

Cover Image

Introduction to Permaculture



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Publication and on-going maintenance of this textbook is possible due to grant support from Oregon State University Ecampus.

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Introduction

Welcome to this free eBook, “Intro to Permaculture”. The permaculture perspective has more resonance now than at any other time since the term ‘permaculture’ was coined in 1978. The Paris Climate Agreement of 2016 has the world admitting it needs to turn civilization onto a different road. Permaculture design has been scouting out that path for nearly 40 years, and now it’s time that the world sees some of what we have learned about living in cooperation with nature.

This free introduction to permaculture is meant for the novice and the professional alike, with no prior experience necessary. For the person new to permaculture design and land stewardship, this book will provide a foundation from which to build upon with subsequent training, and introduce a new perspective that can be applied in many careers and facets of life.

For the gardener, farmer, nurseryman, architect, landscaper, land manager, developer, engineer, aid worker, planner or activist, this book can help to deepen and focus the good work you’re already doing, and provide a grounding in the permaculture design process that you can apply in your current endeavors. The book is not teaching specific techniques as much as a system and process of design which can be used to enhance work in many different fields.

Our aim is to elevate permaculture design further into mainstream knowledge and discussions so this valuable design system can be used to transition civilization to a future with clean water, safe and abundant food, renewable energy and resources, healthy watersheds, and prosperous people and ecosystems.

There is a lot of social, political and environmental instability in the world right now. Consensus has been reached with the Paris Agreement that we need to drastically reduce carbon emissions to maintain a stable climate through this century and beyond. We need a paradigm shift where we change the foundation of business as

usual. The permaculture design system is a tool to accomplish this great shift, and it's time we put that tool in everyone's hands so we can all get to work repairing, restoring, regenerating, and reaping the rewards that will come when we care for Earth and its people.

Please accept this free gift we are offering and share this opportunity of free Permaculture education with your family, friends, and community.

PART I
SECTION I - WHAT IS
PERMACULTURE?

**Welcome to Oregon State University's Introduction to
Permaculture!**



Permaculture design is a method of landscape planning that can be applied at scales from the home garden to city block to village to

farm. It is an ethically based whole-systems design approach that uses concepts, principles, and methods derived from ecosystems, indigenous peoples, and other time-tested practices to create sustainable human settlements and institutions. Although rooted in horticulture and agriculture, Permaculture design is interdisciplinary, touching on a wide range of subjects including regional planning, ecology, animal husbandry, appropriate technology, architecture, and international development. In this free online book, students will learn about the Permaculture design process, its ethics and principles, and delve into climate-specific design elements through interactive technology, videos, graphics and readings. This book is designed to be as accessible as possible, meaning no matter your learning style, time commitments, or technology available, you will benefit from this book.

Image Sources

<https://pixabay.com/en/nettle-plant-green-437963/>

I. What is Permaculture?

In this book, basic information is given to get you started. Firstly, we look at the definition of Permaculture with a bit of history of the word. Secondly, we look at the overall design process and fields of study that inform Permaculture. Finally, we look at the four part Permaculture Decision Making Matrix which is the basis of the information in this book.



Permaculture Definition

It's time to get started learning about Permaculture! In this first video of the book, we define the word, and talk about it's origins.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=32>

- Intro to Permaculture: What is Permaculture? – Video Transcript
- Introdução a Permacultura: O que é Permacultura – Tradução Português

Featured Links

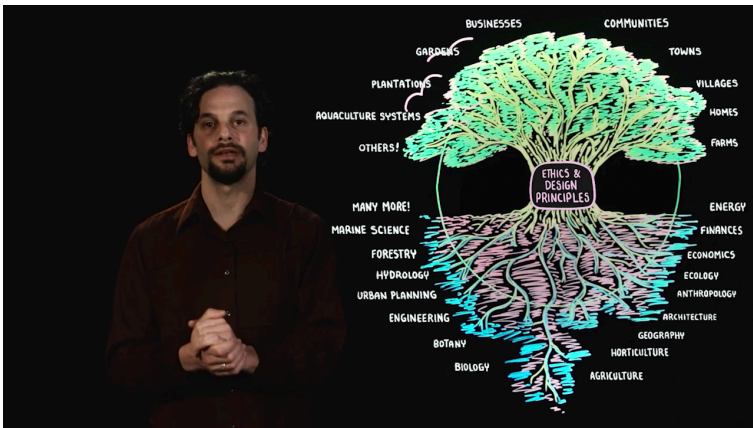
- The Definition of Permaculture: An Interview with Bill Mollison
- Wikipedia Permaculture Definition

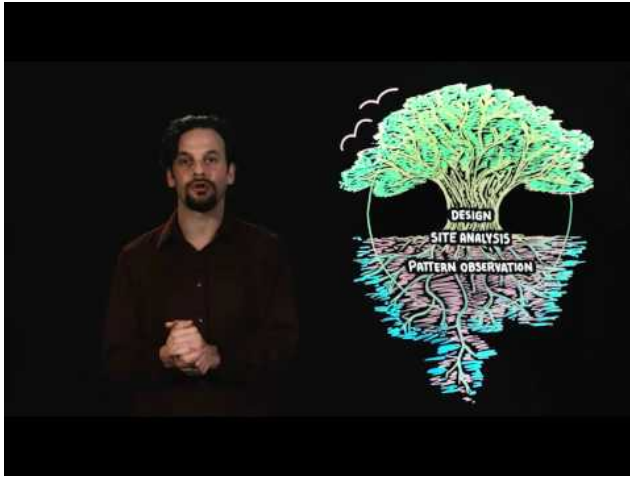
In the video above, we make reference to Permaculture's co-founder, Bill Mollison. You can read an interview with Bill in the featured links provided above where he talks about the

Permaculture definition. We also make reference to water, food and shelter systems. **A system is defined as “a set of connected things or parts forming a complex whole.”** So when we refer to water systems, we’re recognizing that the way we design for water on a Permaculture site takes into account its’ many interconnections, with soils, trees, water tables, the atmosphere, and wildlife.

Permaculture Design Process

We’re going to look now at the overall process of the Permaculture design system. Permaculture is multidisciplinary and multi-faceted, which makes Permaculture very dynamic, but also makes it hard to define. This video explains the wide array of influences and outputs of Permaculture design.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=32>

- Intro to Permaculture: The Foundations of Permaculture Design – Video Transcript
- Introdução a Permacultura: As Fundações do Projeto de Permacultura – Tradução Português

Featured Links

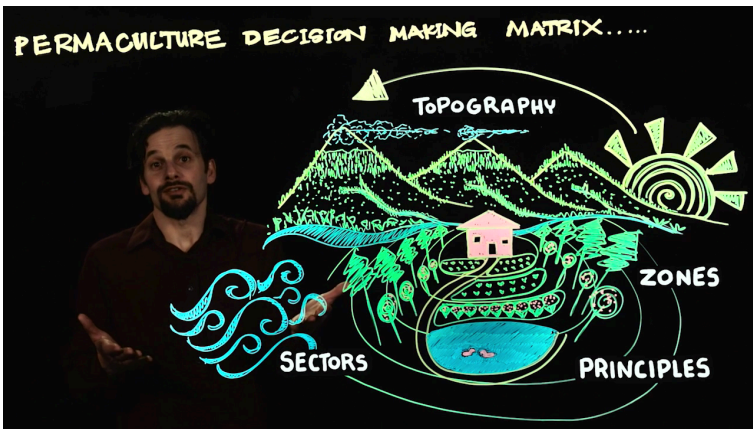
- Holmgren's Permaculture Flower

This video unites a number of diagrams that have been circulating Permaculture design course texts and media outlets for many years, including David Holmgren's Permaculture Flower (link located in the featured links above). You will notice many analogies to a tree in

this book, as the form of a tree provides so many opportunities to understand how nature works and how the Permaculture design system is modeled after nature.

Permaculture Decision-Making Matrix

This video consolidates the Permaculture design process into four distinct parts: topography, sectors, zones and principles. These are the major topics we will be looking at in this short introductory book.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=32>

- Intro to Permaculture: Permaculture Decision Making Matrix – Video Transcript
- Introdução a Permacultura: A Matriz de Tomar uma Decisão na Permacultura – Tradução Português

The Permaculture decision-making matrix is a term and structure coined by Andrew Millison, but only represents a repackaging of Permaculture design process that is explained by Bill Mollison and many great teachers and practitioners. This decision making tool is useful as a basic outline of the main tools used in Permaculture design.

Image Sources

<https://pixabay.com/en/ivy-green-blurry-background-nature-1287383/>

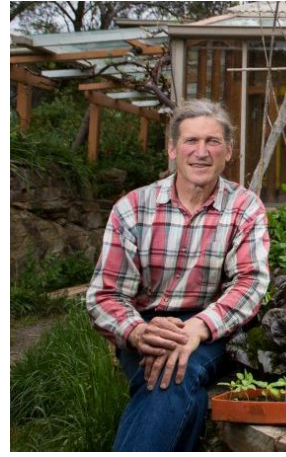
2. The People of Permaculture

These are just some of the people who have worked hard for many years to bring Permaculture to the world. We couldn't include everyone, but each person pictured here has made significant contributions to the field over a long period of time. Choose a few to click on and explore further.



Bill Mollison

- Tagari Publication – About Bill Mollison
- Pacific Edge – A Short and Incomplete History of Permaculture



David Holmgren

- About David Holmgren
- Holmgren Designs



Robyn Francis



Rosemary Morrow

- [Permaculture College Australia – About Robyn Francis](#)
- [Seed Sustainability Com Morrow](#)



Narsanna Koppula

- Aranya Agricultural Alternatives – About Narsanna Koppula
- International Permaculture Convergence India



Penny Livingston-Stark

- Regenerative Designs –



Geoff Lawton

- Permaculture Worldwide Network – About Geoff Lawton
- GeoffLawtononline.com



Maddy Harland

- Mother Earth News – A
- Permaculture Magazine
- Permanent Publications



Mark Lakeman

- [About Mark Lakeman](#)
- [City Repair](#)



Starhawk

- [About Starhawk](#)
- [Earth Activist Training](#)



Eugenio Gras

- Designed Visions- About Eugenio Gras
- Mas Humus



Alias Mulambo

- The Story of Tsuro – Alias Mulambo
- PORET Zimbabwe



Roberto Perez



Julious Piti

- Permaculture Research Institute: How Cuba Leads the World in Permaculture

- PORET Livelihoods – A
- About Chikukwa Ecolog
- PORET Zimbabwe



Patrick Whitefield

- Patrick Whitefield Associates – About Patrick Whitefield



Masanobu Fukuoka

- About Masanobu Fukuoka



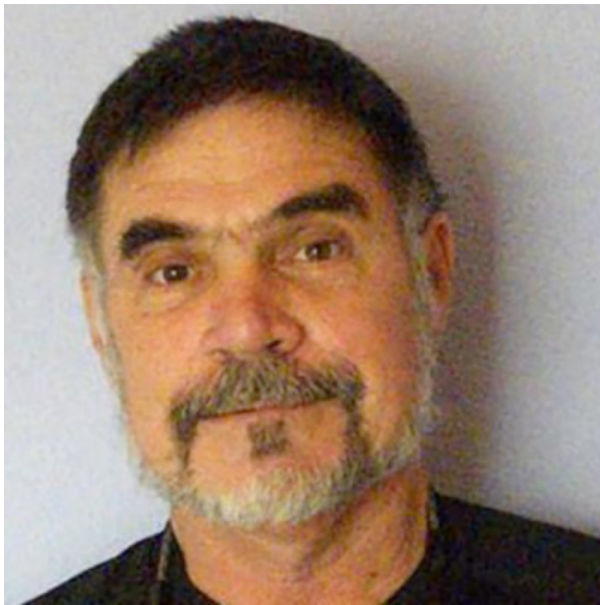
Scott Pittman

- [The Permaculture Institute – About Scott Pittman](#)



Peter Bane

- [Permaculture Activist –](#)
- [Permaculture Handboo](#)



Tim Murphy



Darren Doherty

- Regenesis Group

- Regrarians – About Dar



Warren Brush

- True Nature Design – About Warren Brush
- Quail Springs
- Casitas Valley
- PRI Kenya



Brad Lancaster

- Harvesting Rainwater –
- Sun and Shade Harvest
- Desert Harvesters



Brock Dolman



Ego Lemos

- Occidental Arts and Ecology Center – About Brock Dolman

- Skinny Fish Music – About Ego Lemos
- Permaculture Guidebook



Toby Hemenway

- About Toby Hemenway



Chakra Widia

- Sawah Bali – About Chakra Widia
- Tri Hita Karana Bali



Tom Ward

- Siskiyou Permaculture – About Tom Ward



Joel Glanzberg

- Pattern Mind – About J
- Regenesi Group
- The Tracking Project



Albert Bates

- About Albert Bates



Larry Santoyo

- Permaculture Institute
- Earthflow Designs
- The Permaculture Acad



Robin Clayfield



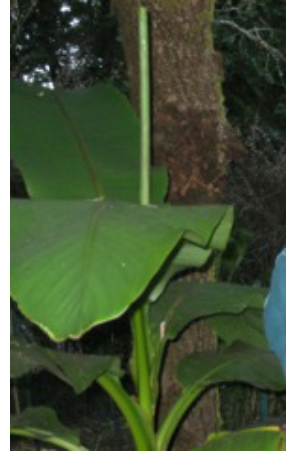
Tom Kendall

- [Permaculture Worldwide Network – About Robin Clayfield](#)
- [Dynamic Groups](#)

- [DIY Food and Health –](#)



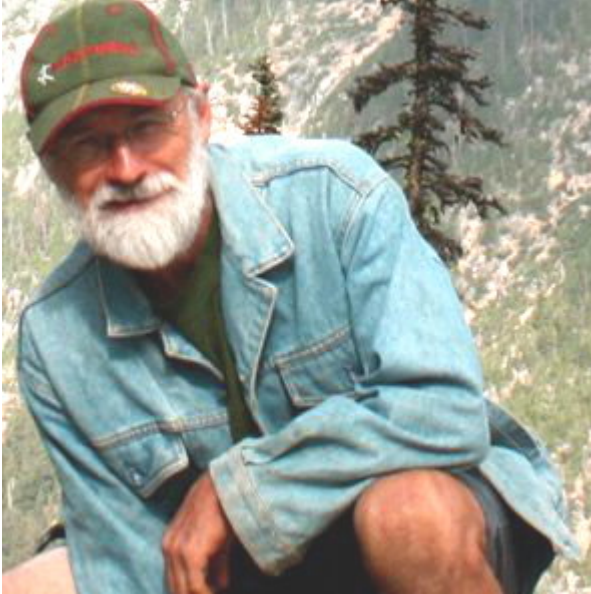
Wayne Weissman



Jude Hobbs

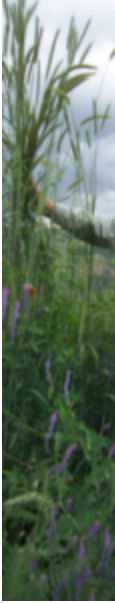
- [The Permaculture Project – About Wayne Weiseman](#)
- [Permaculture Design Build Collaborative](#)

- [Cascadia Permaculture](#)



Michael Pilarski

- [About Michael Pilarski](#)



Sepp Holzer

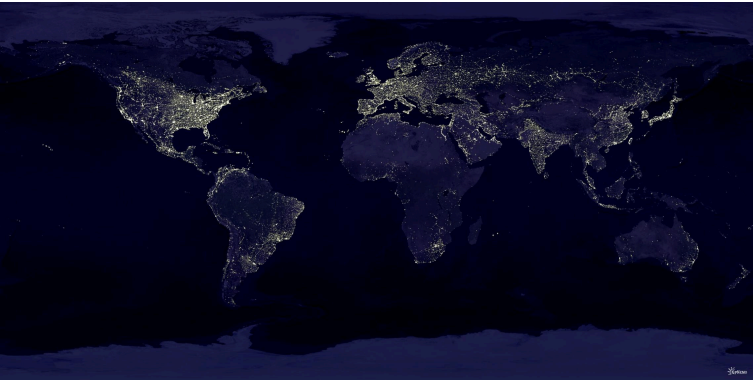
Photo: Elena Leongard

- [About Sepp Holzer](#)

3. State and Challenges of the World

In these two videos, we explore the need for Permaculture and some of the issues we currently face on the planet.

State of the World



To understand the reasons why we do Permaculture, we need to examine the problems we face to get a picture of what issues we are solving. This video looks at the Earth at night, in order to get a new perspective on resource distribution.



A YouTube element has been excluded from this version of the text. You can view it online here:
<https://open.oregonstate.education/permaculture/?p=74>

- Intro to Permaculture: State of the World – Video Transcript
- Introdução a Permacultura: O Estado do Mundo – Tradução Português

References

- World Energy Statistics
- Map of Global Carbon Emissions
- World Shipping Routes

Many of the world's conflicts and problems seem to make some sense when we look at the distribution of energy consumption. The lights on Earth represent the standard of living from a Western perspective, which includes transportation, consumer goods, economic activity and technological development. When designing Permaculture systems, we want to have a wide perspective on the world so we can best assess the forces at work wherever we are.

Challenges of the World



The ecological challenges we face are daunting, but Permaculture provides solutions. Watch this video to identify some of the problems and see how Permaculture addresses them:





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=74>

- Intro to Permaculture: Challenges of the World – Video Transcript
- Introdução a Permacultura: Desafios do Mundo – Tradução Português

Featured Links

Here we look at the causes of land degradation, and then several snapshots of how a Permaculture perspective can reverse these problems.

- Environmental Education Media Project
- Commonland: 4 Returns From Landscape Restoration

Special thanks to John D. Liu for permission to use his video footage

While this video introduces a general overview of a complex problem, throughout the rest of this book we explore the details of how to restore landscapes and stabilize the climate.

Podcast Episodes

- Earth Repair Radio: Rhamis Kent on Permaculture's Solution to the Refugee Crises
 - Earth Repair Radio: Rhamis Kent on Land Degradation and the Rise of ISIS
-

Image Sources

<https://pixabay.com/en/earth-earth-at-night-night-lights-11595/>

<https://pixabay.com/en/forest-perspective-tall-high-up-505860/>

4. David Holmgren's Future Scenarios

This page explores the work of Permaculture's cofounder David Holmgren and what he sees for the possible directions that civilization can take.



