



# PERMACULTURE 101: AN INTRODUCTION TO REGENERATIVE DESIGN

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## Permaculture 101: An Introduction to Regenerative Design

### EXECUTIVE SUMMARY

Permaculture is an ethical design approach rooted in observation of ecological processes. These processes act as a framework for creating regenerative systems for human material and non-material needs, including food, shelter, and energy, as well as economic, legal and social structures. Permaculture's hallmark is the beneficial integration of internal and external elements within a given space for optimal function, production and beauty. Systems designed using the permaculture approach mimic nature in order to minimize waste, maximize efficiencies, and produce abundant yields. Permaculture itself is not a discipline, but rather a design approach based on connecting different disciplines, strategies, and techniques.

Since permaculture is still largely based on the research of its co-creators, Bill Mollison and David Holmgren, their writings are a primary source of introductory material on the topic and its practice. Today, permaculture is practiced worldwide and is based on Mollison and Holmgren's set of three permaculture ethics and twelve design principles. Permaculture ethics serve as the basis for decision-making when developing a given system while design principles serve as the framework for implementation and management.

Systems designed using permaculture can incorporate agricultural practices in addition to elements of a wide range of other disciplines, including landscape design, architecture, community development, energy production and storage, land management, and economic and legal structures.

This ethical design approach challenges long held paradigms by holding up regenerative processes, production of a surplus, and care of people and the environment as objectives that are NOT mutually exclusive but instead, core tenets of good design. Permaculture can aid in our quest towards a viable, healthy, abundant future based on ecological processes and renewable resources.

### INTRODUCTION

Permaculture is a design approach that utilizes multiple scientific disciplines and is practiced worldwide. Many organizations throughout the U.S. and around the world support and teach permaculture, including for-profit businesses, nonprofits and higher education institutions. Today, permaculture organizations and programs exist in all 50 U.S. states including the [Oregon State University Permaculture Design Program](#) and the [Permaculture Design Certificate offered at Cornell University](#). While close to half a century old, permaculture still has challenges to overcome before becoming fully accepted as a design approach in mainstream cultures. However, over the past decade it has flourished as individuals and communities have sought ways to fundamentally alter their relationship with the natural world and create fundamental systems-based change.

This report introduces permaculture as a design approach that can be used to develop environmentally friendly food, energy, and material production systems. The concepts and practice of permaculture offer one way to explore the broad scope of human impacts on the environment and how human behavior can be adapted to achieve greater harmony with these systems. Permaculture should not be viewed as a

silver bullet, just as other forms of design, production and manufacturing are not viewed as cure-alls for the array of environmental and human health issues that exist and persist in the 21<sup>st</sup> century. Rather, permaculture is an approach focused on conscious, ecological design within the much larger environmental design toolbox.

## WHAT IS PERMACULTURE?

The term *permaculture* stems from two words - **permanent** and **agriculture**. However, it incorporates a range of disciplines beyond agriculture, including landscape design, architecture, community development, energy production and storage, land management, and economic and legal systems. Through the use of multiple disciplines, permaculture considers and addresses a wide spectrum of issues (Sidebar 1). These topics are addressed as integrated parts of the whole and not as separate entities. This interconnectedness serves as permaculture's overarching ideology. Permaculture itself is not a discipline, but rather a "design approach based on connecting different disciplines, strategies, and techniques."<sup>1</sup>

