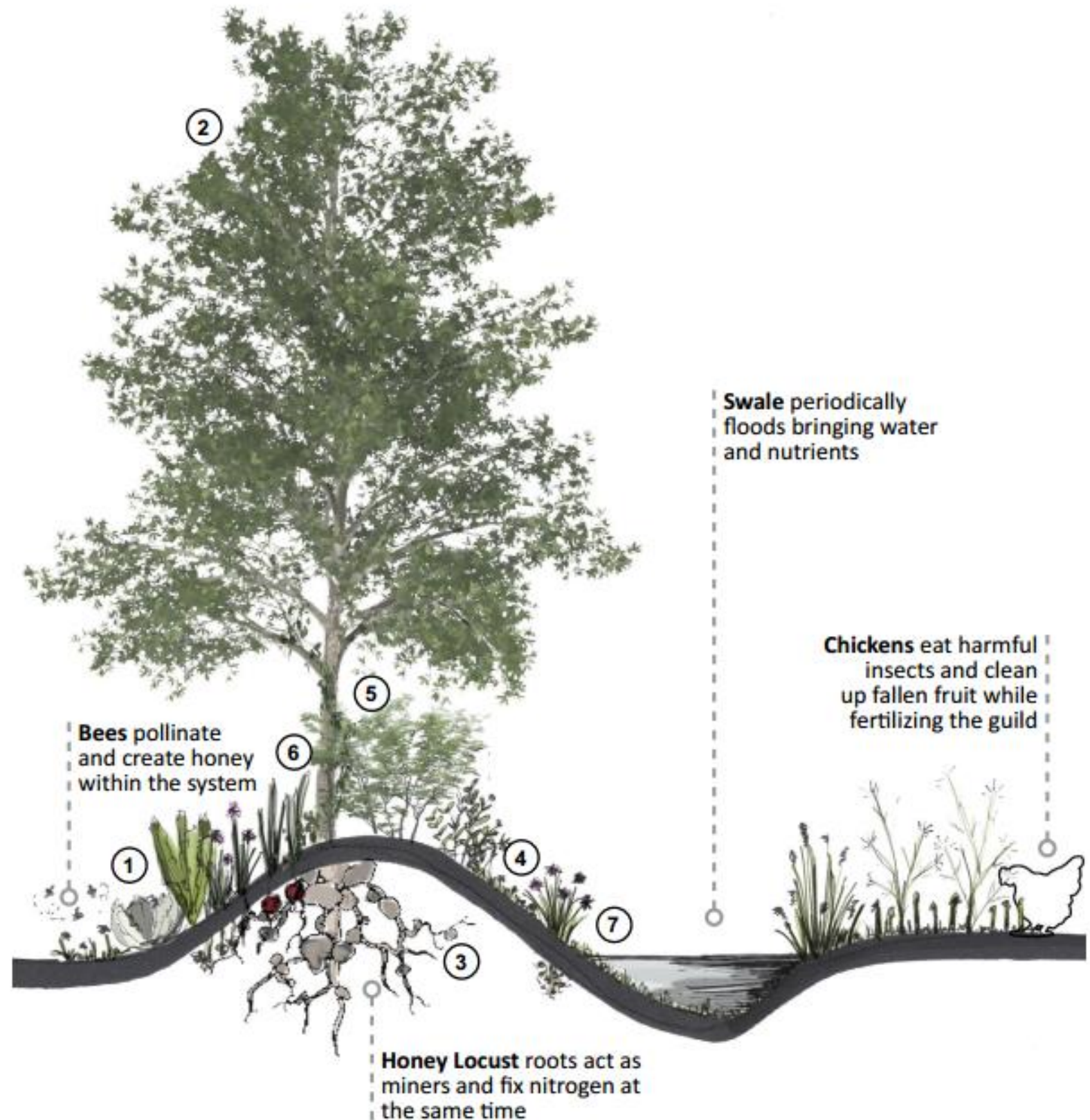
maximize vertical space (beans, passion fruit, cucumbers)

6. Supporters

provide a structure for the climbers (trees, shrubs, stalks, houses, walls, fences)

7. Protectors

strong smelling plants to deter insects (onions, chives, spices, lemon grass, pungent flowers)
habitat for natural predators such as frogs, birds, and beneficial insects, living fences of thorny and sharp plants



Components and Design Strategies

FOOD FOREST

a system which mimics the natural forest ecosystem with food producing species to create a self regulating, ecologically stable, food producing forest
not gardening in the forest, gardening like the forest