David Holmgren's Permaculture site, Melliodora, in Hepburn Springs, Australia

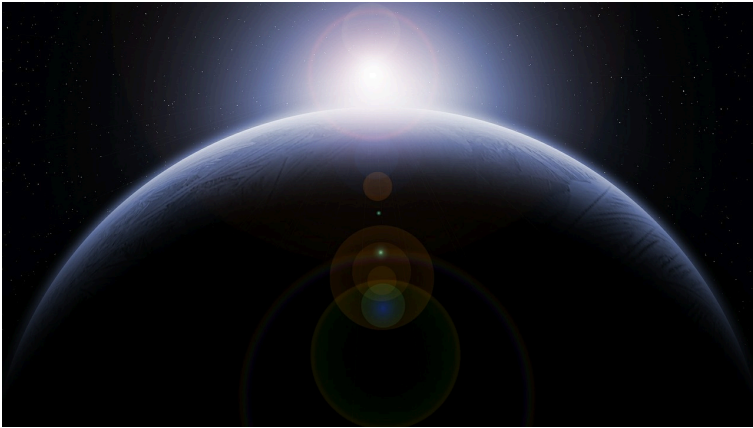
Permaculture's co-founder David Holmgren is a futurist, and has shared deep wisdom and insight about where we are headed as a civilization. He lives in Hepburn Springs, Victoria, Australia, about 99 km (61 miles) from Melbourne. His well-known Permaculture site called Melliodora that is documented in this book *Melliodora: Ten Years of Sustainable Living*. He has published a number of books, including "Permaculture: Principles and Pathways Beyond Sustainability", and "Future Scenarios: How Communities Can Adapt to Peak Oil and Climate Change"

Holmgren's first book "**Permaculture: Principles and Pathways Beyond Sustainability**" introduces the concept of "Peak Oil" which

is the time when the world uses half of the available fossil fuels on the planet, and the other half is more costly to extract, with a decreasing amount available each year. This causes us to seek the dirtier forms of fossil fuel extraction, which exacerbates climate change through increased CO2 emissions.

In “**Future Scenarios**”, Holmgren outlines the possible directions that we can go, given the world energy situation:

Techno Fantasy



“depends on new, large and concentrated energy sources that will allow the continual growth in material wealth and human power over environmental constraints, as well as population growth. This scenario is generally associated with space travel to colonize other planets.” – Excerpted from Future Scenarios website

Cleantech Stability



“depends on a seamless conversion from material growth based on depleting energy, to a steady state in consumption of resources and population (if not economic activity), all based on novel use of renewable energies and technologies that can maintain if not improve the quality of services available from current systems... Photovoltaic technology directly capturing solar energy is a suitable icon or symbol of this scenario.”

Energy Descent

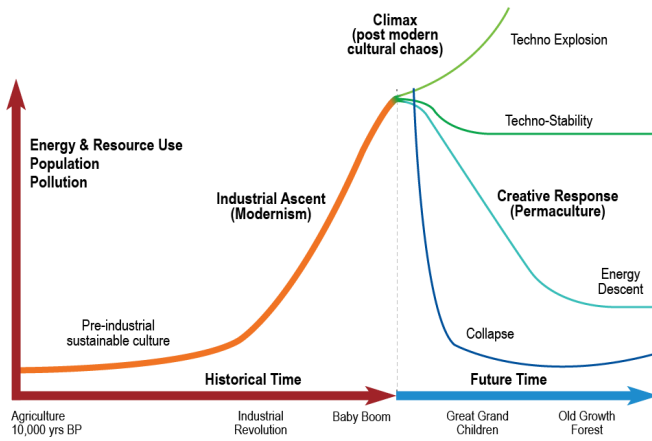


“involves a reduction of economic activity, complexity and population in some way as fossil fuels are depleted. The increasing reliance on renewable resources of lower energy density will, over time, change the structure of society to reflect many of the basic design rules, if not details, of pre-industrial societies. This suggests a ruralization of settlement and economy, with less consumption of energy and resources and a progressive decline in human populations.”

Collapse



“suggests a failure of the whole range of interlocked systems that maintain and support industrial society, as high quality fossil fuels are depleted and/or climate change radically damages the ecological support systems. This collapse would be fast and more or less continuous without the re-stabilizations possible in *Energy Descent*.”



At this point in David’s futurist outlook, he believes that the time for sustainability is over, and we need to look to being as resilient as we can, where we are. His new book due out in 2016 is **“RetroSuburbia”**, which imagines how suburban-scaled Permaculture systems will provide the foundation for survival into an unknown future.

Holmgren’s Future Scenario’s research

- David Holmgren long interview
- David Holmgren presentation in Tasmania: “Surfing Suburbia”
- *Video*: Surfing the Suburbs with David Holmgren
- David Holmgren article: “Retrofitting the Suburbs for the Energy Descent Future”
- David Holmgren’s website outlining “Retrosurbia”

Image Sources

<https://holmgren.com.au/wp-content/uploads/2013/02/HD-Banners-Melliodora.jpg>

<https://pixabay.com/en/planet-moon-orbit-solar-system-581239/>

<https://pixabay.com/en/solar-power-solar-panels-862602/>

<https://pixabay.com/en/cow-pasture-animal-almabtrieb-759018/>

<https://pixabay.com/en/industry-sunset-port-facility-mood-438428/>

5. Permaculture Ethics Investments & Directives

This page explores the ethics of Permaculture, the types of investments we make, and some of the directives which influence the Permaculture design system.

Permaculture Ethics

Permaculture Ethics

- Care of the Earth
- Care of People
- Fair Share

& Design Principles

- Observe & interact
- Take & store energy
- Obtain a yield
- Apply self-regulation & accept feedback
- Use & value renewable resources & services
- Produce no waste
- Design from patterns to details
- Integrate rather than segregate
- Use small & slow solutions
- Use & value diversity
- Use edges & value the marginal
- Creatively use & respond to change

permacultureprinciples.com

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Permaculture ethics are the core of the design system. You can use the tools and processes of Permaculture, but if you're not using the ethics, then it's not Permaculture. In this video, we explain the three ethics: Earth Care, People Care, and Reinvestment of Surplus back into the first two ethics (Fair Share).





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=88>

- Intro to Permaculture: Permaculture Ethics – Video Transcript
- Introdução a Permacultura: Éticas na Permacultura – Tradução Português

There have been different versions of the third ethic put out throughout the years, and most people like “Fair Share”, perhaps because it has a nice ring to it. But “Reinvestment of surplus back into Earth Care and People Care” is a bit more explicit. A respected Permaculture teacher and author, Starhawk, says “Future Care” is the third ethic. There are also those who add a fourth ethic, called the “Transition Ethic“. The transition ethic recognizes that we have a long way to go, and it may be necessary to use unsustainable practices or technologies along the way, like, for example, fossil fuel driven Earth moving equipment. Transitioning to a sustainable future has many steps along the way.

Additional Resources

- Permaculture Ethics
- Overview of the Permaculture Ethics
- Why Permaculture is Different
- Permaculture Association: Ethics
- Exploring Social Permaculture
- Importance of Social Permaculture by Starhawk
- Ethics and a Call to Fair Share
- What is Permaculture – Ethics by Maddy Harland
- Liberation Ecology

Podcasts

- Permaculture Voices: Social Permaculture. Creating a Diversity of Functional Connections Between People and Their Skills

Permaculture Investments



This video explores three different types of investments: degenerative, generative, and regenerative. We are not just talking about financial investments. We're referring to investing time, energy, and resources.





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<https://open.oregonstate.education/permaculture/?p=88>

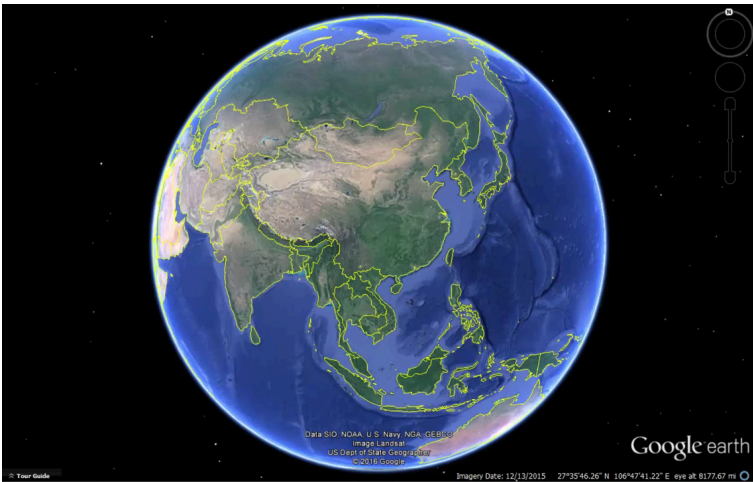
- Intro to Permaculture: Regenerative Investments – Video Transcript
- Introdução a Permacultura: Investimentos Regenerativos – Tradução Português

In Permaculture we are striving to maximize regenerative investments; those that improve over time. There are many forms of capital we speak of when talking about investments. Ethan Roland and Gregory Landua of Terra Genesis International have articulated the Eight Forms of Capital, as another perspective on investments and yields, and financial capital is only one of them!

Permaculture Directives



The Permaculture directives are some of the major themes that we are working with in a Permaculture design. Design with Nature, Design for Culture, Pattern Literacy, and Indigenous Wisdom are all topics we explore in this short video.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=88>

- Intro to Permaculture: Permaculture Directives – Video Transcript
- Introdução a Permacultura: Diretivas da Permacultura – Tradução Português

Permaculture design is based on working with nature, and understanding how nature functions. This is the study of ecology, and is a crucial piece to informing your Permaculture work. Learning how indigenous people lived in a place falls under the study of anthropology and ethnobotany. The ways native people historically lived in an area before and during the industrial age provide clues about what a sustainable relationship with the land looks like. Anywhere that people have a sustainable relationship with the Earth in their use of resources is an example to learn from.

Additional Resources

- Toby Hemenway on Natural Patterns
 - Permaculture: Your Way to Sustainable Living by Geoff Lawton
-

Image Sources

[https://permacultureprinciples.com/downloads/
Pc_Principles_Poster_EN.pdf](https://permacultureprinciples.com/downloads/Pc_Principles_Poster_EN.pdf)

<https://pixabay.com/en/apple-orchard-apple-blossom-75113/>

[https://pixabay.com/en/white-tailed-eagle-adler-bald-
eagle-416795/](https://pixabay.com/en/white-tailed-eagle-adler-bald-eagle-416795/)

6. Scales of System

There are many different scales at which we find Permaculture applied, and on this page you can browse different examples of sites that are using Permaculture.

1. Urban Permaculture



There are widespread examples of Permaculture systems at the urban scale throughout the world. On balconies, rooftops, small yards and empty lots, we find intensively cultivated and highly productive systems. Permaculture designs in urban areas are

packed tightly, making the most use of limited space through complex relationships between rainwater and wastewater flow, food production, composting, sunlight, pollinator habitat, social areas, and the urban waste stream which can provide free and inexpensive materials for building structures and soil. Below are links to urban Permaculture projects and resources:

- Seattle Homestead
- The Institute of Urban Homesteading Oakland, CA
- Urban Permaculture Guild, Berkeley, CA
- Planet Repair Institute, Portland, OR
- Deep Green Permaculture, Melbourne, Australia
- Article: How the Reading International Solidarity Centre built an urban permaculture garden, UK
- Milkwood Blog Funky Urban Permaculture Designs, Melbourne Australia
- The Permaculture Podcast with Scott Mann
- Top Leaf Farms specializing in rooftop farms
- Permaculture Association's resource guide to Sustainable Urban Drainage
- Little Farm L.A.

2. Suburban Permaculture



Suburban-scaled Permaculture systems are rich with possibilities . As co-founder David Holmgren said: “Suburban sprawl in fact gives us an advantage. Detached houses are easy to retrofit, and the space around them allows for solar access and space for food production. A water supply is already in place, our pampered, unproductive ornamental gardens have fertile soils and ready access to nutrients..” When we look throughout the world, we find abundant examples of suburbs that have filled in with productive Permaculture systems. The lower density of suburbs means that there is a lot of space for more expansive gardens, animals, tree crops, and land-based livelihoods. Below are links to suburban Permaculture projects and resources:

- Adaptation of David Holmgren’s lecture on Retrofitting the Suburbs for Sustainability
- Suburban Permaculture, information and resources to

transform the suburban environment

- Growing Futures Kenya, Suburban Permaculture Development
- Midwest Permaculture, 18 part Intro to Permaculture video series
- Erik Ohlsen's Suburban Permaculture Garden Tour Video

3. Permaculture in Public Space



Especially in urban areas, we find very rich examples of Permaculture systems which take advantage of the diversity of the 'human ecosystem' found there. Gathering places, public parks, and community food forests all contribute to the sustainability and resilience of a community. It's not just food, water and habitat that can make a place resilient; it's the social connections between people that make a strong and secure community where people know each other and help each other out. Permaculture in public spaces is often centered around places where people can gather and meet each other, so they have more of an opportunity to make those

connections. Below are links to public Permaculture projects and resources:

- The City Repair Project, Portland OR
- Keepers of the Waters, artistic, community centered remediation of living water systems
- Beacon Food Forest, Seattle, WA
- Permaculture Park, Ithaca, NY

4. Multi-unit Urban Development



As Permaculture design has spread into more conventional fields, developers, architects, planners and landscape architects have utilized it to design multi-unit housing projects. Permaculture is

about applying different patterns to the layout of a housing subdivision, with attention to solar access, energy systems, water flow, pathways, and a productive landscape for people and wildlife. Development projects at this scale are already investing in buildings, utilities, drainage, and road infrastructure, so often it's just the matter of having proper positioning, orientation and interconnection between these elements that creates the 'mainframe' for a more regenerative settlement. Below are links to multi-unit Permaculture projects and resources:

- Village Homes, Davis CA
- Milagro CoHousing, Tucson AZ
- Columbia Eco Village, Portland, OR
- Permaculture Design International, project in Eastern Oregon

5. Ecovillage



The loose term for a Permaculture-based village or community is 'ecovillage', which is short for ecological village. There are many inspiring examples all over the world of how Permaculture design is applied to create intentional communities, as well as transforming existing villages in traditional cultures and contemporary settlements. Ecovillage design is a very rich field, where the elements of food, water, energy, materials, ecology, housing, and forestry are woven in with community political structures,

economics, urban planning, and all the challenges and opportunities of sharing resources. Below are links to ecovillage Permaculture projects and resources:

- Auroville, India
- The Chikukwa Project, Zimbabwe
- Crystal Waters, Australia
- Tamera, Portugal
- Permaculture Association, Housing Resources

6. Retreat and Healing Centers



Many people have utilized Permaculture design when creating healing or retreat centers. It's been used both for retreat centers that are built from the ground up in colonized areas, as well as indigenous people practicing traditional medicine in their native lands. The fact that two of Permaculture's ethics are care of Earth and care of people means that the design system is very conducive

to the healing environment of hot springs, yoga centers, ashrams, retreat centers, alternative medical facilities, indigenous medicine centers, and eco-resorts. In these environments, the natural patterns of Permaculture can bring a heightened aesthetic that is functional and productive. Below are links to retreat and healing center Permaculture projects and resources:

- Eco-Friendly Africa Travel
- Living Art Farm, South Africa
- Chakra Alegria de Amor Rainforest Healing Center, Peru
- Paititi Institute, Peru
- Chaikuni Institute, Peru
- Heartwood Institute, Garberville, CA

7. Homestead



For this list, the homestead scale refers to a rural property that is bigger than a suburban lot but smaller than a working farm. This means that the area under management is between 1 and 5 acres or .5-2 hectares. A homestead will not usually rely solely on the fruits of their land for income and sustenance, but is big enough to have more diverse and extensive production systems. This is a very popular scale for Permaculture projects throughout the world, and offers the potential for significant animal rotation, growing large trees, ponds with more substantial water collection, multiple larger structures, and profitable cottage industry with multiple residents. There are some really beautiful Permaculture homesteads out there! Below are links to some projects and resources:

- Melliodora, Australia, Designed by David Holmgren
- Whole Systems Design, Mad River Valley, VT

8. Farms



Permaculture farms are diverse agricultural systems that are designed with a range of different enterprises that work together to make profitable businesses and healthy landscapes. The layout of a Permaculture farm is influenced by the shape of the land, to maximize production and minimize effort while building soil, benefiting the water cycle, and providing long-term resilience and abundance to the farmers. Permaculture farms look different than conventional farms because they work with natural patterns and integrate animals, crops, trees, water storage, renewable energy, and people in a harmonious and productive way. Below are links to Permaculture farm projects and resources:

- Taranaki Farm, Australia
- Forest Agriculture Enterprises, Viola, WI
- Seven Seeds Farm, Williams, OR
- Bullocks Permaculture Homestead, Orcas Island, WA
- Ridgedale Permaculture, Sweden
- Rancho San Ricardo, Mexico (pictures above)

9. Educational Centers



There are many overlaps on these scales of systems, especially for educational centers, because many are also farms, homesteads, suburban lots, urban lots, or retreat centers. Permaculture demonstration sites with a focus on bringing people into touch with the systems, learn, and be inspired is a category of Permaculture sites that we find. Demonstration sites are often some of the most rich and diverse ones because they are designed for interaction and education of the public. Many sites offer full Permaculture Design Courses (PDC), which we encourage you to take if you want to get deeper into this inspiring field. Below are links to Permaculture educational centers:

- Quail Springs Permaculture, California
- Fambidzanai Permaculture Center, Zimbabwe
- Zaytuna Farm, Australia
- Maya Mountain Research Farm, Belize

- Aprovecho, Cottage Grove, OR

10. Broad Scale Agroforestry



It is not just homesteads and farms that have taken up Permaculture. Some large commercial and industrial-scale producers have seen the value of Permaculture systems and investing in large scale projects that are benefitting whole regional economies, ecology, hydrology, and food security. There are corporations who have invested in these projects, like M&M Mars Inc. in Vietnam. There are also projects that are not under the name “Permaculture”, and are called agroforestry, yet share many of the same design principles, strategies and techniques. This is a growing area where there is the potential for industries to apply Permaculture design to existing supply chains, which turns consumer dollars into agents of land regeneration, like Lush

Cosmetics is doing (link below). Below are links to broad scale Permaculture and agroforestry projects and resources:

- Ghana Permaculture Institute
- Lush Cosmetics, UK
- Sadhana Forest, Haiti
- Cacao Agroforestry in Vietnam

II. International development



International development is another field ripe for the application of Permaculture design. There are already many channels where money, experts and other resources are working to assist in the economic development of other countries, and Permaculture has it's own initiatives to make international development sustainable and regenerative for economies, ecosystems, and societies. Many non-profit organizations already employ Permaculturalists to conduct trainings and development projects in many countries.

Below are links to Permaculture international development projects and resources:

- Permaculture Research Institute, Resiliency in International Development
- Permaculture Research Institute, Integrating Permaculture & International Development
- Quail Springs Permaculture, PDC for International Development
- Accounting For International Development, Permaculture Institute of El Salvador

12. Disaster Relief and International Aid



There are many instances where teams of Permaculture “first responders” have arrived in areas after a major natural or human-made disasters. Often times this is with the support of a non-

governmental organization. Permaculture is very suited to organizing safe and ecological survival systems in refugee camps and places which need to be rebuilt. In many disaster situations, appropriate technology and Permaculture design can really benefit things like the safe processing of human waste through composting, keeping water clean and soils in place through erosion control and layout of camps, fuel efficient cooking using appropriate technology, and fast growing gardens that turn garbage into compost and into food. Below are links to Permaculture for disaster relief:

- Haiti: How permaculture is proving a vital tool in disaster relief
 - Hurricane Yolanda Permaculture Relief Aid Workers, Philippines
 - Treehugger, Rethinking Disaster Relief for Haiti and Beyond
-

Image Sources

<http://www.gettyimages.com/detail/photo/inner-city-urban-allotment-gardening-project-royalty-free-image/107741291>

<http://www.gettyimages.com/detail/photo/inner-city-urban-allotment-gardening-project-royalty-free-image/107741295>

<https://pixabay.com/en/yoga-practice-exercise-fitness-626343/>

<http://www.gettyimages.com/detail/photo/organic-tomato-plants-royalty-free-image/531881455>

<http://www.gettyimages.com/detail/photo/virgin-rainforest-with-stream-amami-oshima-japan-royalty-free-image/568699537>

<https://pixabay.com/en/environmental-protection-environment-683437/>

<https://pixabay.com/en/hands-world-map-global-earth-600497/>

PART II

SECTION 2 - WHERE AM I?