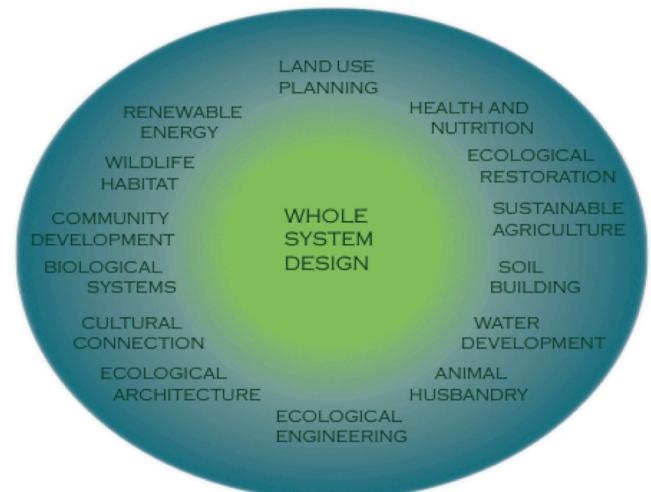
Permaculture is *an ethical design approach rooted in observation of natural systems that can act as a framework for creating productive landscapes for human needs*. It utilizes whole-systems thinking<sup>2</sup> to address human material and non-material needs including food, water, shelter, energy, and health (Figure 1). Permaculture design seeks to benefit all life forms (including humans, wildlife, plants, fungi and microorganisms). It seeks harmonious integration of human needs and ecological processes through systems designed to mimic natural environmental processes. Permaculture's hallmark is the integration of internal and external elements within a given space (i.e., geography, geology, soil biology, precipitation, sun patterns, climate, slope, social and cultural constructs, etc.) for optimal function, production and beauty.

According to permaculture co-creator Bill Mollison, permaculture is defined as, "*the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of landscape and people, providing their food, energy,*

### Sidebar 1: Issues Permaculture Considers

- Climate Change
- Food Security
- Social Equity
- Natural Capital Growth
- Community Development
- Ecological Processes
- Energy Efficiency
- Consumption
- Waste Reduction
- Renewable Resource Capture & Production
- Human & Environmental Health
- Biodiversity

**Figure 1: Whole System Design, A Multidisciplinary Approach**



Source: [www.regenerativedesign.org/permaculture](http://www.regenerativedesign.org/permaculture)

<sup>1</sup> Hemenway, Toby. *Gaia's Garden: A Guide to Home-Scale Permaculture*. Second Edition. Chelsea Green Publishing Company, 2009.

<sup>2</sup> Peter Senge describes systems thinking as "the discipline that integrates the (other) disciplines, fusing them into a coherent body of theory and practice." Senge, Peter. 2006. *The Fifth Discipline*. Doubleday, NY, p 12.

*shelter, and other material and non-material needs in a sustainable way.”<sup>3</sup>* Through the implementation of conscious design, permaculture seeks to, “reduce the impact that human settlements have on nonrenewable and renewable resources, while creating an abundant living environment, catering to the needs of all living creatures” [emphasis added].<sup>3</sup>

## BRIEF HISTORY

Bill Mollison was a biogeography professor at the University of Tasmania in the early 1970s when he, along with David Holmgren, one of his graduate research students, developed the concept of permaculture. Its roots lay in the rural landscapes of Australia where Mollison observed natural ecosystems and the interconnectedness of their ecological processes.<sup>3</sup> These observations led in turn to the idea that productive landscapes designed by humans should *mimic nature in order to minimize waste, maximize efficiencies, and produce abundant yields*. These two individuals provided the origins of permaculture theory, and their writings are a primary source of introductory material on the topic and its practice.

Permaculture practices were initially adopted by individuals intent on achieving greater self-reliance and seeking more holistic landscaping approaches for their remote parcels of land. Since the 1970s, a larger world population, increased numbers of urban dwellers, and the growth of emerging markets have resulted in increased needs for energy resources and tangible goods. As a result, permaculture practices have become more widely adopted over the past 40 years in a wide range of urban and suburban settings.

Over time, permaculture has also evolved to become more inclusive of social and cultural issues. According to Holmgren, permaculture has transformed from a vision focused on permanent agriculture to one inclusive of **permanent culture**.

Thus, permaculture has evolved to embody both ecological processes and human cultures (Sidebar 2). Economic and social structures have been taken into consideration in order to build and repair human-to-human, and human to natural environment, relationships. This transformation has expanded permaculture’s reach socially and geographically – from individual to collective, and from rural to urban. The scope of 21<sup>st</sup> century permaculture focuses on the cultivation of permanent, thriving, ecologically-minded communities.