1. Canopy - timber, nut, fruit
2. Sub-Canopy - fruit, nut
3. Shrub Layer - fruit, nut, hardy herbs
4. Herbaceous Layer - herbs, vegetables
5. Groundcover/ Creeper Layer - herbs
6. Underground Layer - root crops
7. Vertical/ Climber Layer - fruit
8. Aquatic/ Wetland layer - herbs
9. Mycelial/ Fungal Layer - mushrooms



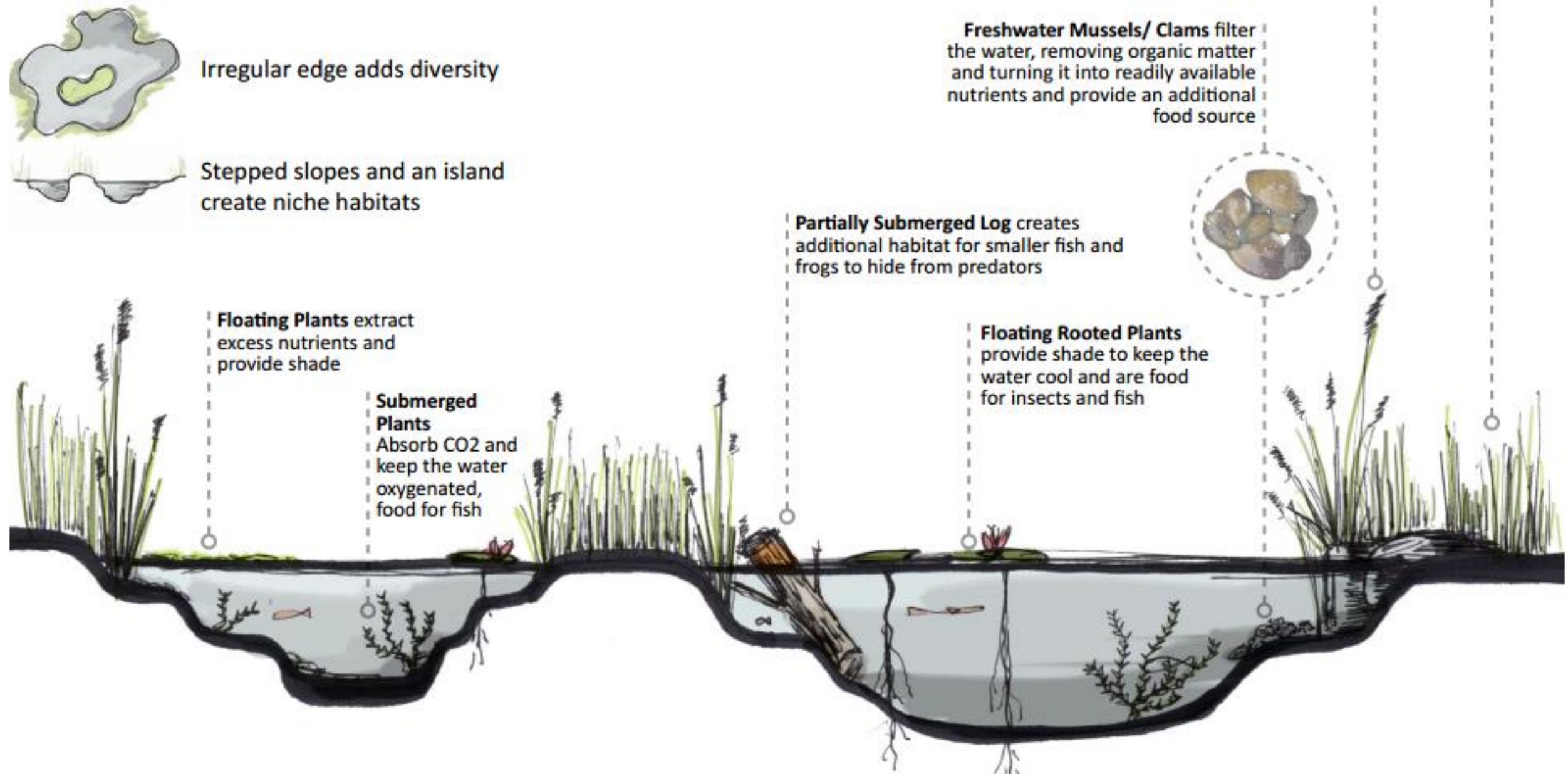
Components and Design Strategies

PONDS/ AQUACULTURE SYSTEMS

the incorporation of bodies of water into a permaculture design which increases biodiversity and opportunities for supporting a range of plant and animal species

USES WITHIN A PERMACULTURE SYSTEM

1. Stormwater Storage
2. Use as Irrigation
3. Biodiverse Habitat
4. Edible Water Species
5. Freshwater Fish, Mussels and Clams