Introduction

This video provides an overview of what we will cover during Section 2. The big question we address in this module is “Where Am I?” by using tools for observation and analysis.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=99>

- Intro to Permaculture: Module 2 Overview – Video Transcript

“We are only truly secure when we look out our kitchen windows and we see our own food growing and our friends working nearby.”

– **Bill Mollison**

Learning Outcomes

By the end of this module you will be able to:

- Identify your watershed
- Identify basic sectors

7. Climate Change & Site Analysis

This page defines climate zones, climatic patterns and the effects of climate change.

Where Am I?



There are recurring characteristics in every climate that will affect the land, and what can grow and live there. These recurring characteristics are called **climatic patterns**. By understanding climatic patterns, you can incorporate the characteristics into your

plan, use them to inform your choices and create a more effective permaculture design.

In this book we will focus on Earth's three major climate zones (climate types). There are many more than 3 climate zones; the Earth is an incredibly diverse place with great variability! But for the purposes of the introductory book we will look at the three most general categories: Tropical, Drylands and Temperate zones. Let's take a closer look at these now, and explore the climatic patterns of each one.

Three Major Climate Zones

Tropic



Drylands



Temperate




For greater detail, please see the Koppen-Geiger Climate Classification System.

The Effects of Climate Change



The climate is changing and weather extremes are increasing throughout the planet. Changing climatic patterns can have an effect on native plants, animals, weather, temperature, agriculture, sea levels, energy use, and much more. A Permaculture design is “permanent” because it is planned around resilience to extreme weather events. A Permaculture designer studies historical and projected weather events, and uses these to make informed design choices. Understanding weather and climate are important for the designer to have all the information to make the best design choices.

View the following video and explore the links below to learn more about the projected changes for locations around the globe.



A YouTube element has been excluded from this version of the text. You can view it online here:
<https://open.oregonstate.edu/permaculture/?p=107>

- Intro to Permaculture: Climate Zones, Climate Change and Permaculture – Video Transcript

References

- NOAA – U.S. Temperature Extremes and the Polar Jet Stream
- Evidence Linking Arctic Amplification to Extreme Weather in Mid-latitudes

Explore Climate Change Predictions



Explore climate change predictions by viewing the videos and clicking on the links below.

Videos

- Temperature and Precipitation Changes Across the World –

NASA

- [Linking Extreme Weather Events to Climate Change – Weather Underground](#)

Animations

- [A Breathing Earth – An Annual Pulse of Vegetation and Ice](#)
- [Animated Jetstream Forecast](#)

Web Pages

- [21st Century Precipitation Scenarios – NASA](#)
- [21st Century Temperature Scenarios – NASA](#)
- [Permaculture Solutions for Climate Change](#)
- [Permaculture Planning and Planting for Climate Change](#)
- [Global Climate Change Impacts in the United States](#)
- [USDA Zone Hardiness Changes](#)

Interactive Tools

- [Climate Inspector – University Corporation for Atmospheric Research](#)

Wikipedia

- [General Circulation Model – Wikipedia](#)

Podcasts

- Earth Repair Radio: Tao Orion on Ecosystems in a Hotter World
- Permaculture Design in Temperate Zones and Cold Climates with Ben Falk – Permaculture Voices

What Will You Do?

Ask yourself “What are the major climatic patterns that determine the conditions which I will respond to with my Permaculture designs? How are my design parameters potentially affected as the climate changes?”

Image Sources

<https://pixabay.com/en/planet-earth-globe-space-world-1348079/>

<https://pixabay.com/en/ipanema-beach-rio-de-janeiro-99388/>

<https://pixabay.com/en/monument-valley-kayenta-arizona-usa-4092/>

<https://pixabay.com/en/squantz-pond-connecticut-landscape-209864/>

<https://pixabay.com/en/high-water-locked-damage-422662/>

<https://pixabay.com/en/climate-change-climate-drought-1325882/>

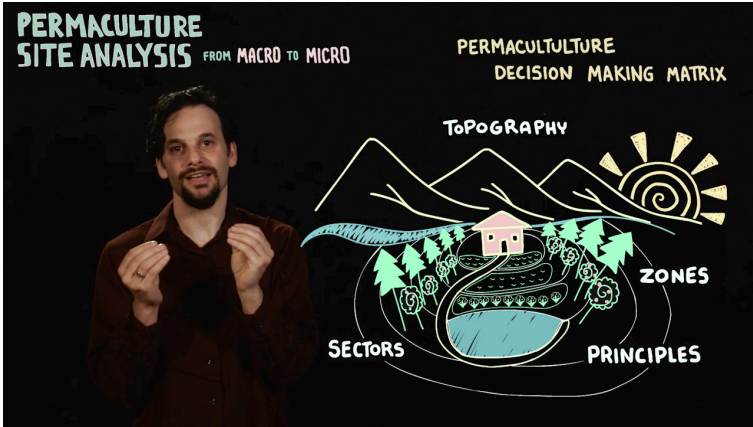
8. Permaculture Site Analysis: From Macro to Micro

This page is about placing yourself within the greater landscape, where we zoom in from afar and look at the macro patterns of topography and water flow. We explore the mountains' relationship to rainfall and learn about the watershed.

When we analyze a site, we first look at that location from larger patterns and then to the details, beginning from a zoomed out perspective to see how macro forces influence the site. We then zoom in to observe the site's unique characteristics, and through this process come to a more comprehensive understanding of the forces that need to be designed for. The videos below outlines this concept.

Site Analysis: From Macro to Micro

First, let's take a look at what you need to consider when conducting a site analysis.



A man with a beard and dark hair, wearing a dark brown jacket, stands on the left side of a black background. He is gesturing with his hands as if presenting. To his right is a glowing blue and white globe of the Earth. The text 'PERMACULTURE SITE ANALYSIS FROM MACRO TO MICRO' is in the top left corner of the image.

A YouTube element has been excluded from this version of the text. You can view it online here:

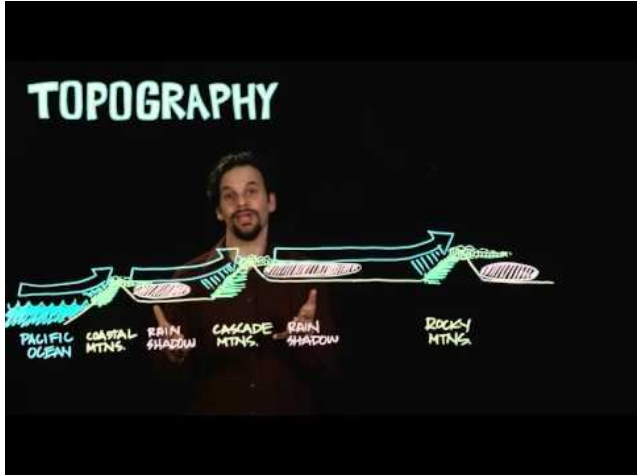
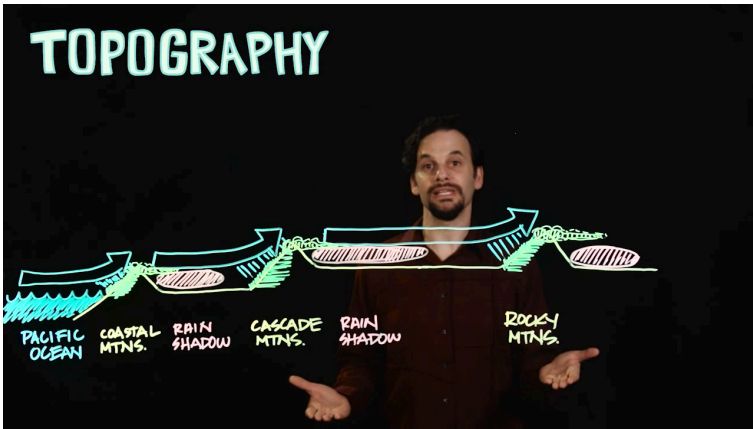
<https://open.oregonstate.education/permaculture/?p=113>

- Intro to Permaculture: Introduction to Permaculture Site Analysis – Video Transcript
- Introdução a Permacultura: Análises do Site de Introdução a Permacultura – Tradução Português

Climate and Topography



Understanding the way that mountain ranges interact with weather and the way that atmospheric moisture moves from the oceans into the interior of continents is an important macro-pattern to understand in order to answer the “where am I?” question.




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<https://open.oregonstate.edu/permaculture/?p=113>

- Intro to Permaculture: Climate and Topography – Video Transcript
- Introdução a Permacultura: Clima e Topografia – Tradução Português

Understanding the Watershed



Next, we look at the watershed. This is the way that land is shaped by water flow and one of the major foundation patterns we look at to understand how our site fits into the landscape.



A YouTube element has been excluded from this version of the text. You can view it online here:
<https://open.oregonstate.education/permaculture/?p=113>

- Intro to Permaculture: Understanding the Watershed – Video Transcript
- Introdução a Permacultura: Entendendo As Bacias Hidrográficas – Tradução Português

At this point you should be starting to have a clue about how to place yourself and your site within the larger patterns of the landscape. On the next page, we provide resources for you to find the watershed in which you live. Nearly every site belongs to a watershed. There are only a few notable exceptions where it is hard to identify a watershed drainage basin, for instance, properties located right along the coast. So take a look on the next page and find your watershed!

Image Sources

<https://pixabay.com/en/wind-rose-north-east-west-south-1209398/>

<https://pixabay.com/en/meander-river-england-1462370/>

9. Watershed Patterns

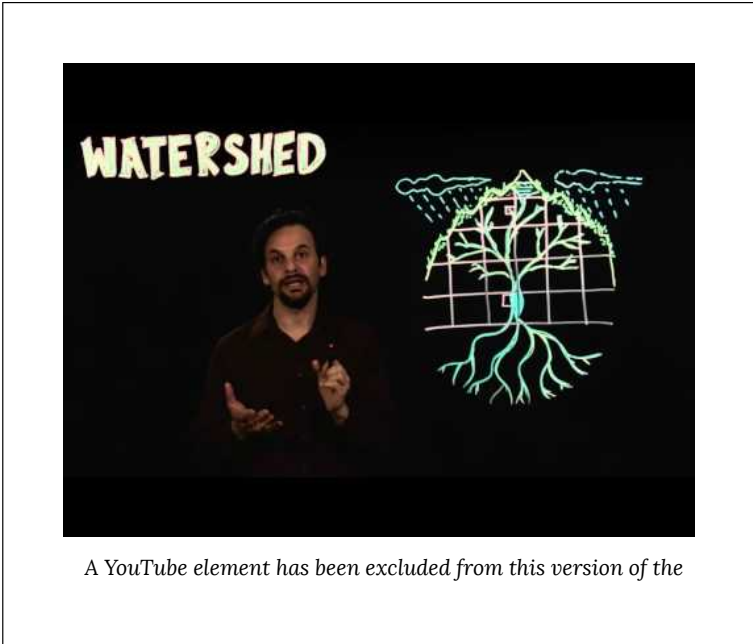
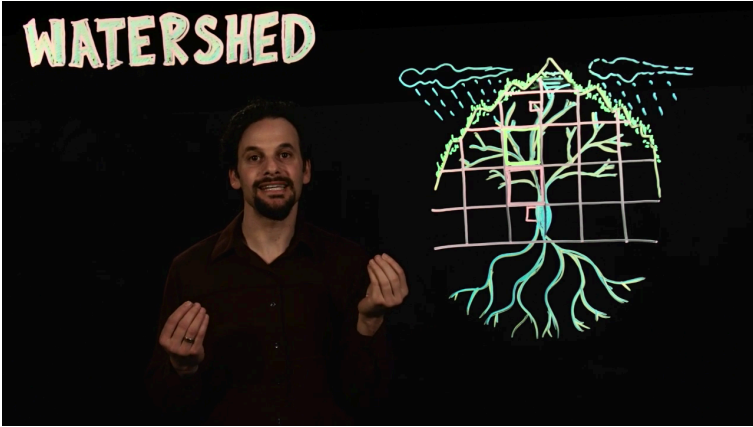
These videos talk more about the way water flows through the landscape, how roadways and property boundaries affect flow, and how water flow is tied in with the way soils are distributed on the landscape. Below, the links to videos we provided help understand terrain and landform.

Watershed Patterns and the Grid



In this video we're going to look more in depth into the watershed

pattern. We will explore how the grid of property ownership interacts with the branched drainage pattern of the watershed.



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text. You can view it online here:

<https://open.oregonstate.edu/permaculture/?p=117>

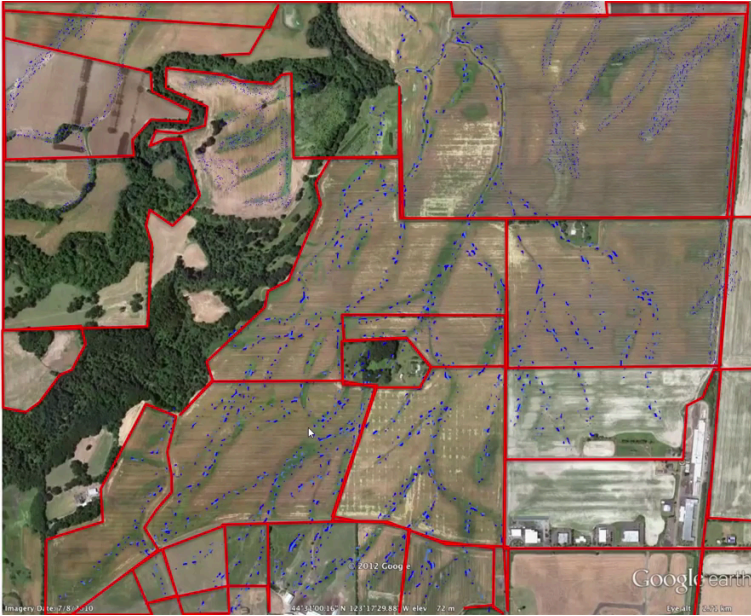
- Intro to Permaculture: Watershed Patterns – Video Transcript
- Introdução a Permacultura: Padrões de Bacias Hidrográficas – Tradução Português

Patters of Soil and Water



Continuing the theme of examining how property boundaries interact with the watershed pattern, we'll use that as the basis for exploring the interaction between how water flows and how soils are distributed. We will also look at the urban grid and discuss the

problems and solutions of Permaculture design for water in urban areas.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=117>

- Intro to Permaculture: Patterns of Soil and Water – Video Transcript
- Introdução a Permacultura: Padrões do Solo e da Água – Tradução Português

Now that we have a better basis for understanding how our sites fit within the watershed boundaries and the effects of property boundary grids, we will give you the opportunity below to learn more about topography and use some of the links and tools below to illustrate and evaluate terrain.

Explore Terrain Resources

Explore terrain resources by clicking on the links below. We have provided some tools for you to use to better evaluate elevation and contours on a site. You could learn a lot if you take the time to experiment with them.

Video: Create and elevation transect in Google Earth

Topographic Maps

- Extra help reading contour lines + video
- US, Europe, New Zealand
- World Topo Maps
- Global Topography Maps
- Geocontext Elevation Mapping
- Mapping Support Website
- Contour Line Diagrams

US

- How to add topographic maps to Google Earth
- Collection of US maps
- Topographic Map

Canada

- Canada and US (Zoom out until you reach Canada, click on the right hand drop down box and select “My Topo USA-Canada”)

Image Sources

<https://pixabay.com/en/canal-venice-italy-boats-cityscape-1209739/>


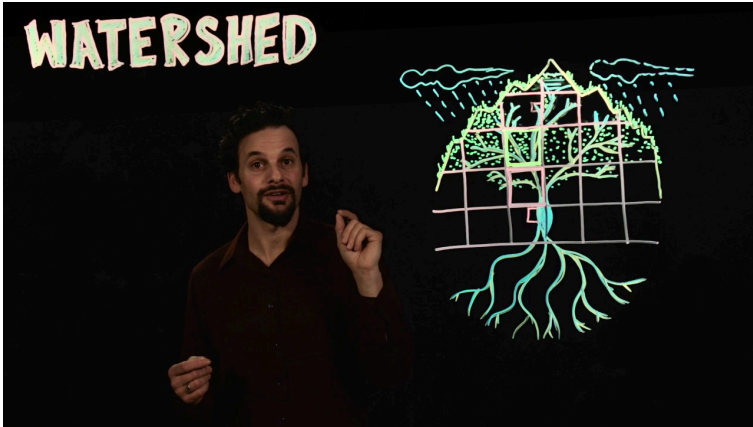
<http://www.gettyimages.com/pictures/an-aerial-view-of-high-peaks-streams-plains-agricultural-news-photo-532068684>

10. Deforested Watershed

What are the effects of deforestation? This is an important question that leads us into Permaculture solutions for many of the world's problems. These videos provide an overview of the problem of deforestation.



Understanding the effects of deforestation on the watershed is crucial to assessing the ecological health of a location and ultimately deciding on strategies and techniques to improve the place using Permaculture design. In this video, we once again revisit our watershed diagram to talk about the effects that deforestation has on the entire watershed.



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<https://open.oregonstate.edu/permaculture/?p=122>

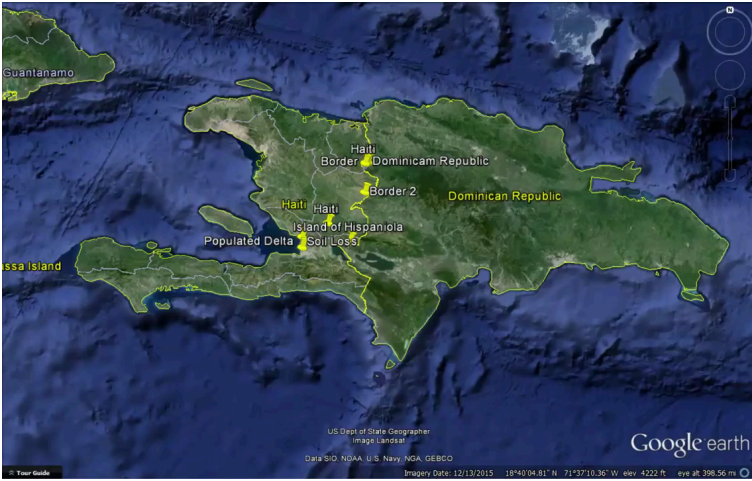
The image shows the same man and diagram as above, but the man is now gesturing with both hands open, palms facing up. The diagram and title "WATERSHED" are identical to the first image.

- Intro to Permaculture: How Trees Affect the Watershed – Video Transcript
- Introdução a Permacultura: Como as Árvores Afetam as Bacias Hidrográficas – Tradução Português

Haiti's Deforested Watershed



There's no clearer example of the effects of deforestation than in the country of Haiti on the Island of Hispanola in the Caribbean Sea. In this video, we take a Google Earth tour where the patterns are clear. The land's response to deforestation and its connection to soil erosion and flooding are stark in this impoverished nation.



