

## Zones and Sectors in the City

by Bart Anderson

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When permaculture was developed in the early 1970s, it emphasized agriculture ("permanent agriculture") and the design of homesteads and small farms.

Thirty years later, conditions have changed. The most urgent environmental issues are what permaculturist Tim Winton calls the "hydrocarbon twins": global warming and the end of cheap energy (Peak Oil) (1) . Since both conditions are caused by fossil fuels, the pressing problem is how to minimize their use. Re-examining transportation is key, since that sector is the biggest consumer of petroleum. According to the New York Times, the transportation sector "represents two-thirds of all oil demand in the United States and is solely accountable for the growth of the nation's oil thirst over the last three decades" (2).

A second emerging issue is the destruction of local communities and their replacement by a globalized commercial culture. Local communities are critical buffers against rising energy prices, economic dislocation and dysfunctional national governments. Their absence puts us at risk.

Proposed solutions are often so big and general that we feel helpless. What can one person do about the Kyoto protocol? Large economic interests dominate the US government, so that the recently passed Energy Bill consists largely of handouts to the fossil fuel industries (3) . To this impasse, permaculture brings a unique emphasis on what can be done by individuals and small groups, fostering a sense of empowerment.

This article describes how a classic permaculture technique -- zone and sector analysis -- can be adapted to deal with current problems.

### **Zones and Sectors**

Zone and sector planning is a design tool for analyzing the site of a homestead or small farm. It suggests locations for activities so they can be performed efficiently and sustainably. The technique is regularly covered in permaculture texts and Permaculture Design Courses (4) .

Zones are usually pictured as six concentric circles, ranging from Zone 0 (home) to Zone 5 (unmanaged land). Structures, plantings and activities are located so that those frequently visited are nearer home and those seldom visited are farther away. For example, intensive gardening is set in Zone 1, orchards in Zone 2 and crop farming in Zone 3.

Bill Mollison has an interesting explanation for zones. In his *Permaculture Design Manual*, he notes that zones are a way to manage "energies available on site: people, machines, wastes, and fuels of the family or society." Later, as we extend the definition of zones, we'll draw upon Mollison's understanding of energy as the principle underlying zones.

If zones are for on-site energies, sectors are a way to look at natural or wild energies that flow across the land. Such energies include sun, wind and wildfires. These energies come from outside the site and pass through it. Sectors can be pictured as wedges in the concentric zones, though their real configurations will be different on different sites.

As powerful as zone and sector analysis is, I found it awkward for planning our life on the San Francisco Peninsula. This is no surprise, since the technique was originally developed for a different purpose -- planning homesteads in rural areas. The homesteads depicted as examples of zones and sectors would cost \$1 to \$5 million in our area. Our activities are not agricultural; even small-scale gardening is a challenge in the city.

And yet there are billions of us city-dwellers in the world. Any tool that enables us to live more ecologically sane lives would make a big difference.

### **Re-defining Zones**

The first step in adapting zones for a wider audience is to expand the notion of the site. The usual image of a permaculture site is that of private property owned by an individual, family or small group attempting some degree of self-sufficiency. The reality for most people is very different.

The city-dweller ranges over a much larger landscape, exerting energy and obtaining resources from properties owned by different entities. An individual may work on property owned by a corporation, buy vegetables from a farmers market (local owners) and hike in publicly owned parks.

Just as zones can be used to minimize distances traveled on a farm, so they can be used to reduce distances traveled in a metropolitan area.