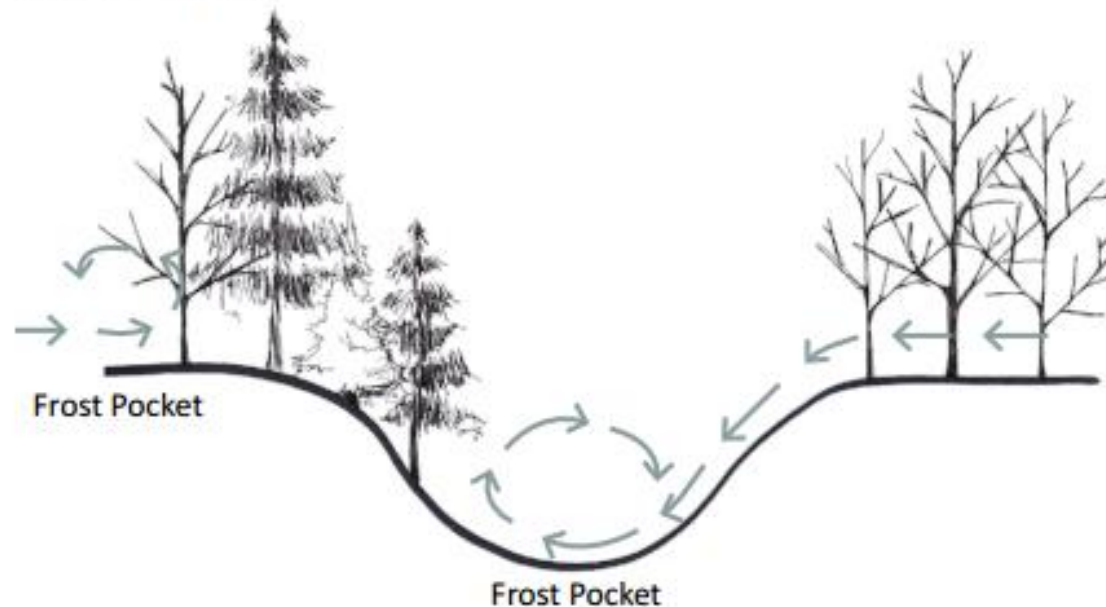


Components and Design Strategies

MICRO-CLIMATES AND LANDFORM

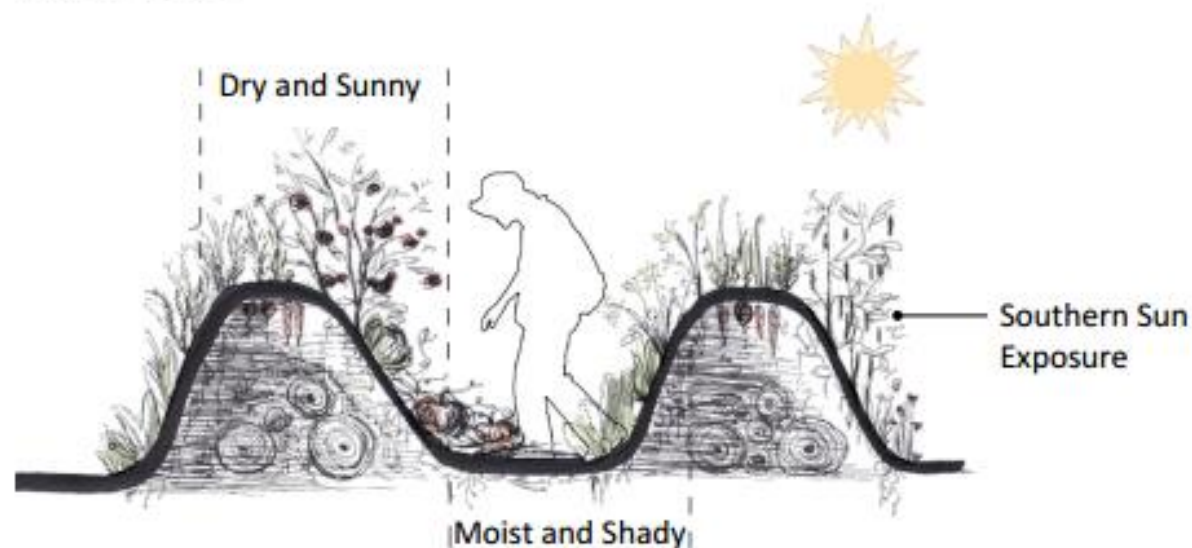
the creation of various landforms and planting arrangements to provide specific climates suited to a variety of species