## “REGENERATIVE” VERSUS “SUSTAINABLE”

Currently, 40 plus years after initial development, permaculture is oftentimes referred to as “regenerative” design. It is important to understand what the word *regenerative* means and stands for within the permaculture context. A clear understanding of terms is especially important during a time in which the word *sustainable* has become a commonly used buzzword among environmentalists,

### Sidebar 2: Examples of Permanent Culture

- *Personal Healing*: personal awareness and growth
- *Relationship Building*: reconnecting individuals to one another
- *Community Development*: social, environmental and economic planning and development
- *Regenerative Cultures*: integrated cultural, social, environmental and economic growth and stability
- *Restorative Justice*: approach focused on mediation, personal needs, victim healing and offender accountability

<sup>3</sup> Mollison, Bill. *Permaculture: A Designers’ Manual*. Tagari Publications, 1988. (Preface, pg. ix)

politicians, academics, mainstream media outlets and private businesses, though not always for the same reasons or end goals.

By looking at the root words, *regenerate* and *sustain*, the difference between the two can be seen. The Merriam-Webster Dictionary defines regenerate as, “restoring to a better, higher, or more worthy state.”<sup>4</sup> Thus, in the permaculture context, to regenerate is to ensure replenishment, rejuvenation, and re-establishment of natural resources and social capital while ensuring the future security of natural resources, ecological processes and social structures. Sustain is defined as, “to bear up or keep in existence,”<sup>5</sup> or in the permaculture context, to maintain a systems’ ability to provide resources at current production and consumption levels. To a certain extent “to sustain” is to create stability at current conditions and consumption levels while “to regenerate” is to produce resources for future resource security and stability using alternative methods of production.

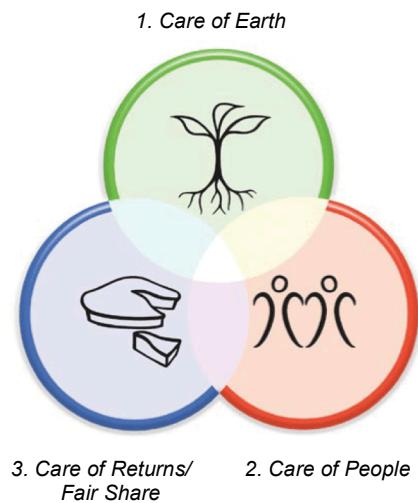
Permaculture seeks to produce and provide an expansion of natural goods by using abundant natural resources (air, water, sunlight, precipitation, healthy soil, etc.) as the system’s main drivers of growth. Permaculture utilizes “waste” (or naturally generated excess) as an input to foster growth. Efficiency and self-sufficiency are important practices incorporated within permaculture designs in order to optimize production and consumption. In this way, permaculture is about regeneration and not dedicated to sustaining current lifestyle and consumption choices by simply applying alternative methods, materials and resources.

## PERMACULTURE ETHICS

Permaculture is still largely based on Mollison and Holmgren’s three guiding ethics and twelve design principles.

An ethic can be defined as “a set of moral principles, especially ones relating to or affirming a specified group, field or form of conduct.”<sup>6</sup> As an ethics-based design approach, permaculture utilizes three guiding ethical principles or “permaculture ethics”<sup>7</sup> that form the foundation for all design decisions. These ethics are largely based on practices and beliefs held in Australian aboriginal and other indigenous societies. By applying these ethics, permaculture seeks to respectfully utilize natural resources while benefiting all living species. The ethics can be seen as defining an inter-related system – one in which no single one is superior to another in either importance or functionality, but wherein both the second and third ethical principles arise from the first.<sup>8</sup>

**Figure 2: The Permaculture Ethics**



Source:  
[www.permacultureprinciples.com/ethics.php](http://www.permacultureprinciples.com/ethics.php)

<sup>4</sup> Merriam-Webster Dictionary, [www.merriam-webster.com/dictionary/regenerate](http://www.merriam-webster.com/dictionary/regenerate)

<sup>5</sup> Merriam-Webster Dictionary, [www.merriam-webster.com/dictionary/sustain](http://www.merriam-webster.com/dictionary/sustain)

<sup>6</sup> <http://english.stackexchange.com/questions/182043/ethic-vs-ethics>

<sup>7</sup> Permaculture expert Toby Hemenway notes that permaculture is notoriously hard to define and uses language that is often confusing (<http://tobyhemenway.com/668-what-permaculture-isnt-and-is/>).

<sup>8</sup> Holmgren, D. 2011. *Permaculture Principles & Pathways Beyond Sustainability*.