A zoomed-in satellite map of the border region between Haiti and the Dominican Republic. The map shows a dense network of roads and a significant area of deforestation, particularly in the central and eastern parts of the island. The border is marked with a yellow line. Labels include 'Haiti', 'Border', and 'Dominican Republic'. The map is credited to Google Earth, with data from NOAA, U.S. Navy, NGA, GEBCO, and an imagery date of 4/8/2013. The map shows a significant area of deforestation, particularly in the central and eastern parts of the island.

A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.edu/permaculture/?p=122>

- Intro to Permaculture: Effects of Deforestation in Haiti – Video Transcript
- Introdução a Permacultura: Efeitos do Desflorestamento no Haiti – Tradução Português

Reference

- New York Times – Forest’s Role in Weather Documented in Amazon

Permaculture Projects in Haiti

Do you want to help make a positive difference for the people of Haiti? The links below lead to Permaculture and reforestation projects supporting the health of the people and watersheds.

- My Hands and Heart in Haiti
 - SOIL Haiti
 - Take Permaculture to Haiti
 - Sadhana Forest, Haiti
 - Permaculture Disaster Relief in Haiti
-


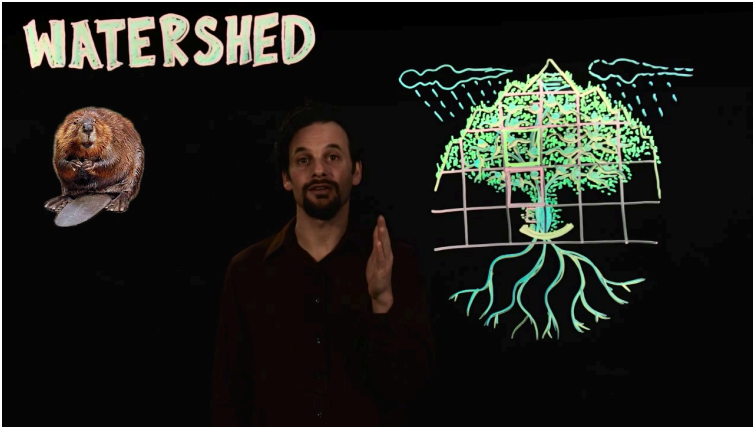
Image Sources

<https://pixabay.com/en/forestry-logging-deforestation-960806/>
<https://pixabay.com/en/haiti-painting-agriculture-fields-597533/>

II. Watershed Restoration



This video revisits our watershed diagram to discuss how watershed restoration can occur. We look at nature's watershed restorer, the beaver, and how we can fulfill the role of the beaver in slowing, sinking, and spreading the water to rehydrate parched landscapes.



A YouTube element has been excluded from this version of the text. You can view it online here:
<https://open.oregonstate.edu/permaculture/?p=134>

- Intro to Permaculture: The Beaver Watershed Engineer – Video Transcript
- Introdução a Permacultura: A Engenharia das Bacia Hidrográficas pelos Castores – Tradução Português

Additional Resources

- The Watershed Wisdom of the Beaver by Toby Hemenway
- Oregon State University Beaver logo

Explore Watershed Restoration

Explore watershed restoration projects by clicking on the links below.

- Greater Good Haiti
- Nandamojo River Basin, Costa Rica
- Occidental Arts and Ecology Center: Watersheds
- Global Water Partnership
- Lomakatsi, Oregon and Northern CA
- Salmon Creek Conservation Program, CA
- Whole Watershed Restoration Initiative, USA
- Basins of Reconnections: Free Download
- Ecotrust: Whole Watershed Restoration
- Ethiopia's Restoration Commitment
- Hope in a Changing Climate: John D. Liu
- Green Gold: John D. Liu
- Forests of Hope: John D. Liu
- Africa Rising: Soil Management in Ethiopia's Highlands

Global



New Zealand

- [Watersheds of the World Interactive Map](#)
- [Major Rivers of the World](#)
- [Artistic Watershed Maps of the World](#)

United States



Crater Lake, Oregon

- [Locate Your Watershed](#)
- [Surf Your Watershed](#)
- [EPA MyWATERS Watershed Mapping Site](#)
- [Explore Your Watershed in Google Earth](#)
- [The United \(Watershed\) States of America](#)

Canada



Upper Kananaskis Lake, Canada

- [Canadian Geographic Protect Your Watershed](#)
- [Explore Canada's Ocean Watersheds](#)

Mexico



Cabo San Lucas, Mexico

- Mexico Watersheds
- NW Mexico Coastal Watersheds Map

Europe



Gorge Du Verdon, France

- Rivers of Europe
- Drainage Basin Maps of Europe

Africa



Weeping River, South Africa

- Primary Watersheds of Africa
- Drainage Basin Maps of Africa

Asia and Oceania



Mekong River, Thailand

- Drainage Basin Maps of Asia
- Major River Basins and Sub-basins of SE Asia

South America



Recife, Brazil

- Drainage Basin Maps of South America
- Nested Watersheds of South America

Australia



Australia

- SE Australia Watersheds Map
- Topographic Drainage Divisions and River Regions Map

Image Sources

<https://pixabay.com/en/beaver-pond-wildlife-aquatic-cute-1448390/>

https://pixabay.com/static/uploads/photo/2015/02/24/05/14/new-zealand-647090_960_720.jpg

<https://pixabay.com/en/crater-lake-lake-water-volcano-1188096/>

https://pixabay.com/static/uploads/photo/2016/06/06/18/39/upper-kananaskis-lake-1440137_960_720.jpg

<https://pixabay.com/en/cabo-san-lucas-mexico-ocean-water-81372/>

<https://pixabay.com/en/gorge-du-verdon-france-provence-969744/>

<https://pixabay.com/en/south-africa-weeping-river-1425918/>

<https://pixabay.com/en/mekong-river-river-chiang-kong-237502/>

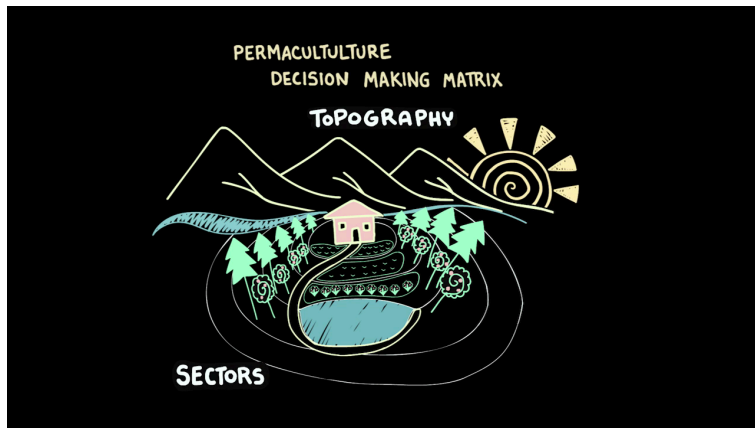
<https://pixabay.com/en/brazil-recife-atlantic-ocean-water-51128/>

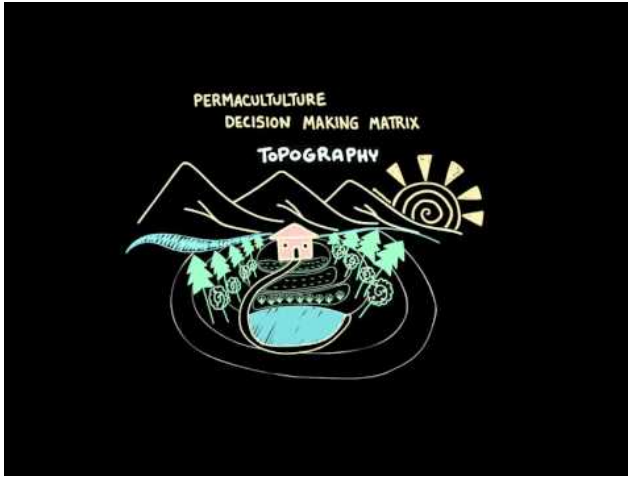
<https://pixabay.com/en/canyon-australia-river-environment-389040/>

12. Sectors

Sectors are directional forces that come in from outside our site. Mapping sectors is an important part of the Permaculture design process and part of the decision making matrix that this book teaches. This page introduces the concept of sectors and provides resources for identifying and mapping those directional forces.

This first video is a short reminder of where we are now in the Permaculture Decision Making Matrix. This provides the context for what's next.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=137>

- Intro to Permaculture: Permaculture Decision Making Matrix Sectors – Video Transcript
- Introdução a Permacultura: Matriz de Decisões na Permacultura – Tradução Português

Sector Compass

In this video, we delve into sector analysis and demonstrate the creation of a “Sector Compass”, a tool we use to map the sectors for a site. A new sector-mapping application was created especially for this book. The relevance of sectors for site analysis will be emphasized repeatedly throughout this book.



A YouTube element has been excluded from this version of the

text. You can view it online here:

<https://open.oregonstate.edu/permaculture/?p=137>

- Intro to Permaculture: Sector Compass Demonstration – Video Transcript
- Introdução a Permacultura: Demonstração dos Setores de Compasso – Tradução Português

Explore Sector Resources

Explore sectors by clicking on the links below. The idea with these links is for you to learn more about the way forces behave so you can more effectively map them on your site. We're talking about wildfire, wind, noise, and others.

Site Analysis

- Things to Notice During Site Analysis
- Permaculture Assessment Phase: Quick Summary
- Sector Analysis Overview
- List of Site Analysis Elements

Fire

- Brief Overview: Wildfire Patterns by Region
- Global Fire Map

- [Global Fire History Search](#)
- [Video: Fire Behavior In the Wildland/Urban Interface](#)
- [Firewise: Home Ignition Zone](#)

Wind

- [Worldwide Wind Forecast](#)
- [Global Wind Flow Charts](#)
- [US Wind Map](#)

Pollutants

- [Global Air Quality Map](#)

US

- [Local Pollutants](#)
- [EPA Toxic Industry Map](#)

Canada

- [National Pollutants Google Earth Layer](#)

UK

- [Local Sites of Pollution](#)

- Air Quality Forecast

Crime

- World Crime Index Map
- World Crime Index Ranking
- Trees and Trash Impact Neighborhood Crime
- City Repair: Building Community

Ice

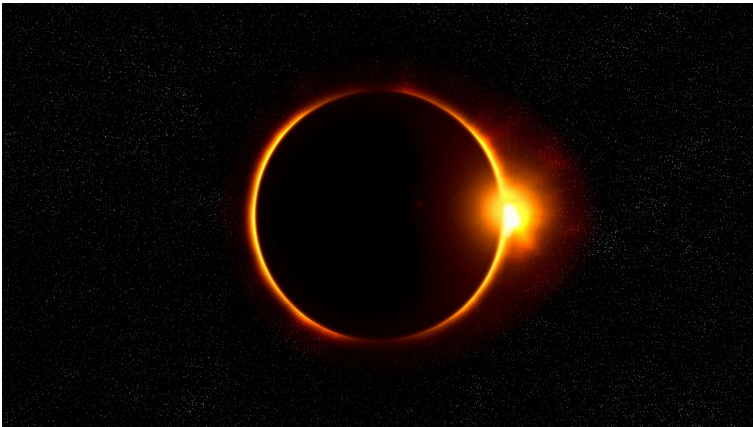
- World Snow and Ice Cover
- My Land Plan: Ice Storms

Wildlife Corridors

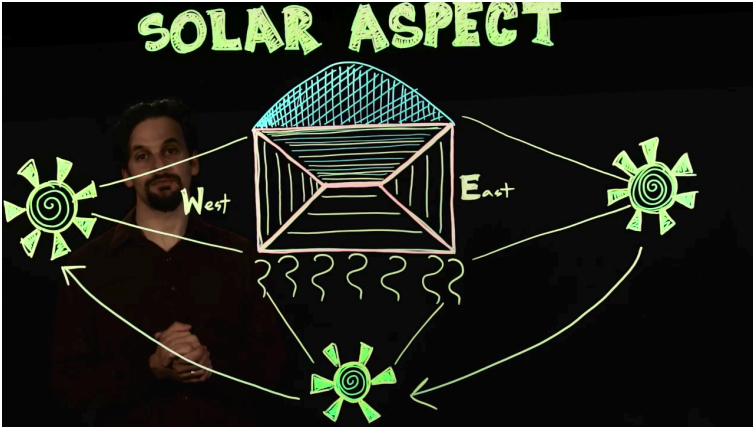
- Landscape Design For Wildlife
- Nature ID Guide

13. Solar Aspect

Understanding the way the sun moves across the sky and changes throughout the seasons is a crucial part of creating a design that is responsive to the existing conditions of a place. Mapping solar aspects and the ensuing micro-climates is a step on the path of creating a Permaculture design.



The sun can be the most important sector to map for your design site, depending how close or far you are from the equator. Especially in temperate zones, which tend to be further from the equator, mapping the sun sector and designing in response to that sun sector is of utmost importance. The video below provides a basic outline of how to map solar sectors.



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<https://open.oregonstate.education/permaculture/?p=140>

The diagram in this block is a simplified version of the one above. It features the title "SOLAR ASPECT" at the top. Below it is a white-outlined structure with a blue grid on top, similar to the one in the first image. To the right of the structure is a man's face and hands holding a green sun icon. Below the structure are seven white wavy lines, and a single green sun icon is positioned below those lines.

- Intro to Permaculture: Solar Aspect – Video Transcript
- Introdução a Permacultura: O Aspecto Solar – Tradução Português

It can be very challenging to fully comprehend the sectors in a two-dimensional format, like this screen! The best way to learn how the sun moves across the sky is to observe it over time throughout the seasons. The goal is to internalize the sector compass, where when you show up at a location and identify the cardinal directions, you automatically know where the sun will rise and set on the Summer and Winter Solstices' and equinoxes. This gives you a tool for quick site analysis, where you can read the conditions of a place and understand some of the major design parameters in an instant of observation.

Explore Solar Sector Resources

Explore solar sectors by clicking on the links below. These provide some tools and perspectives for better understanding the solar aspect and the seasonal movement of the sun.

Passive Solar Design

- Passive Solar Explained
- Videos: Passive Solar Construction
- 10 Stages to Passive Solar Building Design

Solar Positioning

- Create Your Local Solar Path Chart
 - Sun+Shadow Global Position Map
 - Sun Calculator Map
 - Find My Shadow Global Map
 - US: Average Solar Radiation Map
-

Image Sources

<https://pixabay.com/en/solar-eclipse-sun-flare-solar-1482921/>

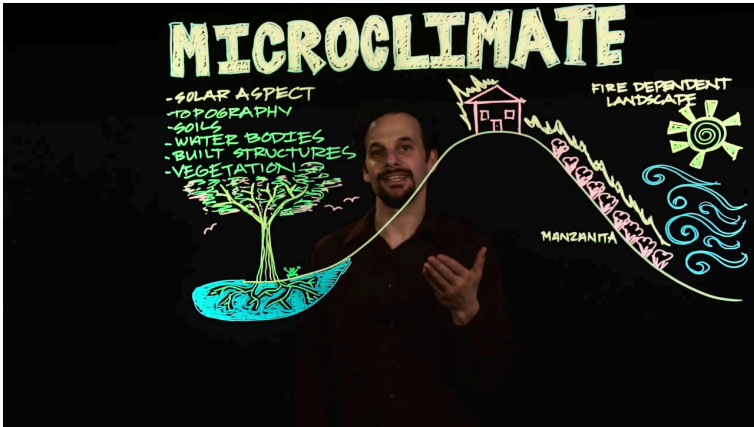
14. Microclimates

Microclimates are areas that have a different climate from the space around them, and there are many reasons why they occur. This page defines and explores microclimates. When we do site analysis, we are studying and identifying microclimates. In design, we are intentionally creating microclimates for more diversity on our site. This page explores microclimates, both analysis and creation of them.

Microclimate



This video takes a look at some factors that create microclimates, and the practical nature of understanding microclimates. We look at how the solar aspect and exposure to wind can combine with vegetation that has fire as a part of its' life cycle to create a potent fire sector.





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<https://open.oregonstate.education/permaculture/?p=145>

- Intro to Permaculture: Identifying Microclimates – Video Transcript
- Introdução a Permacultura: Identificando os Microclimas – Tradução Português

Featured Links

- Fire Ecology
- Use Microclimates for Frost Protection by Joel Glanzberg and Ben Haggard
- Factors Affecting Microclimates
- Finding and Creating Microclimates

City Shadows



This brief animated video illustrates how large buildings in cities creates major sun and shade areas. When tall buildings are placed without regard to the movement of the sun, then many other areas can lose out of good solar orientation.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=145>

- Intro to Permaculture: Assessing Solar Aspect in Urban Areas – Video Transcript
- Introdução a Permacultura: Acessando o Aspecto Solar em Áreas Urbanas – Tradução Português

Featured Links

- ACROS Fukuoka Building: Japan
 - ARCOLOGY: Solar City Design
-

Image Sources

<https://pixabay.com/en/forest-fire-flames-burning-water-991479/>

<https://pixabay.com/en/tower-city-buildings-architecture-863498/>

PART III
SECTION 3 -
PERMACULTURE DESIGN

Introduction

Welcome to Section 3, where we delve into Permaculture design methods and principles. We are moving up the Permaculture tree, from pattern observation to site assessment, and now to design. Watch the welcome video and enjoy the module!





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<https://open.oregonstate.edu/permaculture/?p=147>

- Intro to Permaculture: Module 3 Overview – Video Transcript

Learning Outcomes

By the end of this module you will be able to:

- Identify Permaculture design principles
- Identify Permaculture zones
- Memorize scales of landscape permanence order

15. Design as a Response to Zones and Sectors: Cause Studies

It's now time to combine the zone and sector mapping tools to create a Permaculture design. Below are 5 examples of Permaculture sites located in different climates and including different scenarios.