FROST POCKETS



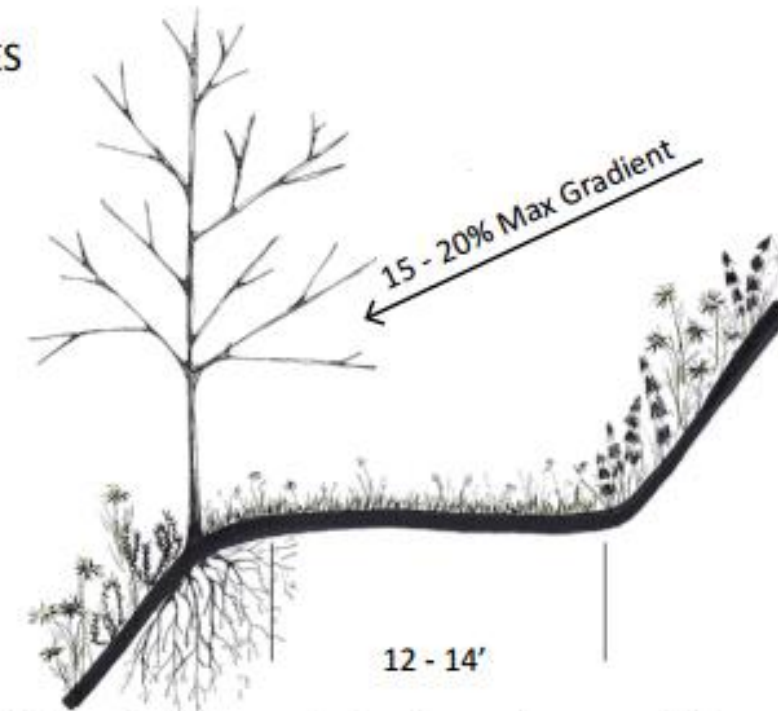
Cold air flows across the landscape and pools in low lying areas or in places where obstructions prevent it from easily flowing past. These low areas are called frost pockets and can get to dangerously low temperatures for plants.

RAISED BEDS



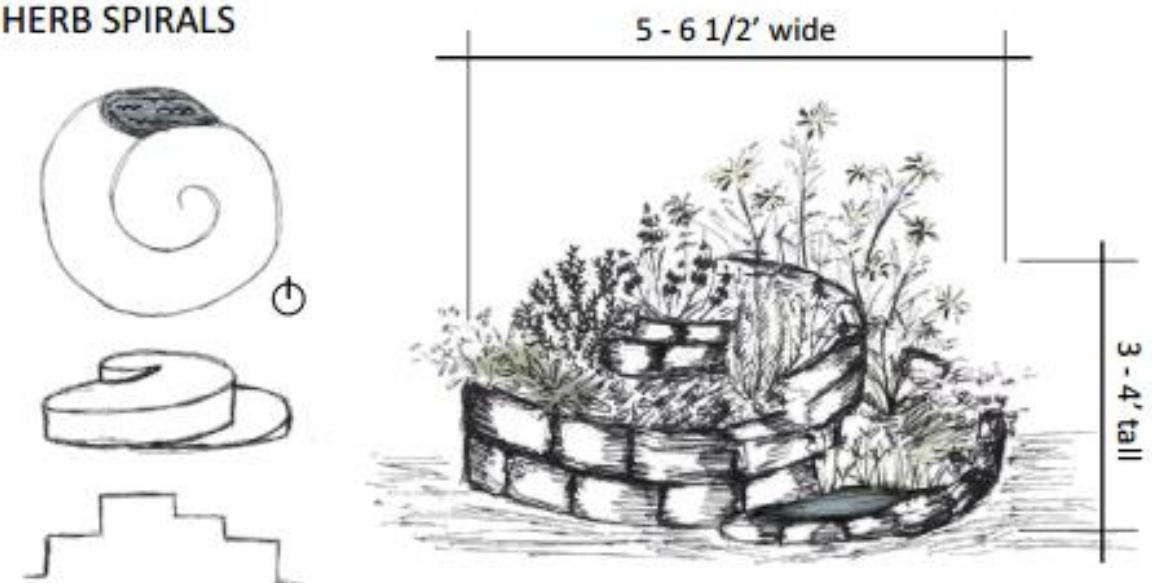
Raised beds can be constructed to create a series of micro-climates which allow a variety of plants to thrive in a small area. The soil between the beds retains moisture while the tops receive more sun and have drier soils.

TERRACES



Terraces built into slopes can maximize the growing potential for a given area and reduce the risk of soil erosion.