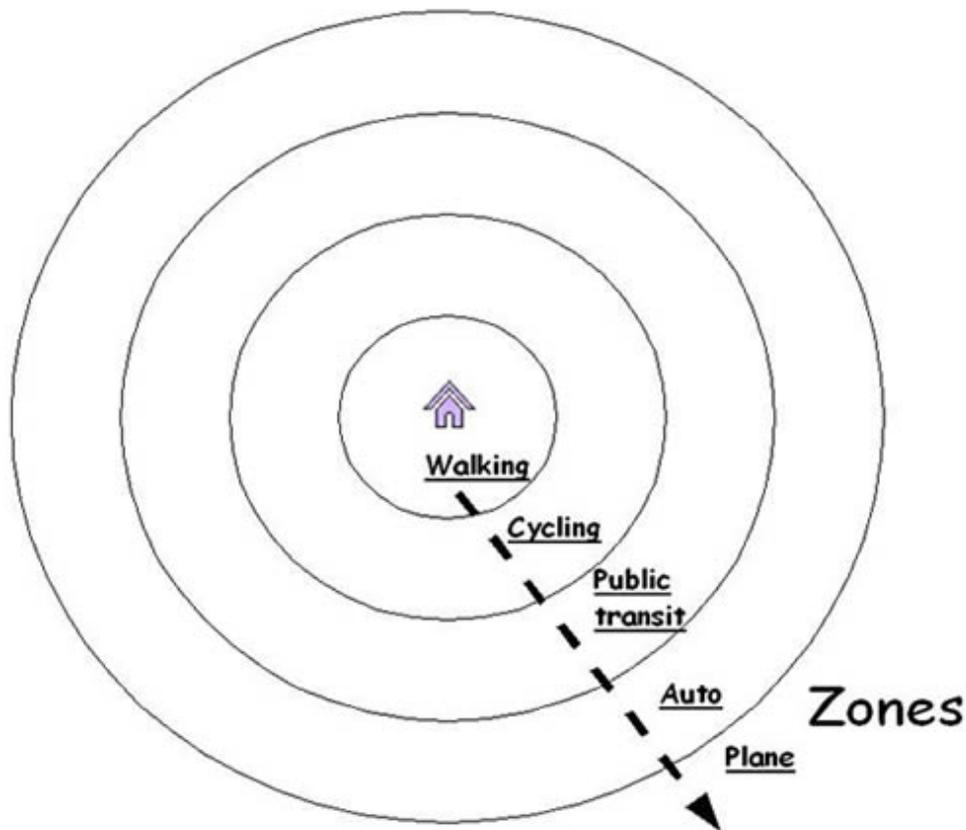
Instead of defining zones by distance, let's define them in terms of energy expended. (Remember the connection that Mollison drew between zones and

energy.) Since the key variable in fuel usage is the type of transportation, we could define the zones as:

- \* Zone 0: Home.
- \* Zone 1: Walking distance ("pedosphere").
- \* Zone 2: Bicycling distance ("cyclosphere").
- \* Zone 3: Reachable by public transportation or by a short drive.
- \* Zone 4: Driving distance.
- \* Zone 5: Reachable only by plane or other long-distance transport.

Figure 1 shows the zones with their new urban definitions.

Zones



**Figure 1. Zones based on fossil-fuel usage**

Defining the zones in this way emphasizes the fact that motorized transport burns fossil fuels and generates greenhouse gases. Zones 0 to 2 (home, walking and cycling) are environmentally benign; Zone 6 (air travel) is an environmental no-no (5) .

### **A Tool for Awareness**

To apply the zones to your daily life, make a zone map. Begin by marking the locations of your activities on a local map. Sites would include the workplace, stores, library, parks, family, friends -- wherever one visits. Frequency of visits can be indicated with different colored pens.

Next, outline the different zones on the map. They won't be the idealized concentric circles of Figure 1, but will be of irregular shapes, determined by the particulars of your situation. Walking and cycling may be bounded by barriers such as freeways. The zone reachable by mass transit will follow the service corridors.

As with any model, modify the categories for your own case. Maybe you don't bicycle or there's no public transit. Or perhaps your definition of cycling distance is a 20-mile radius.

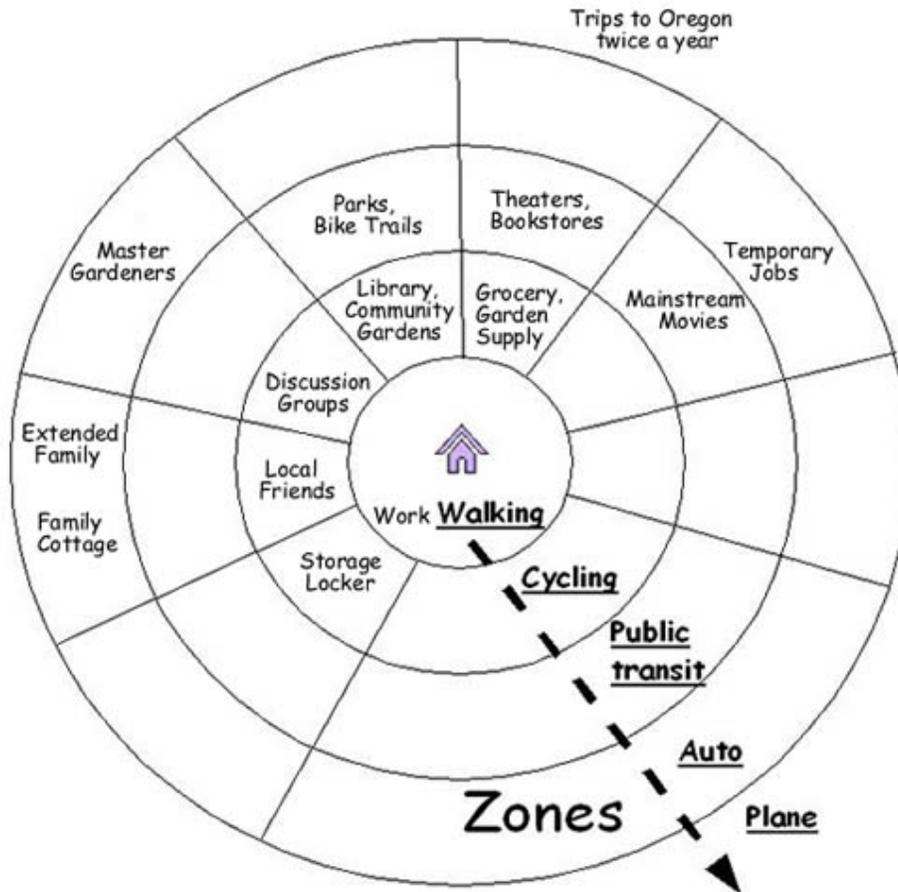
After you've gone through this exercise, you can transfer the information to the simplified diagram of concentric circles. A simplified model can make it easier to see patterns.