The permaculture ethics serve as the basis for all permaculture design decision-making when developing a given system.

The three guiding permaculture ethics (Figure 2) are:

1. *Care of the Earth*
2. *Care of People*
3. *Care of Returns/Fair Share*

These ethics are each briefly described in more detail below.

### **Care of the Earth**

The care of the Earth ethic provides the underlying framework for permaculture. In practice, this ethic includes the following considerations<sup>9</sup>:

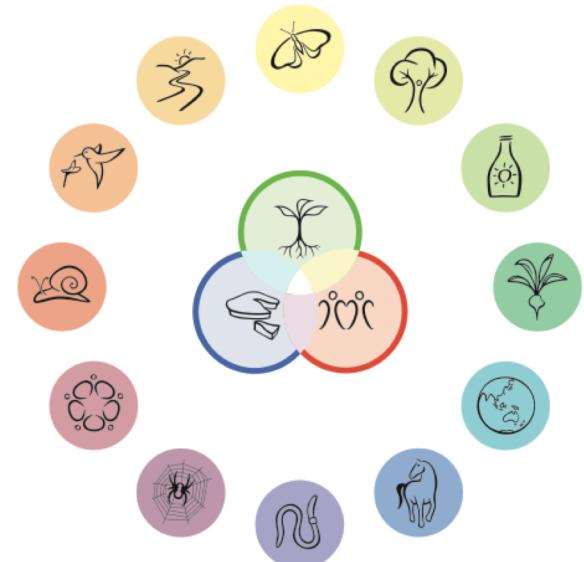
- *Living Soil* – Rebuilding of natural capital and care for living (microbial) soil as the source and provider of life.
- *Environmental Stewardship* – Collectively caring for the Earth's well being through protection and enhancement of all living things and natural resources.
- *Biodiversity* – Caring for, ensuring, and promoting the continuation of diverse life forms and the ecosystems (i.e., forests, rivers, and oceans) that support them.
- *Living Things* – Accepting all life forms or species as intrinsically valuable.

### **Care of People**

Permaculture recognizes humans as part of natural systems, and thus seeks to improve both human and environmental health. This ethic can be broken down into two core considerations:

- *Care for Self* – Caring for ourselves in order to contribute to the greater well being of our families, friends, and communities in order to exert the most influence on others for the greater good.
- *Non-Material Well Being* – Promoting self-

**Figure 3. Twelve Permaculture Design Principles**  
(See Appendix 1 for further descriptions and applications)



Source: [www.permacultureprinciples.com/principles.php](http://www.permacultureprinciples.com/principles.php)

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

<sup>9</sup> Ethical considerations have been adopted from *Permaculture: Principles and Pathways Beyond Sustainability*.

reliance and taking responsibility for more than one's own future. This involves collaboration and sharing of knowledge, skills, resources and experiences among one another.

### **Care of Returns/Fair Share**

The third ethic recognizes the importance of resource productivity and distribution, and the interaction of consumption practices. This ethic can be broken into two core considerations:

- *Setting Limits to Consumption* – Realizing the natural cycles in which resources are created and not overindulging in any one system or cycle.
- *Redistribution of Surplus* – Ensuring and sharing surplus resources between systems and across cycles to assist everyone.

## **PERMACULTURE DESIGN PRINCIPLES**

The three permaculture *ethics* are core to the permaculture design philosophy, while the twelve *design principles* act as the framework for implementation and systems management.<sup>10</sup> The twelve design principles shown in Figure 3 and described in Appendix 1 have been informed by observation of human consumption patterns, energy use and urban settlement. The circular shape depicted in Figure 3 is intended to reflect the inclusiveness and nonlinearity of design. The design process can begin with any one of the principles, and all principles may be used multiple times over the life span of a system. Conversely, not every system designed using permaculture is required to use all of the design principles. Even though these design principles are fundamental to permaculture activities, a given design will vary based on respective location, situation, climate and culture.