HERB SPIRALS



Herb spirals are productive, energy efficient, vertical gardens. The spiral creates a range of micro climates for different herbs. Dry, sun loving species are planted at the top and moisture loving species towards the bottom near the small pond.

Species and Functions

ANIMAL SYSTEMS

the integration of animals into a permaculture system utilizing their natural habits to minimize workloads and their produce to supplement the outputs (i.e. grazing unwanted plants, producing milk, eggs etc.)

POULTRY 100 per acre



- Increase Garden Fertility
- Remove Insects/pests
- Low Soil Impact
- Eggs
- Meat
- Minimal Space

BREEDS

Ameraucana
Black Australorp
Cuckoo Maran
Delaware
Rhode Island Red
Welsummer
Mallards
Styrian Chickens
Geese
Ducks
Quail

GOATS/ SHEEP 4 per acre



- Increase Garden Fertility
- Manage Vigorous Plant Growth
- Can Damage Trees
- Milk
- Cheese
- Wool/ Yarn
- Minimal Space

BREEDS

Sheep -
American Blackbelly
Black Welsh Mountain
Bluefaced Leicester
Clun Forest
Cotswold
Goats -
Nubian
Toggenburg
Oberhasli

SWINE 4 per acre



- Increase Garden Fertility
- Living Plows Turn Up Soil Surface
- No Damage to Trees
- Clean up Fallen Fruit (preventing disease)
- Meat
- Pleasant Workers
- Minimal Space

BREEDS

Swabian-Hall
Duroc
Mangalitsa
Turopolse
Mulefoot
Tamworth
Large Black
Kunekune

CATTLE .5 per acre



- Increase Garden Fertility
- High Soil Impact (compaction)
- Milk
- Meat
- Lots of Fencing
- Large Areas

BREEDS

European Bison
American Bison
Yak
Water Buffalo
Scottish Highland
Hungarian Steepe
Dahomey Miniature
Guernsey
Red Poll
Ayrshire
Randall Blue Lineback

BEEES 10 Hives Suggested



- On Site Pollination
- Honey
- Opportunity to Provide Pollination Services
- Minimal Maintenance
- Minimal Space

SPECIES

Italian
German
Carniolan
Buckfast
Caucasian
Russian
Minnesota Hygienic
Cordovan
Midnite
Starline
Double Hybrid

Species and Functions

PLANTS

1. CANOPY LAYER

Alder	Lime	Hazelnut	Mulberry	Pea Tree	Persimmon
Black Cherry	Linden	Honey Locust	Oak	Pecan	Pine Tree (pine nuts)
Chestnut	Basswood	Monkey Puzzle Tree	Osage Orange	Hickory	Walnut

2. SUB-CANOPY

Apple	Hazelnut	Mayhaw	Pea Tree	Plum	Serviceberry
Sweet Cherry	Jujube	Medlar	Asian Pears	Quince	Sumac
Tart Cherry	Juniper	Paw Paw	Mimosa	Rasin Tree	Willow

3. SHRUB LAYER

Alder	Bougainvillea	Elderberry	Hazelnut	Oak	Roses
Aronia/ Chokeberry	Sweet Cherry	Goji Berry	Juniper	Osage Orange	Sage
Bamboo	Tart Cherry	Gooseberry	Mayhaw	Pea Shrubs	Sumac
Blueberries	Chestnut	Goumi	Nawking Cherry	Rosemary	Wineberry

4. HERBACEOUS LAYER

Asparagus	Chicory	Fennel	Licorice	Plantain	Sorrel
Buckwheat	Red Clover	Ginseng	Lupine	Rhubarb	Stinging Nettle
Borage	Columbine	Hollyhock	Oregano	Saffron	Turkish Rocket
Calendula	Echinacea	Horseraddish	Parsley	Sea Kale	Yarrow

5. GROUND COVERS

Chokeberry	Ground Raspberry	Oregano	Sage	Sorrel	Wild Angelica
Calendula	Hog Peanut	Ostrich Fern	Salal/ Shallion	Stinging Nettle	Wintergreen
Red Clover	Lupine	Rhubarb	Sea Kale	Sweet Potato	Vetch
Creeping Blueberry	Mint	Rosemary	Strawberries	Yurkish Rocket	Yarrow

6. UNDERGROUND

Camas	Ginseng	Hog Peanut	Licorice	Radishes	Sweet Potato
Carrots	Groundnut	Horseradish	Parsley	Skirret	Turnips

7. VINES/ CLIMBING

Cucumber	Hops	Malabar Spinach	Passion Fruit	Sweet Potato	Wisteria
Hog Peanut	Kiwi	Maypop	Pea Vines	Vetch	Grapes