What do you see? The diagram shows how you're allocating your energy -- your time and the fossil fuels you use. The map is a tool for awareness, so don't be judgmental or in a rush to make changes.

### **An Energy Diet**

Over the years I've put myself on an energy diet by changing jobs and dropping commitments that required long distance travel. The result is shown in Figure 2; it's not perfect but it's much better than it was five years ago.

One person's zones and sectors



**Figure 2. One person's zones and sectors.**

As with dieting, I've found that the most lasting changes happen slowly as one gradually modifies one's lifestyle. Draconian resolutions to cut out all car travel don't work -- it's like the starve-and-binge routine that dieters experience.

Nor does it help that American cities and suburbs are designed for cars, not people. Many stores and essential services can only be reached by car. Perhaps as gas becomes more expensive, people will turn away from cars and the vision of cities on a human-scale will come to pass; the prophecies of Richard Register and James Howard Kunstler will be vindicated (6).

In the meantime, there is much that individuals can do in their own lives. The big win would be to move to a community that IS designed for pedestrians and cyclists. There are often easy changes one can make, like skipping vacation trips which are long, expensive and stressful.

### **Mantra: Go Local, Go Deep**

About traditional zones Bill Mollison said, "The golden rule is to develop the nearest area first," and the same applies here. Make full use of what is in front of you, what is local and available:

- \* Get involved with groups close to home.
- \* Adapt tastes to what is available, not what the media advertise.
- \* Do chores via the phone, Internet or postal system.
- \* Explore the local ecosystems and natural history.
- \* Try making what you need at home (food or music for example).

I've found that as I became involved in local activities, my schedule rapidly filled up. I no longer had the urge to travel. I didn't have the time!

Bicycles deserve a note of their own. With their unsurpassed efficiency, bicycles will have an important role to play in a low-energy future (7). To make full use of the possibilities, get hold of the bicycle maps prepared by cities, cycling clubs or map companies. Find routes on which you feel safe and comfortable and learn the basics of safe bicycling. For example, wear bright cycling jackets and carry lights and flashers for riding at night.

### **Re-defining Sectors**

Translating zones for an urban setting is easy, but what about sectors? What variable in the city corresponds to the natural energies of sun, wind and water?

The underlying idea behind sectors is that they map energies from outside. They suggest ways to adapt to those energies, such as planting trees as windbreaks.

There is a corresponding set of influences in a metropolitan area -- something that comes from outside and determines how you use resources. It's not a physical or biological force, but a socio-economic one: the ownership of property.

At the most basic level, there is the dichotomy between our property and the property of others.

But as we consider actual cases, we see that our relationships to property are much more complex. For example, we often make use of property owned by family members or by the community as a whole. In fact, seven sectors can be defined by type of ownership:

- \* Personal - the nuclear family or household unit - ownership or rental.
- \* Family and friends - informal but strong relationships.
- \* Associations - clubs, churches, volunteer groups, etc.
- \* Community - city, county, state, federal.
- \* Local businesses - local retailers, professionals, farmers and crafts people.
- \* Mega-corporations - conglomerates, chains, the Fortune 500, etc.
- \* Undefined - some resources and lands have no clear ownership, such as underpasses, vacant lots, abandoned houses, rights-of-way, etc.

If we overlay the new concept of sectors onto the zones, we get the diagram in Figure 3.

Zones and Sectors



**Figure 3. Zones and Sectors.**

With the new model, you can continue the mapping exercise from before. Transfer the information from the zone map into the appropriate zone and sector, and you'll see where you're spending your life energy. Are you devoting yourself to alien far-away institutions? Is this how you want spend your life?