## **PERMACULTURE APPLICATIONS**

Permaculture incorporates knowledge from many fields of study in its designs and practices, and it can be utilized by and positively impact these fields. These areas of impact can be seen in Holmgren's Permaculture Flower depicted in Figure 4. In this model, the permaculture ethics and principles are centrally located and are depicted as core to the practice, while petals depict areas in which permaculture designs and techniques may be implemented. This particular diagram helps depict permaculture as a natural and social science that is about more than agricultural practices. Fields in which permaculture design can be utilized and incorporated include the building, technology, education, health and spiritual wellbeing, finance and economics, land tenure and community governance, and land and nature stewardship sectors. In many

**Figure 4. The Permaculture Flower**



Source: [www.permacultureprinciples.com/flower.php](http://www.permacultureprinciples.com/flower.php)

<sup>10</sup> Mollison originally provided 28 design principles, which have evolved and transformed as a result of continued real world permaculture implementation, research, and an increasing urgency to address specific environmental and social problems.

instances, permaculture design may be implemented in these sectors through the use of cooperative models of teaching, ownership and governance. Existing models include credit unions, grocery cooperatives and Waldorf school education (a non-sectarian and non-denominational pedagogical method based on self-governance that recognizes all world cultures and religions as equal and important).

The following three case studies illustrate the use of permaculture across the country and application of the ethics and design principles as well as impacts and benefits from each project.

### **University of Massachusetts – Permaculture Initiative in Amherst, MA**

The University of Massachusetts (UMass) Permaculture Initiative began in 2009 in response to a University plan to convert an existing high maintenance grassy area into a surface parking lot. As a result, students proposed transforming various unproductive, maintenance-intensive grass lawns on campus into aesthetically pleasing landscapes that would also produce edible crops. They presented three benefits the permaculture program would provide campus, students, faculty and staff:

- The production of nutritious foods on-site for University consumption;
- The improvement and promotion of environmental health on campus lands; and
- The creation of service-learning opportunities for students and community volunteers.<sup>11</sup>

The students' proposal also stressed the ability of permaculture landscapes to be replicable, scalable, and adaptable, making them ideal for a campus setting.

The Franklin Permaculture Garden is an example of the type of landscape transformation that occurred as a result of the UMass Permaculture Initiative. Located next to the Franklin Dining Commons, on the University of Massachusetts Amherst campus, the  $\frac{1}{4}$  acre area existed as an underutilized patch of grass and was slated to become a parking lot in 2009. After the Permaculture Initiative was created, over 100 students collaborated to develop 40 landscape designs aimed at turning the space into a productive ecosystem.

**UMass Amherst:  
Franklin Permaculture Garden**



Source: [www.umassdining.com/sustainability/permaculture/our-ecosystem](http://www.umassdining.com/sustainability/permaculture/our-ecosystem)

Once the final design was selected, students actively engaged outside community members and stakeholders in order to create a mutually beneficial relationship between the University and its surrounding neighbors. This process also ensured a sharing of knowledge related to permaculture, gardening, healthy eating and the design process. The final design included over 1,500 plants and over

<sup>11</sup> [www.umasspermacultureconference.com/history-of-umass-permaculture.html](http://www.umasspermacultureconference.com/history-of-umass-permaculture.html)

150 different species. During the garden's first growing season 1,000 pounds of produce were harvested and 1,000 volunteers from outside the University were engaged.<sup>12</sup>

This example depicts the ability of permaculture techniques to transform unproductive landscapes into productive ecosystems. It also portrays permaculture's ecological and social values.

### **Permaculture Research Institute Cold Climate – House of Hope Community Garden in St. Paul, MN**

Similar to the UMass Franklin Permaculture Garden, the House of Hope Community Garden makes use of a once underutilized, maintenance intensive grass lawn. In 2011 a St. Paul, MN church's front lawn was transformed into a 4,800 square foot productive community garden of edible plants using permaculture design. The resulting garden became known as the House of Hope Community Garden.

The process began with House of Hope church members and clergy wanting to give back and reach out to the wider community. As a result, the church community and neighborhood volunteers became an integral part of the permaculture garden design, implementation and management process. All food produced on-site is harvested by volunteers and donated to Neighborhood House, Ramsey County's largest food shelf.