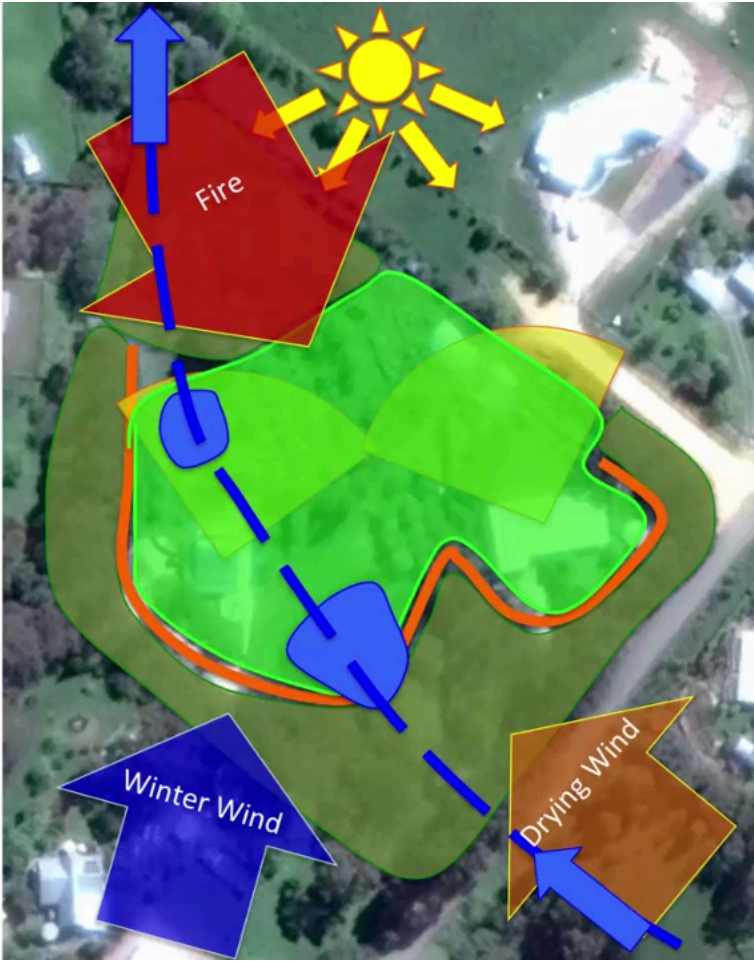


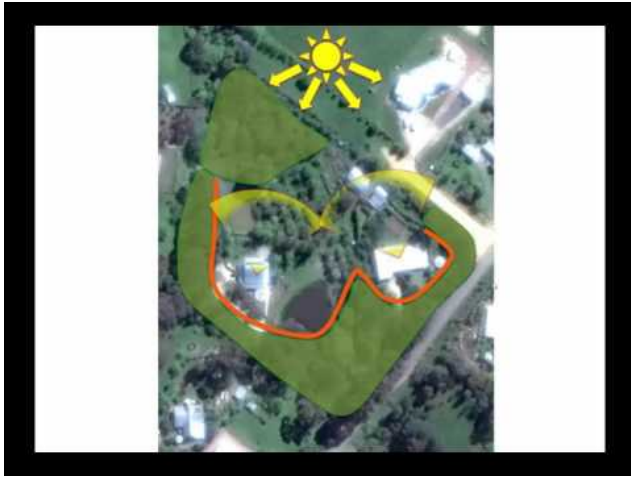
Let's see how the theories of zone and sector design are actually put into place on sites from very different climates and situations. Using mostly overhead imagery from Google Earth, we'll examine

the design patterns of each specific site to understand the process used to create the Permaculture design. Think about your own site while you watch these. What are the major forces that you need to address for your unique location? Is it privacy, pollution, strong sun, or wildfire danger? Each site has its own set of conditions, and every Permaculture design is site specific. So enjoy watching these videos and learning how each of these sites was designed using Permaculture.

Melliodora, Australia

This is David Holmgren's site again in Australia, and in this video we put together the zone and sector analysis to illustrate the pattern of the site's design.





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<https://open.oregonstate.education/permaculture/?p=153>

- Intro to Permaculture: Design as a Response to Zones and Sectors – Video Transcript

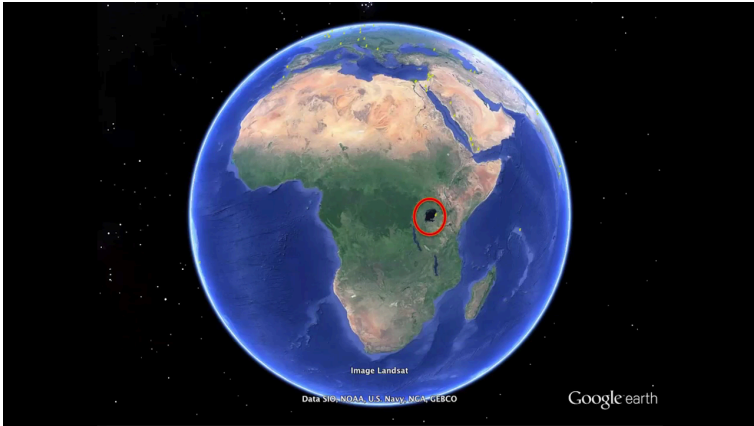
Featured Links

- Melliodora Site
- Melliodora eBook

Kinesi Orphan's Garden, Tanzania

This is a site meant to feed orphans and help the families who take

them in. It was developed with the support of the Global Resource Alliance, and planned by well-known African Permaculturists, Alias Mulambo and Julious Piti.



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text. You can view it online here:

<https://open.oregonstate.edu/permaculture/?p=153>

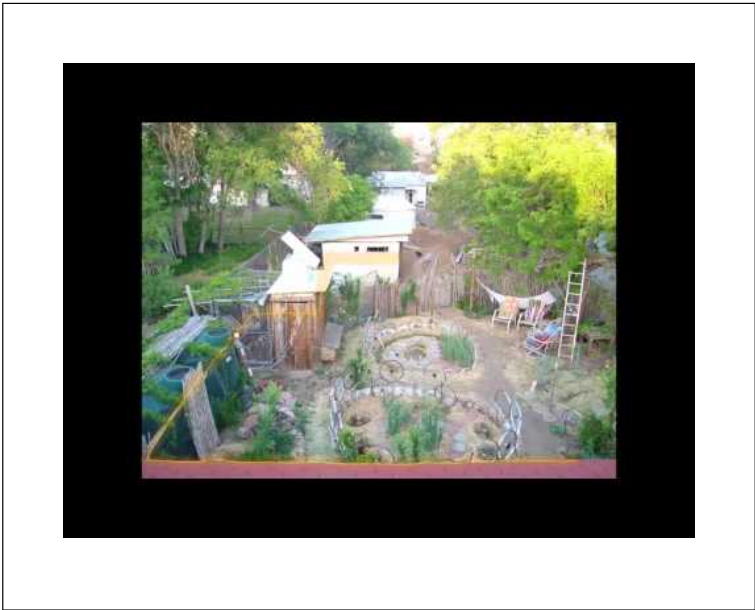
- Intro to Permaculture: Design as a Response to Zones and Sectors – Tropics – Video Transcript

Featured Links

- Global Resource Alliance
- Permaculture Takes Off in Tanzania

Ecohood, Arizona, USA

This is the former home and demonstration site of Andrew Millison in Prescott, Arizona, USA. It is a 1/8 acre urban lot in the high desert.



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<https://open.oregonstate.education/permaculture/?p=153>

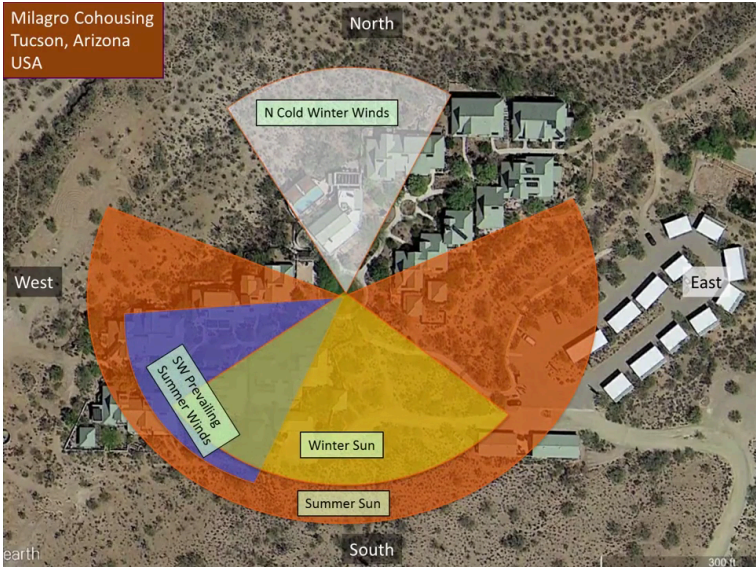
- Intro to Permaculture: Design as a Response to Zones and Sectors – High Desert Microclimate Development – Video Transcript

Featured Links

- Ecohood Ideas Take Root in Older Neighborhood
- Ecomachine

Milagro Co-housing, Tucson, Arizona, USA

This co-housing community is an excellent example of many Permaculture design strategies, especially water harvesting and passive solar design. Try and guess what natural feature the community is patterned after as you go through the video.



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text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=153>

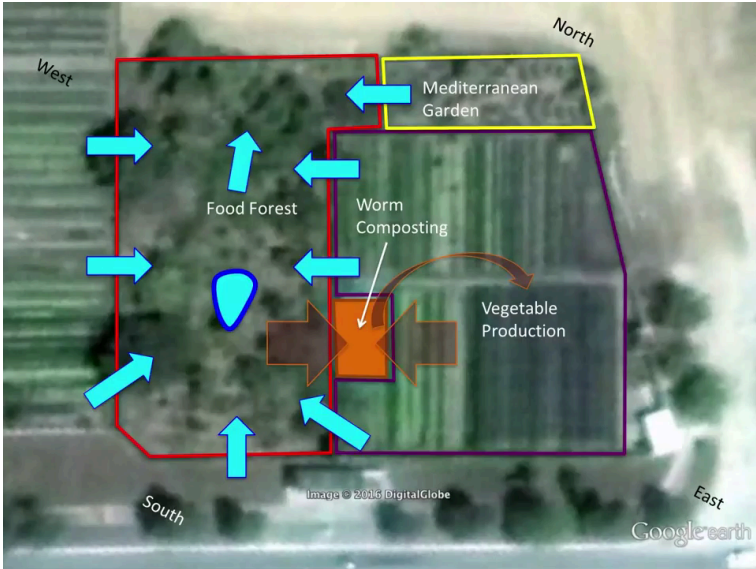
- Intro to Permaculture: Design as a Response to Zones and Sectors – Low Desert Community – Video Transcript

Featured Links

- Milagro Cohousing

Organoponico, Sancti Spiritus, Cuba

Small organic farms are everywhere in Cuba, and Permaculture design is firmly embedded in the design and fertility cycles of these farms, called “organoponicos”. This video explores the design of one such farm.



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<https://open.oregonstate.education/permaculture/?p=153>

- Intro to Permaculture: Design as a Response to Zones and Sectors – Tropical Food Systems – Video Transcript

Featured Links

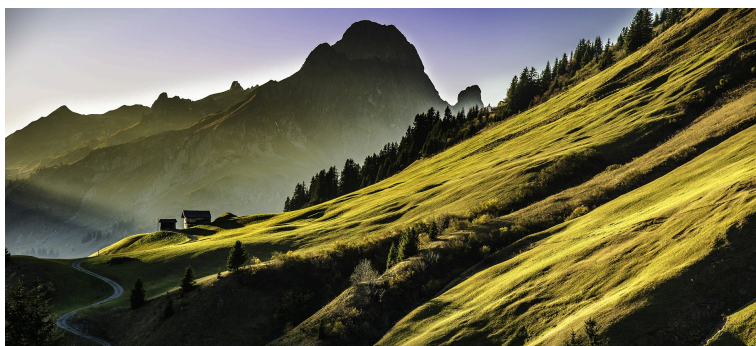
- Organoponicos
 - Cuba Permaculture Pilgrimage
-

Image Sources

<http://www.gettyimages.com/event/lucas-schifres-archive-531356237#-picture-id461115728>

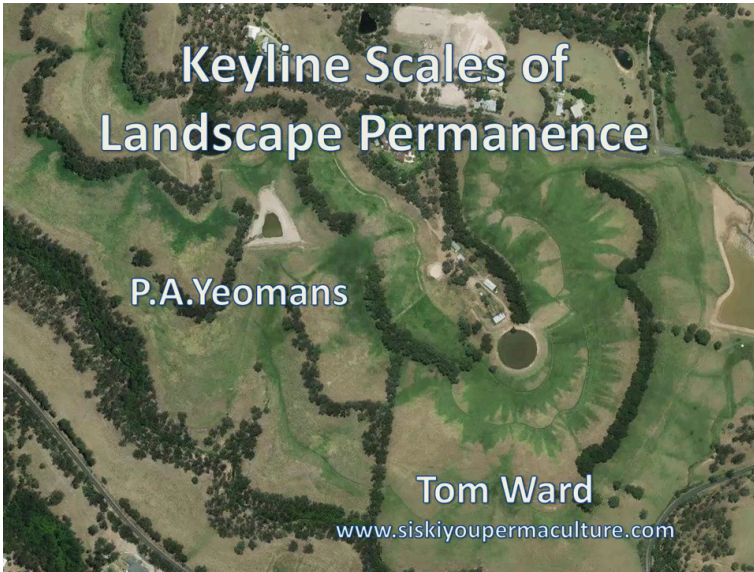
16. Scales of Permanence

Another perspective on design that had an influence on the formulation of the Permaculture design system are the Scales of Landscape permanence, originated by Australian agricultural innovator P.A. Yeomans, who developed the Keyline Design system. Watch this short presentation on this system to see how the scales of permanence illustrate the order in which elements should be designed for.



The Scales of Landscape Permanence or the Keyline Scales of Permanence (KSOP) is a perspective-changing system that teaches the best order of design for elements in the landscape. It begins with Climate, then Landform, Water, Access, Trees, Structures, Subdivision, and finally soil. Watch this video to understand some of the reasoning behind the KSOP, and see how

this design theory was applied on an actual site in Southern Oregon, USA.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=156>

- Intro to Permaculture: Scales of Landscape Permanence – Video Transcript

Featured Links

- Siskiyou Permaculture

The Scales of Landscape permanence originated with Australian, P.A. Yeomans, who has a rich body of work himself. Browse the links below to learn more about the work of P.A.Yeomans and his trademarked “Keyline Design System”. One special link to point out

is Geoffrey Booth's Keyline Video Archive. This is a complete collection of all the educational videos made by P.A.Yeomans' last century when he developed the system, and it is a rich archive for anyone who really wants to get to the root of it. Also in the resources below you'll see links to the Reagrarians. This is the organization of Australian, Darren Doherty, who is the world's foremost expert on Keyline design and a very accomplished designer with 1000's of designs and installations under his belt.

Additional Resources

- Reagrarian's Platform
- Reagrarian's eHandbook
- Keyline Planning and Cultivation
- Yeomans Keyline Systems Explained
- Planning for Permanence
- Permaculture Keyline Water Systems: Tom Ward @ Wolf Gulch Farm
- Permaculture Keyline Water Systems: Don Tipping @ Seven Seeds Farm

Image Sources

<https://pixabay.com/en/landscape-mountains-abendstimmung-640617/>

17. Design Methods Resources

This page provides a number of links to learn more about Permaculture design methods. There are resources here from some of the best out there, so take your time to explore this page.

image

Zones and sectors are one way of assessing and designing a site, but they are not the only ones. In his book “Permaculture Designer’s Manual“, Bill Mollison dedicates a dense 35 page chapter to “Methods of Design”. The links below provide a taste of some of these other design methods, as well as more on the zones and sectors. There are many great books on Permaculture out there, more than anyone could read at this point, but if you are going to go deep into Permaculture, it’s worth it to invest in the “Permaculture Designer’s Manual”. It’s considered the ‘bible’ of Permaculture, and I’ve personally been reading it for 20 years, and still reference it frequently. If you want recommendations on other Permaculture books, here’s author and teacher Toby Hemenway’s Permaculture reading list that are all vetted titles. Please enjoy the links below and get designing!

General Design

- Melliodora: Holmgren Designs

- Design Techniques by Bill Mollison
- Designing For Permaculture by Bill Mollison
- Overview of Design Methods
- Design and Sequence by Tim Murphy
- Overview of Energy Efficient Planning
- Example of the Design Process
- Farm Planning and Land Design via the Regrarians Platform

Design by Needs and Outputs

- A Way of Seeing by Joel Glanzberg
- Quick Overview of Inputs and Outputs
- Nitrogen Fixing Trees
- Starting Your Permaculture Garden
- Djanbung Gardens Integrated Garden
- Pigs: Products and Behaviors to Connect Systems
- Closing the Loop On Waste Using Chickens
- Composting with Worms

Video

- Guilds with Toby Hemenway
- Urban Design by Sectors

Design by Zones and Sectors

- Observing and Creating Microclimates
- Short Guide to WindBreaks
- Landscape for Windbreaks

- Windbreak Characteristics and Design
- Grow More by Paying Attention to Microclimates by Joel Glanzberg

Podcasts

- Design For Temperate Zones and Cold Climates
 - Designing Passive Systems That Work
 - Using Earthworks to Prevent Erosion
 - Geoff Lawton Presents: “Permaculture – A Designer’s Manual”
-

Image Sources

<http://www.gettyimages.com/pictures/japan-kyushu-region-miyazaki-prefecture-takachiho-cho-view-news-photo-506005919>

18. Permaculture Principles

The Permaculture Principles guide our design decisions and organize the structure of our Permaculture system. We are using David Holmgren's version of the principles, where they are consolidated into 12. These principles should be learned in order to help inform all of your future Permaculture work.

12 Permaculture Principles



This video explains the 12 Permaculture Principles as put forth by co-founder David Holmgren. These principles are the last piece of the Permaculture decision making matrix and provide a clear set of guidelines by which we design our sites.



Principle #8:
Integrate Rather than Segregate

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<https://open.oregonstate.education/permaculture/?p=160>

- [Intro to Permaculture: The Permaculture Principles – Video Transcript](#)

The Permaculture Principles cover a lot of ground. In David Holmgren’s book “Permaculture Principles and Pathways Beyond Sustainability” he goes deep into the theoretical side of each one of these principles, talking about their physical and social aspects, and placing the whole Permaculture design system in the context of the modern age. The principles are a very potent tool to use, and much time can be spent thinking about how you can put them into action on your own design site.