8. WETLAND LAYER

Cattail	Reedmace	Mayhaw	Water Spinach	Water Chestnuts
Bulrush	Common Reed	Water Lotus	Willow	Watercress

9. FUNGAL LAYER

Reishi/ Ling Chi	Shaggy Mane	Shitake
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Permaculture Precedents

OIKOS TREE CROPS - permaculture nursery
< 20 acres



LOCATION
Kalamazoo, Michigan

ESTABLISHED
1980

COMPONENTS
Fruits
Berries and Shrub Crops
Tree Crops
Nuts
Perennials
Perennial Vegetables

KNOWN FOR
Unique and heirloom varieties long forgotten, specially selected for ease of growth and productivity

KRAMETERHOF, SEPP HOLZER - permaculture farm
> 111 acres



LOCATION
Burgenland, Austria

ESTABLISHED
1962

COMPONENTS
Fruits +Vegetables
Grains
Animal Products
Fish/ Aquatics
and more

KNOWN FOR
Most productive permaculture farm in the world (at nearly 5,000 ft) run by Sepp Holzer, permaculture expert

DJANBUNG GARDENS PERMACULTURE - Education Centre
5 acres



LOCATION
Australia

ESTABLISHED
1993

COMPONENTS
Cold Temperate through Tropical Plantings
Technologies
Water Systems
Animals etc.

KNOWN FOR
A permaculture college in Australia, a comprehensive and demonstrative site

EAST FEAST FESTIVAL BEACH - Community Food Forest
2.43 acres



LOCATION
Austin, Texas

ESTABLISHED
Proposed

COMPONENTS
Fruit
Vegetables
Enhancing the Soil
Preserving Natural Land

KNOWN FOR
Urban permaculture inspired by the Beacon Food Forest in Seattle

Permaculture Precedents

BEACON FOOD FOREST - Community Food Forest
7 acres



LOCATION
Seattle, Washington

ESTABLISHED
2014 (first phase)

COMPONENTS
Edible Arboretum
Berry Patch
Nut Grove
Community Garden
Kids Garden

KNOWN FOR
Recent project designed
at the completion of a
permaculture design
course, a community
garden for foraging

PERMACULTURE BALCONY - Fabienne Frölich Apartment Permaculture
< 25 square feet



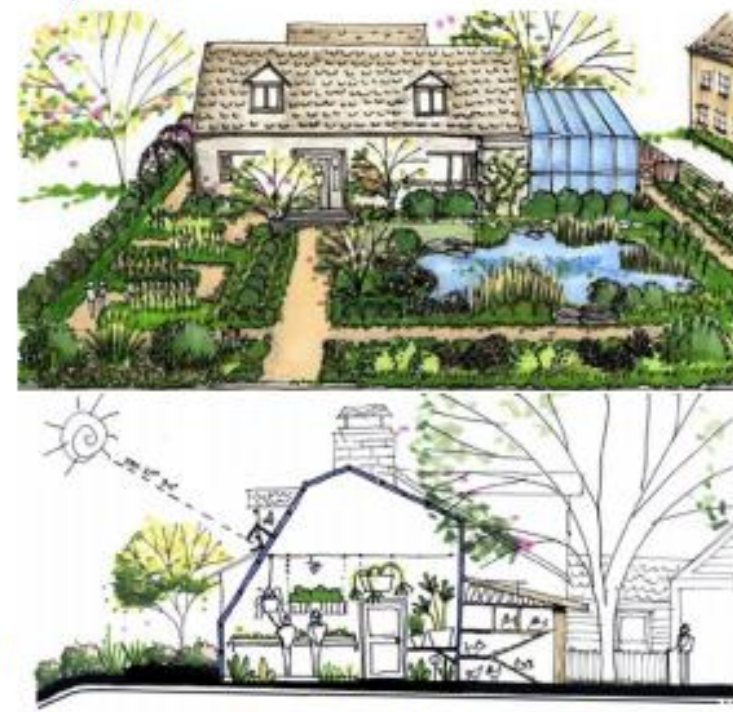
LOCATION
Eisengasse, Basle,
Switzerland

ESTABLISHED
Early 2000's

COMPONENTS
Herbs
Spinach
Vegetables
Vines
Mushrooms etc.