Agricultural productivity within the site is promoted through the use of companion planting of polycultures that include groups of vegetables, flowers and herbs which aid each other in attracting beneficial insects, repelling pests, reducing maintenance needs, and adding to the gardens aesthetic beauty.<sup>13</sup> During the initial year, the garden produced over 900 pounds of food by the end of the growing season. By 2013, the amount of food produced by the garden had more than doubled to over 1,800 pounds.<sup>14</sup>

The House of Hope permaculture garden also portrays permaculture's ecological and social values.<sup>15</sup>

**House of Hope Church:  
Community Garden**



Source: Photo taken by author, Matt Frank

### **Regenerative Leadership Institute – Grey Water Bathhouse in Eugene, OR**

While the first two examples depict permaculture's impacts on food production and community development, this third example depicts how permaculture designs may be utilized within building and energy systems. A grey water bathhouse was constructed on land owned by the Regenerative Leadership Institute in Eugene, OR and serves as one of the organization's facilities for permaculture workshop participants.

<sup>12</sup> [www.umassdining.com/sustainability/permaculture/franklin-permaculture-garden](http://www.umassdining.com/sustainability/permaculture/franklin-permaculture-garden)

<sup>13</sup> [www.pricoldclimate.wordpress.com/2011/06/22/house-of-hopes-new-community-garden-a-design-and-demonstration-project/](http://www.pricoldclimate.wordpress.com/2011/06/22/house-of-hopes-new-community-garden-a-design-and-demonstration-project/)

<sup>14</sup> According to Mary Senkbeil, House of Hope Community Garden volunteer manager

<sup>15</sup> This report's lead author, Matt Frank, helped install the House of Hope Community Garden and labeled its polycultures for public education purposes

The building consists of two restrooms each containing composting toilets and shower stalls. Water for the sinks and showers is provided via rooftop water collection and heated using rooftop solar panels. Once used, the water is flushed through an on-site engineered wetland and recycled back into the system. Native plants located within the wetland just outside the structure have deep roots that effectively filter the water before it returns to the building to be recaptured and reused. All waste from the toilets is composted behind the structure and used elsewhere on site to fertilize soil. Excess heat from use of the composting toilets and showers is captured within an attached greenhouse and used to aid food growth and produce season extension in colder months.

This example depicts permaculture's conscious use of natural inputs and outputs within a given system and further enforces full-circle, or closed-loop methodologies.

## CRITIQUES

There is a scarcity of scientific research and scholarly review of the benefits and impacts of permaculture. Some people view this lack of scientific documentation as problematic. Critics view permaculture as highly theoretical even though it has as its basis many ecological and natural sciences. According to Richard Perkins, a permaculture instructor in the UK, permaculture is in need of scientific measurement and financial modeling in order to persuade the mainstream of its benefits.<sup>16</sup> In his experience teaching and researching permaculture around the world, Perkins states that he has found little evidence of clear financial evaluations and replicable data for permaculture practices.

Furthermore, two factions tend to exist today within the permaculture field – those who view themselves as antiestablishment and wish to use permaculture to escape from conventional forms of production and governance, and those who wish to utilize permaculture as a means to solve ecological and human health issues within the contexts of existing industrialized systems (including within urban areas). These challenges have, unfortunately, prevented permaculture from being widely adopted, even though the concepts have been practiced for many years on varying scales and across a wide range of ecosystems, geographies, land uses and cultures.

## LEARN MORE

Many organizations throughout the U.S. and around the world support and teach permaculture. A list of permaculture resources including publications, websites and organizations are included at the end of this

### Regenerative Leadership Institute: Grey Water Bathhouse



Source: Photo taken by author, Matt Frank

<sup>16</sup> Perkins, Richard. "Why Permaculture Needs Accurate Data and Measurement to Persuade the Mainstream." Permaculture – Inspiration for Sustainable Living. May 2<sup>nd</sup>, 2012. [www.permaculture.co.uk/articles/why-permaculture-needs-accurate-data-and-measurement-persuade-mainstream](http://www.permaculture.co.uk/articles/why-permaculture-needs-accurate-data-and-measurement-persuade-mainstream)

report. In the U.S., permaculture organizations and programs exist in all 50 states and permaculture courses are offered at various universities (e.g., the Oregon State University Permaculture Design Program and Cornell University's Permaculture Design Certificate). Permaculture organizations offer introductory classes, hands-on workshops, lectures and intensive certification courses. Multi-day Permaculture Design Certification (PDC) courses are offered that follow a curriculum based on an original one designed by Mollison and Holmgren. These certification courses teach a specific set of standards derived by permaculture's creators. Upon graduating from a PDC course, students become certified and may begin teaching permaculture theory, concepts and design strategies to others.<sup>17</sup>