Links

- [David Holmgren’s Permaculture Design Principles](#)
- [The Permaculture Association: 12 Design Principles](#)
- [Knowledge Base – Overview of Principles](#)
- [Tips for Self-Regulation](#)
- [Applying Permaculture Principles](#)
- [TC Permaculture on Producing No Waste](#)
- [The Permaculture Student: Permaculture Education for Children](#)

Videos

- [Principles in a Polyculture Orchard](#)

Songs

- Look Around by Charlie Mgee
- Yield by Charlie Mgee
- Limits by Charlie Mgee
- Oil by Formidable Vegetable Sound System
- No Such Thing As Waste by Charlie Mgee
- Patterns by Charlie Mgee
- Small and Slow by Charlie Mgee
- Many Many by Formidable Vegetable Sound System
- The Edge Is Where It's At by Charlie Mgee
- Change by Charlie Mgee

Podcasts

- Principles in Practice
 - Observe and Interact
 - Catch and Store Energy
 - Obtain a Yield
 - Apply Self-Regulation and Accept Feedback
 - Use and Value Renewable Resources and Services
 - Design From Patterns to Details
 - Integrate Rather Than Segregate
 - Use and Value Diversity
 - Creatively Use and Respond To Change
-

Image Sources

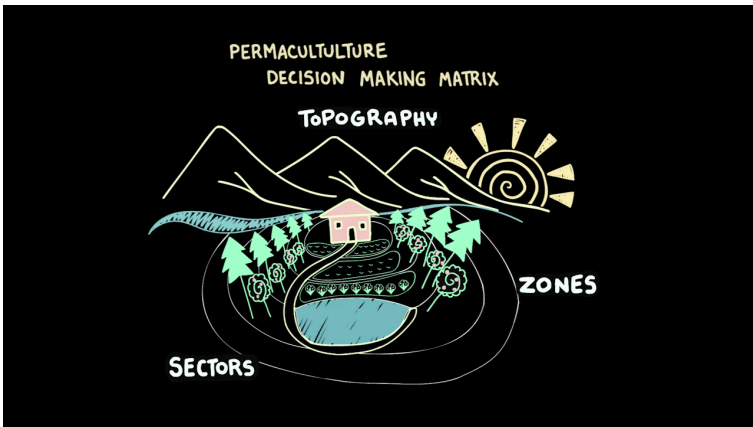
<https://pixabay.com/en/recycling-reuse-1202274/>

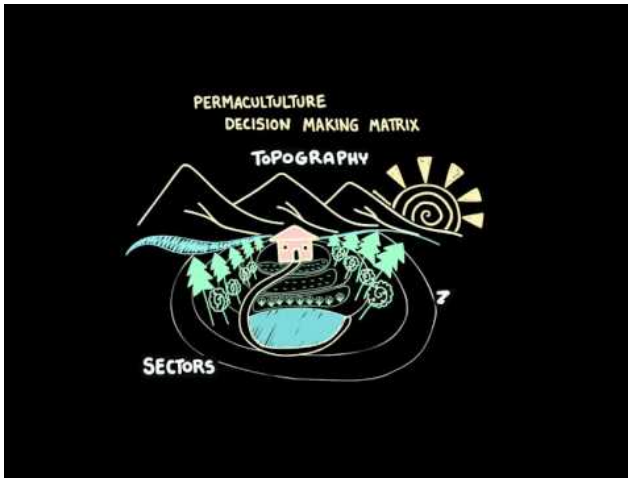
19. Zones

Zones are a key design tool that we use in Permaculture, and they are part of the decision making matrix. Zones are concerned with the level of human activity, efficiency of movement, and human effort on a Permaculture site. This page defines and explores the zone concept.

Zones in the Matrix

This video reminds us of the Permaculture decision making matrix, and puts the zone design system in perspective with the rest of the matrix.





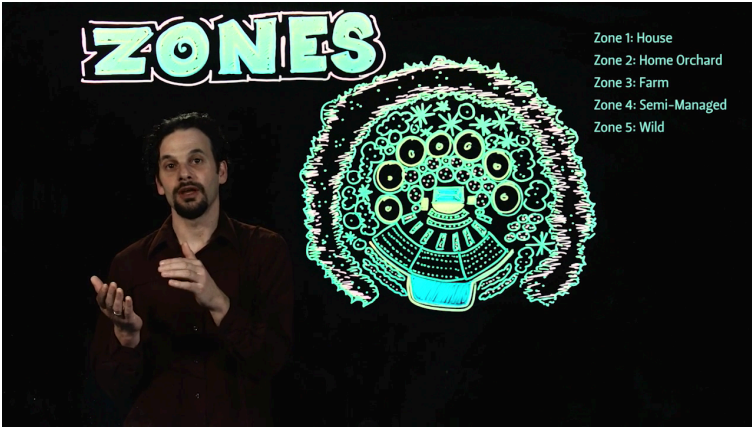
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<https://open.oregonstate.education/permaculture/?p=166>

- Intro to Permaculture: Zones in the Matrix – Video Transcript

Permaculture Zones

This video explains one of the hallmarks of the Permaculture system, the zone design method. Placing elements in the landscape based on their frequency of use distinguishes this from other approaches to placement. Watch the video.



A YouTube element has been excluded from this version of the text. You can view it online here:
<https://open.oregonstate.edu/permaculture/?p=166>

- Intro to Permaculture: Permaculture Zones – Video Transcript

As mentioned in the video, most projects are not fortunate enough to have the idealized concentric circle zone model. Each site is unique, and the zones need to be seen more as a guideline than a strict set of rules. The zone model can be adapted for the particulars of your site. There's a much different perspective on zones depending if you are in an urban, suburban or rural location. Here are some links to articles about zones that are a good compliment to the video lecture:

- Urban Permaculture Zones & Sectors
- Urban Permaculture Zone 4: Harvesting the Urban Landscape
- What is 'Zone 0'?
- 'Zone 00': Right Intentions, Wrong Term

More on zones

A Permaculture site is divided into zones. Zones take into account the human energy use and flows within a system in order to reduce unnecessary travel time between areas. Zone analysis is about understanding the patterns of human movement within a space in order to place design elements where they are naturally and easily given the attention they require. By analyzing movements like what pathways you typically follow, where in your yard you find yourself hanging out, and how often you use a particular area you can begin to decipher a pattern of how humans flow and interact with your design space.

Understanding the five zones allows for a design that considers the most effective placement of components and how they relate to each other. Each zone has a different requirement for maintenance and function. Zones 1 and 2, or the areas needing the most attention, are placed closer to the home and heavy traffic areas while zones

3, 4, and 5 radiate out from heavy traffic areas as upkeep needs become less intensive. Let's take a look at each zone individually.

Zone 1

Zone 1 is the area nearest the home or area of most traffic. Elements that are placed in zone 1 are things that require daily attention, observation, and frequent upkeep. By placing high maintenance plants and/or structures next to areas that you pass every day, you are more likely to give them the attention they need with little to no extra effort.

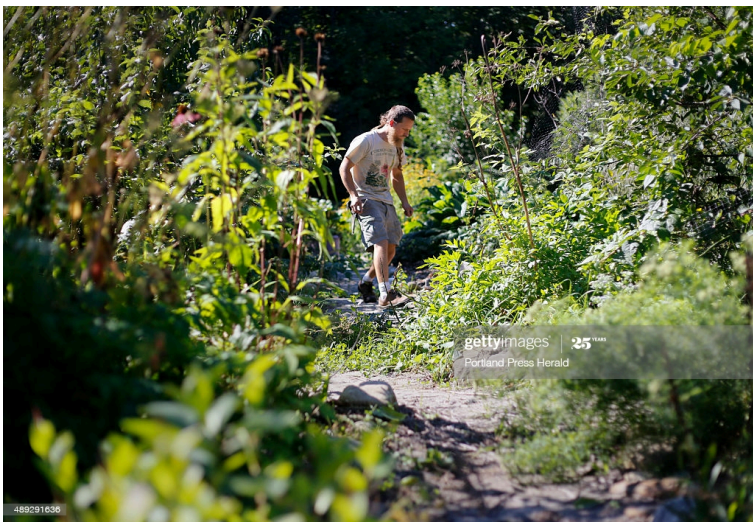


Herb and kitchen vegetable gardens are an example of elements often placed close to the house in zone 1. By placing them close by, it is just a quick step outside to gather necessary cooking ingredients. If you had to walk all the way across your property to gather herbs chances are you would be less inclined to use and maintain them.

Other examples of elements that could be placed in zone 1 would be soft fruits like strawberries or raspberries, poultry laying boxes, and kitchen compost bins.

Zone 2

Zone 2, often thought of as the home orchard, is the area that is semi-intensely managed and requires observation and maintenance every few days. This zone may be present along areas of heavy traffic or extended through more outlying areas. Zone 2 can be made up of different elements depending on if the land in question is urban or rural.



In an urban setting, zone 2 may include shrubbery, perennial gardens, longer cycle vegetable gardens and areas that require occasional weed control and mulching. In a farm or rural setting, zone 2 may also include managed livestock, beehives, and orchard/

fruit trees. Typically, plantings in zone 2 are fully irrigated and protected by mulch or tree guards.

Zone 3

Zone 3, known as the farming zone, includes field crops and production areas. This is where the main crops are grown that require minimal maintenance and attention once established. Crops in zone 3 are typically visited once a week or less. It is easy to think of zone 3 in large farmland or rural settings as the ‘cash crop’ area filled with crops such as corn, wheat, rice, bamboo, etc., and pasture land.



In an urban area, zone 3 can be thought of in a few different ways. Many urban designs designate the lawn as a modified pasture which can fall into this zone. Another way zone 3 can be incorporated into urban plots is to think of the neighborhood and city as an extension

of your land. While it is common for many urban gardens to only directly have zones 1 and 2, it is not uncommon for the surrounding neighborhood to have many potential crops for harvest, such as, fruit trees, rose hips, currants, nuts, dandelions, etc. These crops could be seen as the zone 3 of your urban garden.

Zone 4



Moving farther away from the center of living, zone 4 is a semi-managed area full of self sustaining forests and woodlots that require very little care or attention. This area is where wild foods and timber are collected. Zone 4 may also be used to pasture animals on occasion to manage and control tree growth. Trees may also be thinned in this area in order to allow for select varieties to

grow. Zone 4 is often used as a buffer between wilderness areas and cultivated land.

Zone 5



Zone 5 is the un-managed wilderness area that requires no intervention. This area is visited for recreation and appreciation and is made up of naturally occurring plants and wildlife. Although zone 5 is typically not present in an urban setting, a possible wilderness element could be a wild thicket utilized for habitat in the outskirts of an urban yard.

Zones are an extremely helpful design tool in permaculture. By identifying the zones around a home, one can begin to organize and decide where elements should be placed in the landscape based on

human traffic and maintenance needs. Remember that zones are not a hard boundary but rather a conceptual diagram of the flows within the system.

Image Sources

<http://www.gettyimages.com/pictures/aaron-parker-is-a-permaculture-landscaper-who-will-speak-at-news-photo-489291636>

<http://www.gettyimages.com/pictures/organic-farmer-andrew-monk-harvesting-some-zucchini-on-his-news-photo-134601141>

PART IV

SECTION 4 - CLIMATES

Introduction

Welcome to Section 4! In this section we will do a survey of some of the major design strategies for systems in different climates. This is a really broad overview, with the hope of whetting your appetite to learn more on your own. We provide many links to further resources for you to pursue.





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<https://open.oregonstate.education/permaculture/?p=168>

- Intro to Permaculture: Module 4 Overview – Video Transcript

Learning Outcomes

By the end of this section you will be able to:

- Articulate major design strategies for each climate

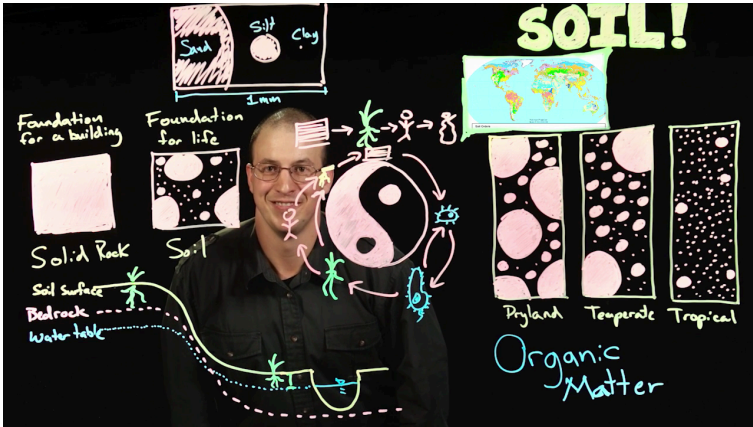
20. Soil

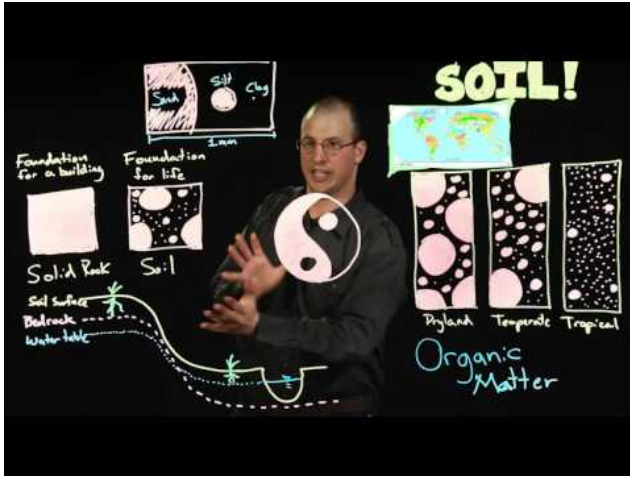
SOIL! It's a crucial part of life, especially for food production. For this video we have brought in a guest lecturer Jacob Kollen who has a Master's degree in Soil Science and Hydrology from Oregon State University, was a Permaculture student of Andrew's back in 2011, and is a self professed soil nerd. Enjoy Jacob's presentation and explore the links below.



Permaculture is well known for the multitude of soil building practices employed in Permaculture design systems. Some you may have heard of and some not, with exotic names like vermicompost, humanure, and hugelkultur. The video below does not go into

specific strategies, but takes the wider view for you to understand the foundations of soils, and how they differ based on your climate zone. We welcome Jacob Kollen, a former OSU Permaculture student who has gone on to earn Master's Degrees in Soil Science and Hydrology.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.edu/permaculture/?p=171>

- Intro to Permaculture: Permaculture Soils Perspective – Video Transcript

Featured Links

- Soils Instructor Jacob Kollen's Website
- Global Soils Map
- Interactive Global Soils Data

Additional Resources

The video above presented a more macro perspective on soils, and now the links below provide more specific details about Permaculture soil management strategies and methodologies for the various climate zones. This is not an exhaustive list of links, but please browse through your climate zone and other links as well.

Tropics

- Tropical Food Forest- Chop and Drop
- Earthworks for Soil Building in the Tropics
- Phayao Permaculture in Thailand
- Tropical Soil Building Techniques Part 1
- Tropical Soil Building Techniques Part 2
- Tropical Soil Building Techniques Part 3
- Tropical Soil Building Techniques Part 4

Dryland

- Dryland: Sand Dune Stabilization by Carl Wachtmeister
- Hopi Tutskwa Permaculture: Lasagna Beds in the Desert
- Through Cover Cropping by Kate Tieman
- Imprinting Soils: Creating Instant Edge for Large Scale Revegetation of Barren Lands

Temperate

- Sheet Mulching Strategy for Healthy Soil by Cathe' Fish

- Hugelkultur: The Ultimate Raised Garden Beds
- The definitive Guide to Building Deep Rich Soils by Imitating Nature

Video

- Urban Soil Building Methodologies in Temperate Climates

Multi-Climate

- Soil Science Basics for Beginners
- Soil Food Web: Dr. Elaine Ingham
- Overview: Origin of Soils and How They Influence Capability and Uses of Soil
- Building Soil by Imitating Nature
- PRI- DIY Compost

Video

- Suburban Chicken Rotation System

Podcast

- Building Healthy Soil by Dr. Elaine Ingham
-

Image Sources

<https://pixabay.com/en/green-landscape-tree-nature-soil-973596/>

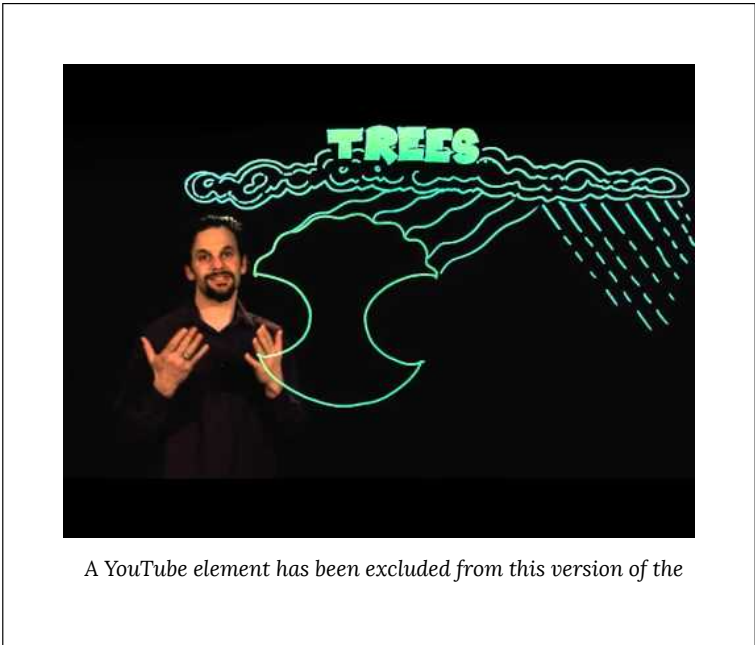
21. Trees

Permaculture is permanent agriculture, and there is no plant that is more permanent in the landscape than trees. Trees are a foundational element of a stable and enduring Permaculture system. In the presentations below, we explore the characteristics of trees, and their typical patterns of use in Permaculture systems for the various climate zones. Explore the links below to gain a deeper insight into the many benefits of trees.



Trees are important for so many reasons that we've already discussed throughout the book. Trees are incorporated into Permaculture projects at all scales and in all climate zones. In the

next series of videos we discuss the importance of trees and look at their use in the major climate zones.



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text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=177>

- Intro to Permaculture: Trees in the Permaculture Landscape – Video Transcript

References

- New York Times – Forest’s Role in Weather Documented in Amazon

Trees in Dryland Climates



Trees in dryland climates are tied into rainwater harvesting earthworks for their establishment. It takes extra water for a tree to get its roots down into the soil where it can survive on rainfall alone. So often times earthworks are constructed to concentrate storm runoff where trees can take advantage of excess water.





A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=177>

- Intro to Permaculture: Permaculture Trees in the Drylands – Video Transcript

References

- Dryland Salinity
- Dryland Salinity Mitigation and Trees

Trees in Temperate Climates



Throughout the temperate regions, there is adequate rainfall and trees can survive and thrive on their own without needing to divert excess water to them. Many temperate regions will naturally revert to forest anyway if un-managed. So forest management is a big part of designing tree systems in temperate regions.



A YouTube element has been excluded from this version of the text. You can view it online here:
<https://open.oregonstate.education/permaculture/?p=177>

- [Intro to Permaculture: Permaculture Trees in Temperate Climates – Video Transcript](#)

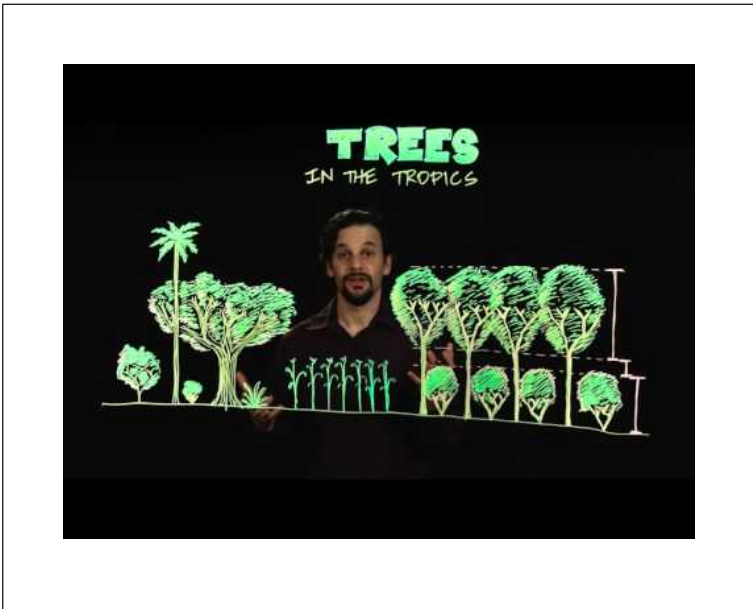
Featured Links

- [Aprovecho](#)
- [Sustainable Forestry at Aprovecho](#)

Trees in Tropical Climates



Trees in the tropics are where nutrients are held, and they play a vital role in stabilizing the tropical ecosystem. The tropics are where we see the most pronounced forest layers, with tall and low canopies, and climbing vines.