KNOWN FOR
Incredibly productive small
space

ASLA STUDENT AWARD - Residential Permaculture Plan, Vanessa Gilbert
< 1/4 acre



LOCATION
Muncie, Indiana

ESTABLISHED
Conceptual design

COMPONENTS
Vegetable Gardens
Aquaculture Pond
Chickens/ Greenhouse
Storm Water
Gathering Spaces

KNOWN FOR
Turning an unproductive
lawn into a self sustaining
paradise

Costs and Profit

IMPLEMENTATION AND PROFIT FOR 4 MODELS WITH VARYING SCALES

Model 1							
Residential Permaculture System Per Person							
.01 Acres Per Person							
Component	Area (acres)	Area (sf)	Initial Cost	Annual Cost	Gross Annual Profit	Net Annual Profit	Years
Mixed Vegetables and Fruit	0.01	500.00	\$ 290.00	-	-	-	2
Herb Spiral w/ pond (1 per household)	0.00	33.00	\$ 290.00	-	-	-	1
Nut Trees (3 at 4 - 5' tall)	0.00	80.00	\$ 80.00	-	-	-	5 - 6
Total Cost (1 person)			\$ 660.00	.01 acres			
Total Cost (4 people)			\$ 1,770.00	.04 acres			
Total Cost (45 people)			\$ 19,913.00	.45 acres			

Model 2							
Community Permaculture System							
1 Acre Total							
Component	Area (acres)	Area (sf)	Initial Cost	Annual Cost	Gross Annual Profit	Net Annual Profit	Years
Mixed Vegetables and Fruit	0.75	32670.00	\$ 12,500.00	\$ 40,500.00	\$ 67,500.00	\$ 27,000.00	1 - 7
Mixed Herbs	0.03	1306.80	\$ 42.00	\$ 84.00	\$ 328.00	\$ 244.00	1
Nut Trees	0.10	4356.00	\$ 60.00	\$ 100.00	\$ 150.00	\$ 50.00	7 - 12
Aquaculture (84 fish + 1/3 surface crop cover)	0.07	2970.00	\$ 395.00	\$ 78.00	\$ 245.00	\$ 167.00	1
Egg Production (45 hens free range w/in garden)	0.01	450.00	\$ 715.00	\$ 1,039.00	\$ 2,114.00	\$ 1,075.00	1
Honey Production (10 hives)	0.00	30.00	\$ 5,442.00	\$ 500.00	\$ 1,200.00	\$ 700.00	2 - 3
Mushrooms (250 logs)	0.02	1000.00	\$ 729.00	\$ 1,286.00	\$ 3,217.00	\$ 1,931.00	4
Other (paths, play area, compost etc.)	0.02	871.20				\$ -	
Total Cost			\$ 19,883.00	\$ 43,587.00	\$ 74,754.00	\$ 31,167.00	

Model 3							
Community Food Forest							
*1 Acre Total							
Component	Area (acres)	Area (sf)	Initial Cost	Annual Cost	Gross Annual Profit	Net Annual Profit	Years
Mixed Vegetables and Fruit	0.75	32670.00	\$ 12,500.00	\$ 40,500.00	\$ 67,500.00	\$ 27,000.00	1 - 7
Mixed Herbs	0.75	32670.00	\$ 1,050.00	\$ 2,088.00	\$ 8,221.00	\$ 6,133.00	1
Nut Trees	0.75	32670.00	\$ 450.00	\$ 750.00	\$ 1,125.00	\$ 375.00	7 - 12
Aquaculture (240 fish + 1/3 surface crop cover)	0.20	8712.00	\$ 1,131.00	\$ 223.00	\$ 700.00	\$ 477.00	1
Egg Production (45 hens free range w/in forest)	0.01	450.00	\$ 715.00	\$ 1,039.00	\$ 2,114.00	\$ 1,075.00	1
Honey Production (10 Hives)	0.00	30.00	\$ 5,442.00	\$ 500.00	\$ 1,200.00	\$ 700.00	2 - 3
Mushrooms	0.04	2000.00	\$ 1,458.00	\$ 2,572.00	\$ 6,434.00	\$ 3,862.00	4
Total Cost			\$ 22,746.00	\$ 47,672.00	\$ 87,294.00	\$ 39,622.00	
Total Cost (10% reduction)			\$ 21,346.00	\$ 43,338.20	\$ 79,609.40	\$ 36,271.20	

*area for each planted component is stacked vertically within the forest, i.e. nut trees, mixed fruit and vegetables and mixed herbs fit within the same .75 acres with 10% reduction in initial cost, annual cost and gross profit for each component to account for reduced density per acre