Because of its integrated, whole systems approach, successful permaculture design application requires significant upfront knowledge prior to implementation. PDC courses are an excellent resource for those wishing to become certified. Certification is not necessary to practice permaculture; however, since permaculture is information and design intensive it is recommended that interested parties do some research either online or through publications prior to initiating a project. It is also important to note that a large measure of permaculture knowledge can be attained experientially once a base understanding is gained.

## THE BOTTOM LINE

Permaculture utilizes an understanding of ecological processes and applies this knowledge through designed systems in order to improve environmental and human health, while simultaneously reconnecting us to one another and the natural environment. This ethical design approach challenges long-held paradigms by focusing on regenerative processes, production of a surplus, and care of people and the environment as objectives that are NOT mutually exclusive but instead, core tenets of good design. Its main drivers of growth, security and regeneration lie in consciously designed energy, food, building material and human relationship-building systems. Unlike conventional models of modern-day human settlement, food production, energy production, and consumption, permaculture uses models based on renewable resource inputs and outputs. Permaculture is a design approach that can aid in our quest towards a viable, healthy, abundant future based on ecological processes and renewable resources.

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<sup>17</sup> This report's lead author, Matt Frank, attended a 9-day intensive PDC course in Eugene, OR in April 2012 that was offered through Common Circle Education (now the [Regenerative Leadership Institute](#)). He also took part in a nine month-long Urban Farming Certification Program from January-September of 2014 through [Permaculture Research Institute Cold Climate](#) in Minneapolis, MN.

## RESOURCES

### Publications

- Hemenway, Toby. *Gaia's Garden: A Guide to Home-Scale Permaculture. Second Edition.* Chelsea Green Publishing Company, 2009.
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- Weiseman, Halsey and Ruddock. *Integrated Forest Gardening: The Complete Guide to Polycultures and Plant Guilds in Permaculture Systems.* Chelsea Green Publishing, 2014.
- Permaculture Activist Magazine: [www.permacultureactivist.net](http://www.permacultureactivist.net)

### Websites

- Bill Mollison's Website: [www.tagari.com](http://www.tagari.com)
- David Holmgren's Website: [www.permacultureprinciples.com](http://www.permacultureprinciples.com)
- Geoff Lawton Permaculture Videos: [www.geofflawton.com](http://www.geofflawton.com)

### Organizations

- Kinstone Academy of Applied Permaculture: [www.kinstonecircle.org](http://www.kinstonecircle.org)
- Midwest Permaculture: [www.midwestpermaculture.com](http://www.midwestpermaculture.com)
- Permaculture Institute: [www.permaculture.org](http://www.permaculture.org)
- Permaculture Research Institute Cold Climate: [www.pricoldclimate.org](http://www.pricoldclimate.org)
- The Permaculture Research Institute of the USA: [www.permacultureusa.org](http://www.permacultureusa.org)
- Regenerative Design Institute: [www.regenerativedesign.org](http://www.regenerativedesign.org)
- Regenerative Leadership Institute: [www.permaculturedesigntraining.com](http://www.permaculturedesigntraining.com)
- Urban Permaculture Institute: [www.upisf.com](http://www.upisf.com)