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<https://open.oregonstate.education/permaculture/?p=177>

- Intro to Permaculture: Permaculture Trees in the Tropics – Video Transcript

References

- Multifunctional Shade Tree Management in Tropical Agroforestry Landscapes – A Review
- Characterizing the Traditional Tree Garden Systems of Southwest Sri Lanka

Additional Resources

Browse the links below to learn more about trees and their uses in the different climate zones.

Dryland

- Restoring the Sonoran Desert at Barnes Butte Bajada by Gary Paul Nabhan and David Valenciano
- Revitalizing Barren Ground: A Succession Model by Tim Murphy
- Sonoran Desert Native Tree List

- How to Plant a Desert Tree
- Salt Tolerant Plants
- Mongongo Trees in the Kalahari Desert

Video

- Farmer Managed Natural Regeneration in Africa
- 30 Years of Greening the Desert: Flowering Tree
- High Desert Permaculture: 15 Years Later

Tropical

- Rainforest Regeneration
- SOIL Haiti – Occidental Arts & Ecology Center
- Avocanoes at Zaytuna Farm
- About Cohune Palm

Video

- Willie Smits: How to Restore a Rainforest

Temperate

- Nitrogen Fixing Trees for Snowy Regions
- Aprovecho Sustainability Education Center

Video

- How to Make a Temperate Forest Garden Part 1
- How to Make a Temperate Forest Garden Part 2

Podcasts

- Restoring Tall Grass Prairie and Tree Crops with Ben Tyler

Multi-Climate

- Forests in Permaculture by Bill Mollison
 - Shelter Trees and Water Saving Techniques
 - Bioremediation Basics
 - Restoring Natural Stream Hydrology
 - Permaculture Design International Restoration Projects
 - Urban Experimentation on Getting Rid of Unwanted Plants in a Garden by Joel Glanzberg
 - Animals as a Discipline to the System
 - Tree Soil Companions in Three Different Climates
 - Nitrogen Fixing Trees to Cure N2 Deficiency
-

Image Sources

<http://www.gettyimages.com/pictures/old-maple-tree-covered-with-moss-in-the-hoh-river-news-photo-452253482>

<http://www.gettyimages.com/pictures/baobab-tree-is->

surrounded-by-reeds-and-stagnant-water-in-an-news-
photo-133851151

<http://www.gettyimages.com/pictures/agroforestry-man-picking-acai-fruits-sustainable-work-news-photo-524047246>

22. Shelter

Buildings and structures are an important part of the human element in a Permaculture system. Ecological design and green architecture are vast fields that we are just scratching the surface of on this page, but the video provides a simple overview of building design for the major climate zones, and the links below provide a direction for further study.



Ecological building design is a vast subject, with many great architects and builders with a long history of innovation and demonstration. Ecological architecture is it's own field that overlaps with permaculture in many places. Natural and environmentally

sound building practices are a hallmark of many Permaculture sites. The video below is a very basic introduction, with the links below filling in some more detail about specific building materials and systems for the major climate zones.



A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=179>

- Intro to Permaculture: Permaculture Shelter Design – Video Transcript

Featured Links

- Rocket Stove Mass Heater
- Masonry Heater
- Taos Pueblo
- Earth Sheltered Homes

Additional Resources

The field of ecological housing design and building is vast, and this is not a complete list of resources or information. This is a collection of a bit of information for each major climate zone, and then more information that applies to multiple climate zones. Browse these links, and if you're interested, keep searching on your own. There's a lifetime's worth of amazing information out there!

Tropics

- Shaping Buildings for the Humid Tropics

- Earth Building in Thailand
- Hurricane Proof Building

Temperate

- An Overview of Indigenous Building Materials
- Rocket Mass Heaters
- Making an Earth Oven

Drylands

- What is Super Adobe?
- The Berber Cave Homes of Tunisia
- Patterns of Sustainability in Desert Architecture

Multi-Climate

- Tiny House Movement
- 50 Impressive Tiny Houses That Maximize Function and Style
- Natural Homes from Around the World
- Overview of Natural Building Materials
- Auroville Earth Institute
- Building Bale Walls by Tim Farrant

Cob

- The Cob Builders Handbook by Becky Bee

- Cob and Earthen Plaster Example
- How to Build a Cob House with Cob Construction
- Mud and Wood: What is Cob?
- Making a DIY Earthen Floor
- Build Naturally with Cob

Adobe

- Adobe Floor Basics and How To
 - Earthen Floor Recipe from Sustainable Nations
 - Building an Adobe House
 - Making Adobe Bricks
-

Image Sources

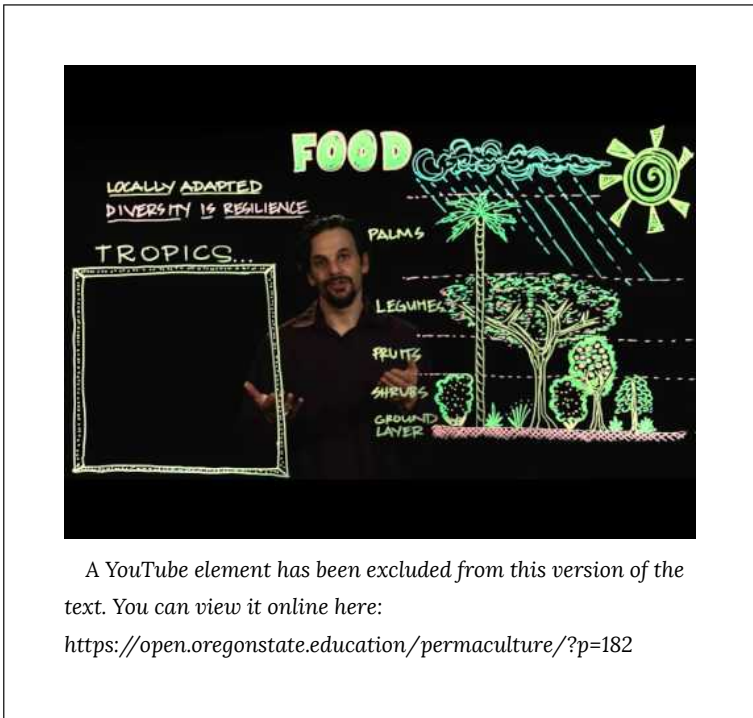
<http://www.gettyimages.com/pictures/indonesia-flores-island-bena-village-ngada-tribe-news-photo-539062276>

23. Food

Permaculture is most well known for its food systems and forest gardens. This video and the links below provide an introduction to producing food in Permaculture systems and what that looks like in different climate zones. Watch the video and browse the links to learn more!



This video looks at some of the major themes for food production in Permaculture systems. We address some controversial topics like genetically engineered organisms, and do a quick breeze through the major themes and strategies of food production in the major climate zones we are looking at in this class.



A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=182>

- Intro to Permaculture: Permaculture Design for Food – Video Transcript

References

- Dryland Pasture Management
- Unesco – Environmental Impacts of Converting Moist Tropical Forest to Agriculture and Plantations

Featured Links

- Permaculture Design International's Maui Tomorrow Land Visioning Plan

There is much more to Permaculture food production than can be covered in the video presentation above, so we encourage you to look through these links as an introduction into Permaculture food systems. Aside from the major climate zones listed below, there are resources and strategies for high elevation areas, the Subtropics, cold deserts, sand dune areas, and the list goes on. The techniques of food production are many, and the plant choices and methods are very specific to the conditions of each area. A Permaculturist in a region inevitably becomes an experimenter and propagator of good edible plant varieties. The field is wide open, and by no means has it all been figured out, so go out there, make plenty of mistakes, and share your successes.

Know Thy Plant!

Many species of plants are what we describe as “rampant”, which is something that flourishes or spreads unchecked. Introduction of some plant species into your site can create huge maintenance problems for you, and also spread that plant into the surrounding environment through seed dispersal and vegetative growth. So it’s really important to do your research before introducing any new species. Here’s a link to the United States Department of Agriculture’s Noxious Plant List. The agriculture department of your country should be able to provide a similar list.

Introduction of rampant and invasive species is a controversial subject in the Permaculture field, and has been a source of conflict between agricultural agencies, native plant enthusiasts, and Permaculture’s horticultural experimenters. To read more on Permaculture views on “invasion biology”, Tao Orion’s book “Beyond the War on Invasive Species: A Permaculture Approach to Ecosystem Restoration” is a well-researched text. This is not a simple subject, and is one that warrants much consideration when planning your food and forest systems.

“Know Thy Plant” is a good mantra when making any species selection, and we encourage you to exercise great caution, because the introduction of a new rampant species of plant or animal can cause long term changes to an ecosystem and have many unintended consequences. To learn more about the hazards of introducing rampant or invasive species, please read this document.

Additional Resources

Tropics

- Tips on Growing Vegetables in the Tropics
- Banana Circle Construction and Placement
- Urban Frontyard Food Forest
- Suburban Garden Plan
- Cover Crops Solution Chart
- Seeing the Garden in the Jungle by Toby Hemenway
- Ahupua'a Explained
- Useful Tropical Plant List
- Subtropical Plant List for all Layers of a Food Garden

Temperate

- Mixed Vegetable Gardening for Temperate Climates
- Use Microclimates for Frost Protection by Joel Glanzberg and Ben Haggard
- Simple Straw Bale Cold Frame by Sue Mullen
- Visit Sepp Holzer's Permaculture Farm
- Temperate Climate Permaculture Plant Index
- Permaculture Q & A: Perennial Plants for Temperate Climates
- Carbon Farming Practices
- Masanobu Fukuoka's Natural Farming and Permaculture

Dryland

- Keyholes for Dryland Gardens by Vicki Marvick

- Desert Food Forest
- Using Edible Flowers by Ben Haggard in the Drylands
- Permaculture Under Saline and Drought Conditions
- Intensive Rotational Livestock Grazing
- Advanced Cell Grazing Livestock Systems at Zaytuna Farm
- Edible Plants in the US Desert
- Desert Harvesters: Appreciating the Native Foods of the Sonoran Desert

Video

- Experiments in Urban Small Space Gardening in Mexico City
- Greening the Desert: Jordan

Multi-climate

- Natural Capital Plant Data base
- Annual Vegetable Polyculture
- Forest Garden Guild Building
- How to Build a Small Permaculture Vegetable Garden
- Getting Started with Rotational Chicken Pastures
- The One Straw Revolution by Masanobu Fukuoka

Podcasts

- Earth Repair Radio: Don Tipping on Organic Seed Farming and the GMO Struggle
- Earth Repair Radio: Rico Zook on Permaculture and India's 400 Million Farmers

Image Sources

<https://pixabay.com/en/pumpkins-vegetables-orange-autumn-1004417/>

24. Water

Water is life! The video below is a really brief introduction to Permaculture perspectives on how to design for water in the landscape. The links below provide a bit more detail of the specifics of Permaculture water systems in different climate zones.



The design for water is the bones of any Permaculture system. The basic infrastructure, or the ‘mainframe’ of the design, is shaped around working with the flow of water. Whatever the climate zone, water needs to be a primary consideration. This video provides a very basic outline of the way we view water and the strategies we employ to design for water in the Permaculture landscape.



A man with a beard, wearing a dark shirt, is speaking and gesturing with his hands. Behind him is a glowing green diagram on a black background. The word "WATER" is written in a stylized, dripping font at the top. Below it, a house is shown with a blue water tank on its roof. A blue line representing a stream flows from the tank, through a series of green hills, and into a blue pool at the bottom. To the left of the man, there is a large, empty rectangular frame with a decorative border, labeled "Drylands". The man's head is positioned in the center of the diagram, as if he is explaining the concept.

A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=185>

- Intro to Permaculture: Permaculture Design for Water – Video Transcript

Featured Links

- Al Baydha Project
 - Brad Lancaster: Harvesting Rainwater for Drylands and Beyond
 - Chinampa
 - Ethel M Chocolates Living Machine
-

There are several different projects highlighted in the video, as well as images of a number of others that are not named. Browse these links below to see a number of project examples that are focused on water systems. Whether you are working with water scarcity, abundance, or over-abundance (flooding), the Permaculture perspective on water can help you assess your situation and use clear strategic guidelines to choose the best design for the water on your site. Remember the watershed, and that all water is ultimately connected in the hydro-logic cycle. When your design works harmoniously with water, then your piece of the watershed is functional, and helps to benefit everything downstream from you.

Additional Resources

Dryland

- Dryland: The Man Who Farms Water by Brad Lancaster
- Brad Lancaster Books: Rainwater Harvesting for Drylands and

Beyond

- Zvishavane – Dryland Water Harvesting
- Swales for Water Retention in Drought Stricken Areas
- Kykotsmovi Village Desert Gardens
- Build Sand Tanks for Dry Land Water Storage by David Bainbridge

Temperate

Video: Sepp Holzer – Aquaculture: Synergy of Land and Water

Tropics

- Chinampas
- Chinampas of Mexico City
- The Art of Gardening on Wetlands
- How to Build a Gravity Fed Aquaculture System

Multi-Climate

- Constructed Wetlands Treat Waste Water with Weeds
- Common Reed for Constructed Wetlands
- Building an Urban Greywater Reedbed
- Magical Orchard Greywater Design
- Building a Simple Biological Greywater System
- WET Systems for Waste Purification and Resource Production
- Urban Street Runoff Harvesting
- Water Filtration Systems
- How to Construct a Dirt Catchment for Harvesting Surface

Runoff by Daniel Howell

- Permaculture International Water Solutions
- Rainwater Catchment Calculations

Podcast

- Earth Repair Radio: Neal Spackman: How to Make it Rain in the Desert
-

Image Sources

<https://pixabay.com/en/sunrise-lake-water-scenic-182302/>

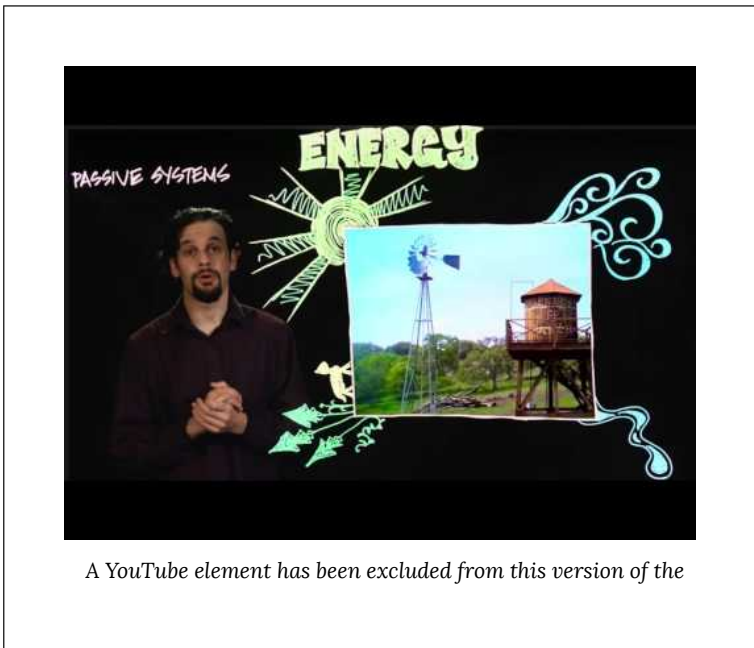
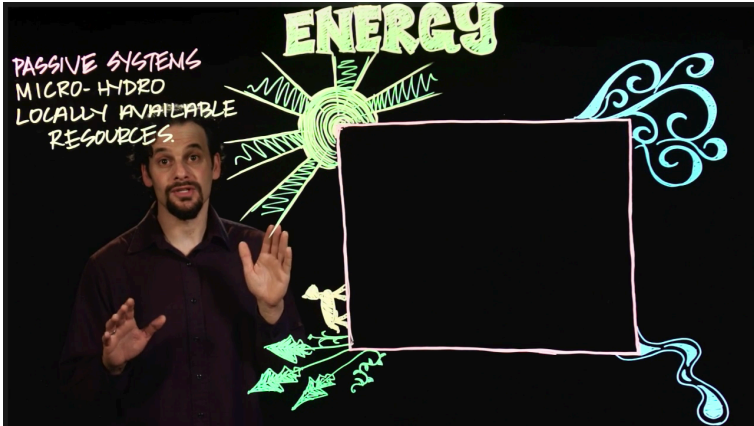
25. Energy

Energy systems in a Permaculture design are small scale and decentralized, using renewable sources. The video below gives a very brief glance at types of renewable energy systems commonly employed, and the links below provide further avenues for exploration and study.



Between coal, nuclear, natural gas, oil, oil shale and tar sands, the production of energy is one of the more destructive activities of human civilization. The first step is to reduce consumption of energy to reasonable levels that recognize the environmental impacts of non-renewable energy sources. After conservation,

deriving renewable energy sources is the way to go. The video below is a brief overview of the most commonly used renewable energy sources that we find in Permaculture systems.



A YouTube element has been excluded from this version of the

text. You can view it online here:

<https://open.oregonstate.edu/permaculture/?p=187>

- Intro to Permaculture: Energy Systems Permaculture – Video Transcript

Additional Resources

Please browse the links below that provide more information about the major renewable energy types highlighted in the video. Think about what renewable energy source is most feasible in your location, and pay special attention to that section of links.