If you want to make changes, the same guidelines hold true as for reducing fuel use: a gradual and non-judgmental approach works best. You're fighting the mainstream culture, so patience is required.

### **Shields, Deflectors and Collectors**

An intriguing set of possibilities is suggested by Bill Mollison's remarks on natural energies:

"Some factors we may invite in to our homes... Some we may exclude... Energies from outside can be thought of as so many arrows winging their way towards the home, carrying both destructive and beneficial energies; we need to erect shields, deflectors, or collectors."

In other words, we need to think deeply about the different sectors. It's simplistic to label one sector good and another bad. The task is to understand the nature of the sectors and to develop complex relationships with them. There's enough material here for years of thought and discussion. As a start, let me offer these stray thoughts:

\*The mega-corporations are the most problematic sector in the modern world. As the dominant form of ownership, they control the resources that flow in and out of an area.

\*Re-localization is the banner cry of Peak Oil activists such as the Post Carbon Institute. They argue that in a low-energy future, shipped goods will become prohibitively expensive as transportation costs increase. If there is widespread employment or an undependable national government, it is better to rely on local institutions. This argument for local production is echoed by local food enthusiasts and the food security movement (8).

\*The "undefined" sector is large in Third World countries, where title to property may be difficult to obtain. People build homes, businesses and gardens without clear land ownership, and consequently live in a state of insecurity, never knowing if the result of all their work will be taken away. Community gardens often exist in a similar state, with developers hungry for land to build on.

### **Filling in the Blanks**

You can use zones and sectors to expand your awareness of resources available in your area. Draw a zone-and-sector diagram, then fill in as many of the blanks as you can with real or possible resources. Figure 4 shows one example.



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## Notes

Note 1 - "Preparing for Peak Oil in the Northern Rivers" talk by founder of The Permaforest Trust, Tim Winton, on Thursday the 19th of May 2005 at the Byron Bay Community Centre. [Australia]. Audio and slides (PDF) are downloadable.

Note 2 - Mouwad, Jad and Wald, Matthew L. "The Oil Uproar That Isn't." New York Times. July 12, 2005.

Note 3 - Energy Bulletin website: US Energy & Roads Bills Headlines - 12 August, 2005

<http://energybulletin.net/7806.html>

Note 4 - Zones and sector analysis is covered in:

\* Holmgren, David. Permaculture: Principles & Pathways Beyond Sustainability. 2002. p.138-9.

\* Mollison, Bill and Slay, Reny Mia. Introduction to Permaculture. 1991. p.9-14.

\* Mollison, Bill. Permaculture: A Designers' Manual. 1998. p.49-55.

\* Morrow, Rosemary. Earth User's Guide to Permaculture. 1993. p.59-62.

\* Quinney, John. "Designing Sustainable Small Farms." Mother Earth News. Issue 88 (July/August 1984). \* Whitefield, Patrick. The Earth Care Manual. 2004. p.27-8.

Note 5 - Asthana, Anushka and McKie, Robin. "Rising number of greens ditch cheap air travel." The Observer. May 1, 2005.

[http://observer.guardian.co.uk/uk\\_news/story/0,6903,1474219,00.html](http://observer.guardian.co.uk/uk_news/story/0,6903,1474219,00.html)

<http://energybulletin.net/5822.html>

Note 6 - Sites and articles on New Urbanism and car-free cities:

\* Richard Register. "Green Cities and the End of the Age of Oil." Common Ground. June 2005.

<http://www.commongroundmag.com/2005/cg3206/greencities3206.html>. Also at

<http://energybulletin.net/8248.html>

\* Register, Richard. Ecocity Builders website.

<http://www.ecocitybuilders.org/index.html>

\* Kunstler, James Howard. Website. <http://www.kunstler.com/>

Note 7 - Illich. Ivan. Energy and Equity. 1973. See especially the chapter on

"Degrees of Self-Powered Mobility." Available online at:

[http://www.cogsci.ed.ac.uk/~ira/illich/texts/energy\\_and\\_equity/](http://www.cogsci.ed.ac.uk/~ira/illich/texts/energy_and_equity/)

Note 8 - Some recent articles on local food:

\* Smith, Alisa and MacKinnon, J.B. "Living on the Hundred-Mile Diet," (ongoing series). The Tyee ( <http://www.thetyee.ca/> ).

The first three articles are compiled at <http://energybulletin.net/8138.html>.

\* Dundas, Zach. "Attack of the \$3 Tomato." Willamette Week Online. August 17, 2005.

<http://www.wweek.com/story.php?story=6633>.

Note 9 - Heinberg, Richard. "Peak Oil: Sustainability with Teeth." Speech at the 2004 Peak Oil Conference sponsored by Community Solutions. Transcript at: <http://energybulletin.net/3204.html>