## APPENDIX I - Permaculture Design Principles

SYMBOL	PRINCIPLE	DESCRIPTION	APPLICATIONS
	<b>Observe and Interact</b> <i>Practice continuous and reciprocal interaction</i>	Designs are created based on observation of and interaction with a given space's inputs and outputs. Careful observation and thoughtful interaction provide initial insight into existing working systems and ideas for potential future adjustments or redesigns.	Edible garden and food forest maintenance, redesign, evolution and transformation
	<b>Catch &amp; Store Energy</b> <i>Use existing natural capital</i>	Designs include the capture and storage of natural resources (e.g. wind, sun, moisture, precipitation, geothermal heat). Designed systems mimic the self-sufficient systems found in plants and natural environments.	Wind towers, photovoltaic panels, heat pumps, solar ovens, grey water systems, passive solar building design, engineered wetlands
	<b>Obtain a Yield</b> <i>Produce abundant natural and social capital and ensure regeneration</i>	By creating regenerative systems and producing abundant yields permaculture creates long-term solutions, resource security and systems stability.	Edible gardens, food forests, keyhole gardens, bio-intensive gardening, agroforestry
	<b>Apply Self-Regulation &amp; Accept Feedback</b> <i>Understand positive and negative system feedbacks in order to reduce future management issues</i>	While permaculture systems seek to mimic natural processes, they are still human designed systems that require maintenance for continued success.	Edible garden and food forest maintenance and management
	<b>Use &amp; Value Renewable Resources &amp; Services</b> <i>Make use of and value existing, natural, renewable resources and services</i>	Tools and processes exist throughout the natural environment that aid in the creation of resources and the minimization of waste – permaculture strives to better utilize and value these natural tools and processes.	Natural energy sources (e.g. sun, wind, water, biomass), human and animal labor, natural building materials (wood, adobe, cob, hay, rammed earth), biological services (cooperative microbial interactions, symbiosis)
	<b>Produce No Waste</b> <i>Value frugality, and reuse "waste"</i>	Permaculture systems are designed to make use of all respective inputs and outputs in order to minimize waste and pollution. "Waste" is viewed as a resource opportunity.	Recycling, material reuse and salvage, composting, sheet mulching

	<b>Design from Patterns to Details</b>  <i>Recognize natural patterns and design systems based on them</i>	The principle of patterns seeks to mimic biological patterns for the purpose of system efficiency and self-sufficiency.	Earthworks (berms, swales, terraces), garden design and layout, biomimicry
	<b>Integrate Rather than Segregate</b>  <i>Connections between elements are as important as individual one</i>	Inclusion and consideration of every element in a given design allows for the creation of symbiotic relationships that further promote regeneration, system stability, resource efficiency, and production of abundant yields.	Grey water systems, engineered wetlands, rooftop gardens, integrated production systems (e.g. aquaponics)
	<b>Use Small &amp; Slow Solutions</b>  <i>Design systems to perform functions at the smallest scale possible; focus on self-reliance, patience and reflection</i>	Systems are designed first and foremost to function properly at the smallest scale possible in order to aid system efficiency and stability and future growth or replication.	Small scale permaculture systems and their respective growth and transformation towards larger scale systems
	<b>Use &amp; Value Diversity</b>  <i>Promote, create and value diversity to ensure design structure, stability, productivity and growth; as well as communal building, learning and cross-cultural growth</i>	Permaculture flourishes and is based on diversity. It is critical to promote and create diversity through systems design and implementation. Biological and social diversity, growth and promotion are of utmost importance.	Companion planting, co-operatives (co-ownership of food, resource, material, tool, financial, legal and knowledge bases), learn and skill-share events
	<b>Use Edges &amp; Value the Marginal</b>  <i>Utilize edges or interfaces since this is the area where biodiversity thrives</i>	Permaculture designs view edges, or interfaces, as opportunities rather than challenges. Edges are the areas where the greatest exchange of materials and energy occur.	Garden and building design, layout and the interactions between the two; creation of landscape edges to promote diversity, curvilinear and organic design structures
	<b>Creatively Use &amp; Respond to Change</b>  <i>Adaptability and flexibility are crucial for systemic evolution and transformation</i>	Change may occur within permaculture systems due to a variety of factors, including seasonal weather patterns, natural resource availability, depletion and disturbance. Instead of viewing change negatively as a barrier to stability it is viewed as an opportunity for system evolution and growth - designs must positively respond to change in order to survive and thrive.	Landscape designs based on existing site conditions with built-in adaptability to change, creation of micro-climates, use of seasonal extension tools (e.g. hoop houses, winter grow boxes)

Source: Adapted from - Holmgren, David. *Permaculture: Principles & Pathways Beyond Sustainability*. Holmgren Design Services, 2002.

*This report was prepared by*  
**DOVETAIL PARTNERS, INC.**

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