Model 4							
Profitable Permaculture Farm							
10.31 Acres Total							
Component	Area (acres)	Area (sf)	Initial Cost	Annual Cost	Gross Annual Profit	Net Annual Profit	Years
Mixed Vegetables and Fruit	1.50	65340.00	\$ 37,500.00	\$ 81,000.00	\$ 135,000.00	\$ 54,000.00	1 - 7
Mixed Herbs	0.50	21780.00	\$ 700.00	\$ 1,392.00	\$ 5,481.00	\$ 4,089.00	1
Rotational Pastures (for Nubian Goats)	7.00	304920.00	\$ 13,800.00	\$ 9,800.00		\$ (9,800.00)	1
Feta Cheese (40 Nubian Goats barn and facilities)	0.20	8712.00	\$ 57,460.00	\$ 10,000.00	\$ 96,190.00	\$ 86,190.00	1
Honey Production (20 Hives)	0.00	60.00	\$ 10,884.00	\$ 1,000.00	\$ 2,400.00	\$ 1,400.00	2 - 3
Egg Production (500 hens in coops, graze in fields)	0.11	5000.00	\$ 7,951.00	\$ 11,552.00	\$ 23,495.00	\$ 11,943.00	1
Aquaculture (1,200 fish + 1/3 surface crop cover)	1.00	43560.00	\$ 5,656.00	\$ 1,116.00	\$ 3,500.00	\$ 2,384.00	1
Total Cost			\$ 133,951.00	\$ 115,860.00	\$ 266,066.00	\$ 150,206.00	

ACRES REQUIRED PER PERSON

Permaculture Sizing				
# of People	Time (years)	Produce (lbs)	Area (sf)	Area (acres)
1	1	750	500	0.01
45	1	33750	22500	0.52

VALUE ADDED OPTIONS

Restaurant

Organic Foods Farm Stand

Permaculture Design Courses

Seedlings and Saplings

Heirloom and Organic Seeds

Compost and Compost Teas

Goat Cheese

Honey

Wine

Dairy Products (cheese, cream, yogurt etc.)

Fresh Cut Flowers

Maple Syrup

Jam

Wine

Eggs

Wool/ Yarn

Bacon

Permaculture Precedents Links

Oikos Tree Crops - <http://oikostreecrops.com/>

Krameterhof - <http://www.krameterhof.at/>

Djanbung Gardens Permaculture - <http://permaculture.com.au/>

East Feast Festival Beach - <http://festivalbeachfoodforest.weebly.com/>

Beacon Food Forest - <http://www.beaconfoodforest.org/>

Permaculture Balcony - <http://permaculturenews.org/2010/10/02/my-balcony/>

ASLA Student Award - <http://www.asla.org/2010studentawards/020.html>

Recommended Resources

Gaia's Garden – Toby Hemenway

Earth User's Guide to Permaculture – Rosemary Morrow

An Introduction to Permaculture – Bill Mollison

Plant Guilds <https://midwestpermaculture.com/plant-guilds/>

<http://permacultureprinciples.com> – David Holmgren

Permaculture Principles and Pathways Beyond Sustainability – David Holmgren

Edible Forest Gardens Vol 1 & 2 – David Jacke & Eric Toensmeier

Permaculture – A Designers Manual – Bill Mollison

MIDWEST PERMACULTURE

- Permaculture Design Certificate Courses
- Topical Workshops
- Internship Programs
- Speaking and Educational Services
- Permaculture Design Consulting & Services

Our Permaculture Design Certificate (PDC) courses cover the essential elements contained in the curriculum outlined by Bill Mollison, the originator of this world-class training. The richness of our trainings we believe comes from our 35-years of experience living in a sustainably-oriented community. As such we have many useful insights into what it takes to create 'permanent culture.' Successful permaculture projects are built upon whole-integrated design including such key elements as water, soil, food, energy, buildings and people. We'll help you learn how to do that in most any climate.

**Please Visit Our Website
or Contact us.**

Web: <http://midwestpermaculture.com>
Email: info@midwestpermaculture.com
Phone: [815-256-2215](tel:815-256-2215)
Cell/Text: [815-782-2216](tel:815-782-2216)



Student Comments on our Permaculture Design Certificate Courses

"I'm so glad I took this training. It opened my eyes to what I was missing by just reading the books on permaculture & sustainability."

Al

(32 –Federal Aviation - Security)

"Everything we did at the course had a reason and tied back into the underlying concepts being taught. Each demonstration, each example was relevant."

Catherine

(46 –University Prof./Writer/Farmer)

"Taking my PDC course with Midwest Permaculture two years ago set me on a much more focused path and has been instrumental in enriching my life in many ways."

Being guided by the ethics and principles of permaculture has set me free, bringing me joy every day in the work I do, the people I invite into my life, and the choices I make."

Deanna

(45 – Botanic Garden Horticulturist)

"The information, design methods, networking, and even food were beyond my expectations. Taking this course has re-ignited a fire in me that had been only embers. There is hope for the human species."

Ron

(60 - Landscape Architect)