- Energy and Permaculture By David Holmgren
- Overview of Alternative Energy Sources
- Energy Cycling
- Combining Natural Building for Energy Efficiency by Catherine Wanek

Sun

- Retrofitting for Passive Solar
- 10 Stages to a Passive Solar Building from Design to Build
- How to Build a Simple Solar Water Heater by Dan Dorsey
- How to Build a Simple Solar Oven by Dan Dorsey
- Types of Solar Thermal Collectors
- Permaculture Association: Solar Hot Water
- DIY Off Grid Solar System

Wind

- Windmill Power Basics and FAQ
- Permaculture Magazine: The Viability of Wind Turbines Questioned
- Small Wind Case Studies
- Energy Saving Trust: Wind Turbines
- Small Wind Guidebook

Water

- Planning a Microhydropower System
- Water Wheel Engineering
- Small Scale Hydropower Example

Biomass

- Sustainable Wood Lot in a Dry Climate
- Really Saving Energy: Paul Wheaton (Rocket Stove Information at 11 Minutes into Video)
- Podcast: Biochar, Gasification, and Woodlot Management
- Biomass Fuels from Sustainable Land Use: A Permaculture Perspective by David Holmgren
- Compost Water Heaters With the Jean Pain Method
- Heating a Greenhouse with Compost and Manure by Maddy Harland

Geothermal

- How Geothermal Energy Work

Decentralized Energy and Microgrids

- Example: How to Build Your Own Portable Microgrid
 - What is Decentralized Energy?
 - Living Energy Learning Center: Community Microgrids
 - Guide to Developing Community Renewable Energy Projects in North America
-

Image Sources

<http://www.gettyimages.com/pictures/small-domestic-biogas-plant-methane-and-carbon-dioxide-news-photo-129371267>

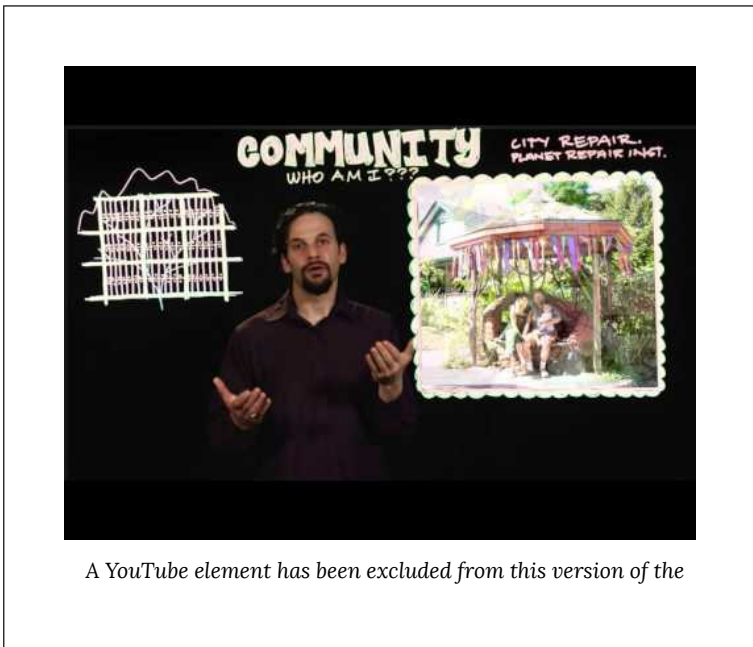
26. Community

No one exists in isolation. Our impacts all affect each other, both on the social and environmental levels. Permaculture is about integration, and community is the way that comes to life! Sharing Permaculture with friends, neighbors, and relatives is the way we reap the benefits of the abundance that a Permaculture system creates.



The Permaculture Principle “Integrate Rather than Segregate” makes a not so subtle allusion to community. The power of people working together towards a common goal is one of the most potent tools that we have, and it’s a tool which enables the physical and

non-physical structures of a Permaculture system to be put into place. Watch the video below to get a perspective on how Permaculture can build and improve communities.



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text. You can view it online here:

<https://open.oregonstate.education/permaculture/?p=190>

- Intro to Permaculture: Building Community – Video Transcript

Featured Links

- The City Repair Project
- Communitecture
- Planet Repair Institute
- Nahalal, Israel

Additional Resources

Browse the resources down below to learn more about community. There are two different threads here. One is about changing the existing community you already live in to one which is embedded with Permaculture principles. The other is about building community from the ground up. Either way, there are many ways to use Permaculture design to assist that process.

- VillageLab
- ReInhabiting the Village | Co-Creating Our Future
- NuMundo- Finding Communities Around the World
- Pathways to Resilience: Permaculture and Prisoner Re-entry
- Alternative Money Systems
- Biology Based Resilient Cities
- Building an Intentional Community

- Global Ecovillage Network
- Patterns to Revitalize Your Neighborhood by Andrew Millison
- Lessons in Village Design by Peter Bane
- Building Community through Permaculture
- Permaculture International: Resilient Community Design
- Planting Justice

Podcasts

- Earth Repair Radio: Pandora Thomas on Building the Garden of Social Relationships
- Social Permaculture. Creating a Diversity of Functional Connections Between People and Their Skills

Video

- The Power of Community – How Cuba Survived Peak Oil
- Reclaiming the Public Commons: Mark Lakeman
- Mark Lakeman on Urban Permaculture

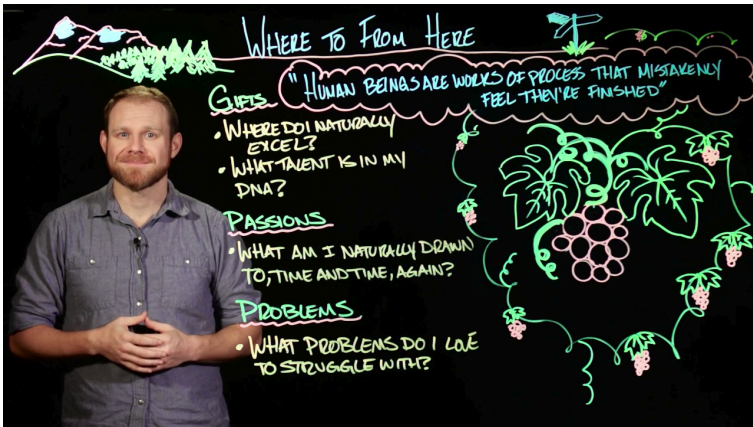
Image Sources

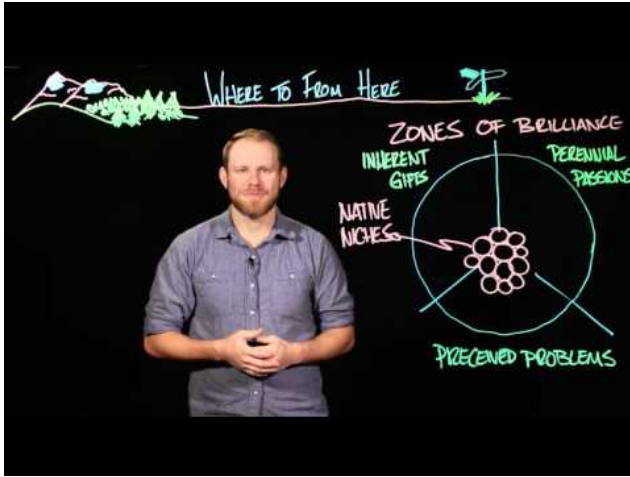
<https://pixabay.com/en/seminar-motivation-joy-of-life-711675/>

27. Where to From Here?

Join our guest from British Columbia Permaculture, Javan Bernakevitch, as he provides some direction about how to take this information and do something useful with it! Javan offers a challenge for you to complete after this book, so watch the videos and participate in the 10/10/100 challenge.

We have offered information to fill your minds and your heart with inspiration – but what do you do with all that? Our guest Javan K. Bernakevitch has spent years working with Permaculture students to answer that question, providing students with a framework to figure out ‘where to from here?’. Enjoy the video and discover your own ‘Zones of Brilliance’ and your next steps after this course.





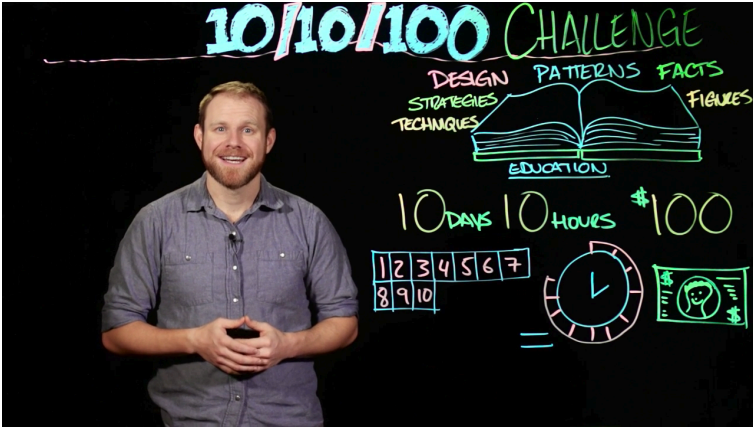
A YouTube element has been excluded from this version of the text. You can view it online here:

<https://open.oregonstate.edu/permaculture/?p=193>

- Intro to Permaculture: Where to From Here? – Video Transcript

10/10/100 Challenge

Javan and the whole Intro to Permaculture team are challenging you to make something real out of this book in the 10 days following the end of your reading. Watch this video to get the details and come up with your own idea for the challenge!



A YouTube element has been excluded from this version of the text. You can view it online here:
<https://open.oregonstate.education/permaculture/?p=193>

- Intro to Permaculture: 10-10-100 Challenge – Video Transcript

10/10/100 Challenge Facebook Page

Further Permaculture Education

As mentioned in the video, there are a number of ways of learning where and what to do next regarding education in permaculture. Permaculture is a gateway. It's a way to make sense of the world and bring in many different disciplines for the same goal. To take more responsibility for ourselves and for that of our children and community.

The Permaculture Design Course was and is the flag ship way of learning about permaculture. This can be taken in the traditional residential course where you go to class every day, or even live where the course is being held. Part time courses are held as well to accommodate modern schedules. Further accommodating courses, like the Oregon State University's online PDC, provide a 10 week, academically rigorous course with a low student to instructor ratio, that focuses on comprehension and design.

Other courses have long term immersions of months or even years.

Find the course that's a best fit for you, in your ecology and for what you think you would like to do with your permaculture knowledge. Remember you don't DO permaculture, you USE permaculture in what you do.

From there you can intern at a specific site or learn more about your specific Zones of Brilliance and native niches, reaching out to mentors and instructors that are specific to your niche.

Life Design – Zones of Brilliance

Thanks for making it through the book. In a world of increasing variability and volatility, most come to permaculture to learn about the solutions that can help the world and by effect, each other.

It's easy to look at others and think, "That's what I should do", yet it's our gifts, passions, and focus that we bring into permaculture which can be our greatest offering to our community.

The first video above explains one part of a three part process Javan created to help individuals use permaculture design, patterns, strategies and techniques to create their own right livelihood. A livelihood that is within their ethics and beliefs.

Coming from an overdeveloped world we bring many societal beliefs with us into our work. Three major aspects that most of us were never taught, but are essential for living a right livelihood are: creating long term objectives (Map), decisions making abilities to achieve those objectives (COMPASS) and ways to reach our objectives (ROUTES).

"Where to From Here" provides the MAP, COMPASS AND ROUTES.

In this video we'll discuss the ROUTES. These are ways you can take your interest in permaculture one step further. By observing and evaluating your inherent gifts, perennial passions, and problems you enjoy struggling with, we can discover your native niches. The places where you naturally excel, and the many ROUTES or paths that can lead to your objectives.

From here, businesses, hobbies, collaborations and further study can be engaged in. Permaculture is a broad way of looking at the world, thus it can include – EVERYTHING. That's a lot to take in.

Working through your Zones of Brilliance can provide a simple way to figure out your next step from here.

If you'd like to learn more about this work, visit Javan and All Points design here.

10/10/100 Challenge

Now that you've watched the video, here's the deal:

Starting tomorrow, take what you've learned, or learn a bit more about a specific element, technique, strategy, principle or design and DO SOMETHING with it!

Improve yourself, experiment, share what you've learned, build, create, dive into your native niche, contact one of the organizations, instructors or individuals introduced to you in this work; make tangible the intangible of your education.

You may be an experienced individual in permaculture, or brand new... it does not matter. All are invited and all are challenged to make something of your time here.

Then, share it with others via the link above on Facebook. If you're not on Facebook, have a friend or acquaintance post it for you.

Document your effort and post only once with:

- Photos of your work
- What you did
- Why you did it
- How it relates to permaculture
- What you're heading towards next

Make your time here on the planet meaningful, make it important, make it yours.

If you'd like to learn more about Javan K. Bernakevitch, visit [Where to from Here](#), [All Points Land Design](#), through [Permaculture BC](#) or view [permaculture videos](#) on his two [YouTube channels](#), [here](#) and [here](#).

28. World Permaculture Organizations

These are links to many of the world's Permaculture organizations, divided by region. Permaculture was developed as a decentralized network, and not a top-down organization, so there is no one organizational body which has control over the network. It's the pattern of the mycelial web, with independent cooperative organizations interlinking throughout the planet. Find the one nearest to you and connect with them! This list is not exhaustive; there are certainly reputable organizations that did not make it on this list, and apologies go out to anyone who was not included but should be.



Permaculture Design Firms

- Permaculture Design International
- Terra Genesis International
- Regenesis – Santa Fe, USA
- Whole Systems Design – Vermont, USA
- Earth Flow Designs – Los Angeles, CA, USA
- All Points Land Design – B.C., Canada
- Terra Phoenix Design– Washington State, USA
- Holmgren Design – Australia
- Reqrarians – Australia
- Southwoods Permaculture – Minnesota, USA
- Permaculture Artisans – Sebastopol, CA, USA
- Ecology Artisans – San Diego, CA, USA

Professional Training

- The Ecosa Institute (Free tuition)
- Permaculture Skills Center

Global Permaculture Organizations

- The Permaculture Association
- We the Trees
- Permaculture Global
- Permies Discussion Forums
- World Permaculture Association
- Sadhana Forest

Magazines

- Permaculture Magazine UK
- Permaculture Magazine North America
- Permaculture Design Magazine

Podcasts

- Earth Repair Radio with Andrew Millison
- The Permaculture Podcast with Scott Mann
- Diego Footer's Creative Destruction
- Sustainable Living Podcast
- Sustainable World Radio

Centers and Institutes by Region

Asia



Mount Everest, Nepal

- Permaculture Institute Asia

Thailand

- Panya Project
- Sahainan – Nan
- Permaculture Institute Thailand
- Phayao Permaculture Center

Philippines

- Permaculture Philippines
- Cabiokid Permaculture <https://cabiokid.wordpress.com/>

Malaysia

- Murujan
- Permaculture Perak

Laos

- Sustainable Laos Green Building

Indonesia

- Jiwa Damai Bali Retreat and Permaculture
- Tri Hita Karana Bali

Nepal

- Sunrise Farm Himalayan Permaculture
- Nepal Permaculture Group

India

- Permaculture Society of India
- Aranya Agricultural Alternatives- India

- Permaculture Patashala

China

- Hangzhou Permaculture Education Center

Japan

- Permaculture Center Japan

North America



Mount Denali, Alaska (U.S.)

- Permaculture Institute of North America
- Permaculture Magazine North America

United States

- Quail Springs Permaculture – Southern California
- Regenerative Design Institute – San Francisco
- Earth Activist Training – San Francisco
- Black Permaculture Network
- Occidental Arts and Ecology Center – Sonoma County, CA
- Permaculture Institute of the Northeast
- The Permaculture Academy – Los Angeles
- Spiral Ridge Permaculture – Tennessee
- The Farm- Tennessee
- Permaculture Research Institute Cold Climate – Minneapolis
- Central Rocky Mountain Permaculture Institute – Colorado
- Midwest Permaculture – Illinois
- Permaculture Design Build Collaborative – Illinois
- Seeds Sustainability Consulting – New York
- The City Repair Project – Portland, OR
- Aprovecho – Oregon
- Siskiyou Permaculture – Oregon
- Permaculture Rising
- The Permaculture Activist – Indiana
- The Permaculture Institute – New Mexico
- School of Permaculture – Texas
- Cascadia Permaculture – Oregon
- Friends of the Trees Society

Canada

- Permaculture BC

- OUR Ecovillage – Vancouver Island
- Permaculture Research Institute of Saskatchewan
- Permaculture Institute of Eastern Ontario
- Verge Permaculture – Alberta

Mexico

- Mas Humus
- Bosque De Niebla

Central America, South America, and the Caribbean



Mount Aconcagua, Argentina

Trinidad

- Wa Samaki Ecosystems

Barbados

- Permaculture Research Institute of Barbados
- Walkers Reserve

Belize

- Maya Mountain Research Farm

Costa Rica

- Rancho Mastatal Education Center
- Punta Mona Center for Regenerative Design and Botanical Studies

Ecuador

- Permaculture Caimito
- Seed Guardians Network of Ecuador
- Rio Muchacho Farm, Eco-lodge, Education

Guatemala

- The Yoga Forest

Nicaragua

- Project Bonafide

Argentina

- Instituto Argentino de Permacultura
- Na Lu'um Latinoamerica

Brazil

- Instituto de Permacultura da Bahia
- Ecocentro IPEC

Chile

- The Permaculture Institute of Chile
- El Manzano

Europe



Mount Elbrus, Russia

Austria

- Krameterhof
- Permakultur Austria

Sweden

- Ridgedale Permaculture

Portugal

- Casalinho

Scotland

- Tap o' Noth Permaculture – Aberdeenshire

Italy

- Italian Academy of Permaculture

Bulgaria

- Green School Village
- Balkan Ecology Project
- Permaship

Britain

- Northern School of Permaculture
- The Permaculture Association of Britain
- Map of Projects
- Permaculture Magazine
- Designed Visions

Denmark

- Permakultur Denmark

Norway

- Norsk Permakulturforening
- Polar Permaculture Solutions – Svalbard

France

- Permaculture Eden
- Eco-Centre Le Bouchot
- Popular University of Permaculture
- Brin de Paille

Germany

- Permakultur Akademie

Greece

- Re-Green Greece
- Permaculture in Greece

Holland

- Permacultuur Nederland

Ireland

- Carraig Dulra Organic and Permaculture Farm

Africa



Mount Kilimanjaro, Tanzania

South Africa

- Permaculture Design South Africa
- Ukuvuna

Kenya

- Permaculture Research Institute Kenya

Egypt

- Permaculture Egypt

Ethiopia

- Strawberry Fields Eco Lodge

Zimbabwe

- PORET
- Chikukwa Project

Middle East



Mount Damavand, Iran

Palestine

Global Campus Palestine
Marda Permaculture Farm

Lebanon

SOILS Permaculture Association – Lebanon

Israel

Kibbutz Lotan Center for Creative Ecology

Jordan

Permaculture Research Institute of Jordan

Saudi Arabia

Al Baydha Project

Australia, Tasmania, and New Zealand



Mount Kosciuszko, Australia

Australia

- Permaculture College Australia
- Permaculture Australia
- DIY Food and Health
- Permaculture Sydney Institute
- Geoff Lawton
- Reagrarians
- Northey Street City Farm – Brisbane

New Zealand

- Permaculture in New Zealand

Tasmania

- Permaculture Tasmania
-

Image Sources

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About the Author

Andrew Millison brings over 20 years experience in designing and building permaculture projects to his teaching and wants to share that rich, real-world experience with his students.

He has been studying, teaching and practicing permaculture since he took his first design course in 1996. He began teaching permaculture design at the college level in 2001 and has been an instructor at Oregon State University in the Horticulture Department since 2009. Andrew currently teaches the Permaculture Design Course and the Advanced Permaculture Design Practicum at OSU on campus and online.

Andrew first learned permaculture design in the drylands of Arizona, where he studied for his undergraduate and master's degrees at Prescott College. His focus was on rainwater harvesting, greywater systems and desert agriculture. He started a permaculture landscape design and build company and also worked in an ecologically-based landscape architecture firm.

In recent years, Andrew's focus has been more on broad scale farm planning, permaculture housing developments and obtaining water rights. In 2015 he founded Permaculture Design International, a collaborative design firm that works on large-scale global projects.

You can stay current with Andrew's Permaculture conversations on his podcast www.earthrepairradio.com.

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- Said, Edward W. *Culture and Imperialism*. Knopf, 1994.

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- Davidson, Donald, *Essays on Actions and Events*. Oxford: Clarendon, 2001.
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Versioning

This page provides a record of changes made to this guide. Each set of edits is acknowledged with a 0.01 increase in the version number. The exported files for this toolkit reflect the most recent version.

If you find an error in this text, please fill out the form at bit.ly/33cz3Q1

Version	Date	Change Made	Location in text
0.1	MM/DD/YYYY		
0.11	8/17/2020	Links to External Sources updated	All