ERSC 316H

Community Natural Resource Management

<u>The Science of Sustainable Soup</u>

Principles of ecologically sustainable consumption within the local foodshed

A research project prepared for the

Seasoned Spoon Café

Taarini Chopra

155457

"Food is wrapped round with family, ethnic, and community traditions that remind us of who we are, where we are, and what we value. Food is closely connected with the health and vitality of our bodies. Food represents our most intimate link with the land and with the other beings with whom we share that land. In the production, purchase, and preparation of food we yet retain substantial capacity to disengage from some of the most damaging components of the global economy and create alternatives."

(Kloppenburg & Lezberg)

The consumption of food is the most basic environmental choice we all make, everyday. It is a reflection, at the most fundamental level, of the lifestyle we choose to adopt, and the future we wish to see. It is not merely about living a balanced healthy life, but also about living in a way that is compatible with a balanced and healthy ecosystem, the non-human biotic communities around us and the long term use of natural resources. Ensuring that these choices are sustainably made is "an indicator of our commitment to work not simply to reform the food system but to transcend that system entirely" (Kloppenburg et al, 1996).

The Seasoned Spoon Café is a part of just such a movement. The café is a student run co-operative at Trent University, and aims to provide locally sourced and organically grown vegetarian food, as well as aiming to spread awareness about food issues. The purpose of this paper is to provide a theoretical background of the ecological principles underlying the functioning and cycling of a food production and consumption system. These principles, when combined with the socio-economic aspects of food consumption, may be used to assist with the creation of a sustainable sourcing model for the Seasoned Spoon Café.

The paper introduces watersheds as a basic unit for environmental impact assessment and management. The watershed and ecosystem approach are linked to, and overlap with the development of the concept of bioregionalism and its key ecological and cultural values of sustainable living. This overlap between the two approaches leads to the introduction of the concept of the foodshed as a means to merge the principles of the watershed approach and of bioregionalism, while also specializing this model to the functioning of the food cycle. The foodshed, however, is not an inflexible and rigid area of land, but instead also encompasses the various practices of production that take place within it. This multi-dimensional character is reflected in the three principles of proximity, diversity and balance (Kneen, 1993) that are suggested as a measure with which to make sourcing decisions while still remaining adaptable and flexible to the changing boundaries and capacities of the natural ecoregion.

Watersheds

"A watershed is a marvelous thing to consider: this process of rain falling, streams flowing, and oceans evaporating causes every molecule of water on earth to make the complete trip once every two million years. The water will always be there, and it will always find its way down. …from the tiniest rivulet at the crest of a ridge to the main trunk or a river approaching the lowlands, the river is all one place and all one land."

(Gary Snyder, 1995)

Natural systems do not have rigid boundaries. Ecosystems distinguish themselves through their structural and functional features, though they are not as strictly demarcated as political divisions and jurisdictions from the regions surrounding them. One such system, which may be used to separate a larger area of land into smaller units, is the watershed.

A watershed, at a basic level, can be described as the area of land that is drained by a common water network. Water collects at the higher elevations of the watershed through groundwater sources or surface sources such as precipitation and glacial streams. It flows toward the lower elevations, often converging at rivers or lakes, which gradually grow as they move towards the lowlands as more tributaries join them (MNR, 2004).

An elevated land feature, such as a ridge or a land divide that limits the course of the river flow, may naturally define the boundaries of a watershed. The watershed includes this water network, the land features it runs through, as well as all the living things that live in the area (Center for Environmental Education, CEE, 2000). This natural delineation may include merely a few acres or extensive tracts of land drained by a connected water network. Such a watershed may also be divided into smaller 'sub-watersheds', the areas drained by one of the smaller tributaries (CEE, 2000).

The functioning and balance of a watershed is maintained on the basis of one key cycle – the hydrologic cycle. The mainstem stream and the smaller tributaries are fed by precipitation. These streams then drain the land and infiltrate the groundwater. It is at this stage that the contaminants found in agricultural runoff are added into the water flow, and are transported to larger water bodies and the groundwater. The water cycles back to the atmosphere through evaporation from water bodies and transpiration from vegetation. (Trent University, 2000) of the precipitation that falls, approximately 60% evaporates or transpirates, 30% infiltrates through the soil and 10% runs off into surface water bodies (MNR). This "water balance" or "water budget" is the essence of the functioning of the watershed, and all human and biotic interactions are connected to it directly.

"Everyone lives downstream from someone else"

The various elements, both biotic and abiotic, that fall within the boundaries of a watershed are all interconnected and interdependent. Consequently, impacts or stressors in one part of the watershed affect all the other components as well, irrespective of the political boundaries that may intercept them. The contaminants produced during agricultural processes, for example, collect in the upper reaches of the stream path and travel downstream, affecting all the sites they pass through. Additionally, as smaller tributaries join the main watercourse, the amount of contaminant transported increases cumulatively, affecting the water quality and the aquatic and terrestrial life (MNR, 2004). Similarly, all other anthropogenic activity in one part of the watershed has wide reaching impacts in the rest of the watershed area as well. Therefore, the 'watershed', as an ecological unit includes not just the topography, soils, waters and landscape features, but also encompasses the land uses, natural resource uses and the economic and social patterns that occur within it. Due to its widely inclusive nature, it is useful to adopt a management approach that is based on this interdependent concept of watersheds rather than one that focuses on an individual species or site.

Agriculturally, the watershed takes on an increased importance, as it is the main provider of the required irrigation and nutrient cycles, as well as being the primary receiver of a number of the impacts of cultivation. Water quality in a watershed may be affected by both point and non point sources of pollution. Agricultural waste and by products such as fertilizer, herbicides and pesticides comprise a large portion of the non point or diffuse sources of water pollution. Inclining trends of impervious surface areas in watersheds greatly increase the runoff, and hence the effects of these sources of pollution.

"These boundaries […] are porous, permeable, arguable. They are boundaries of climates, plant communities, soil types, styles of life. A thin line drawn on a map would not do them justice. Yet these are the markers of the natural nations of our planet.
(Snyder, 1995,

The watersheds of Ontario, like many others, do not respect the constructed boundaries of counties, towns and cities that have been drawn through them. However, though also anthropogenically defined, the watershed divisions we have attempted to determine are a less arbitrary way of distinguishing regions. The province falls under three large or primary

Fig 1: Primary watersheds of Ontario. OMNR

watershed systems; the Great Lakes, Hudson Bay and the Nelson watershed. (Fig.1). Within these, there are seventeen secondary watersheds, based on large river systems or coastal stream networks, and 144 tertiary watersheds.

The secondary watersheds are most commonly used as an ecological management unit. It is on the basis of these that the Conservation Authorities of Ontario[1] have been divided (Fig 2) and they are often the level at which the effect of anthropogenic stressors is most visible. Peterborough County falls largely in one secondary watershed, the Otonabee river watershed, with approximately a quarter of its area extending into the adjoining Kawartha watershed. Peterborough city, however, lies nested in the Otonabee watershed, which covers an area of 1951 square kilometres and contains the watersheds of three major rivers, The Otonabee River, The Indian River, and The Ouse River. The northern half of both the Kawartha and Otonabee watersheds is covered with mixed deciduous and coniferous forests, has thin soils and a number of small lakes and granite outcroppings, while the southern half of the watersheds are a mix of wetland, forests and agricultural area (Andree, 1999).

Living within a watershed then, is not merely about living in a physical region, but also about trying to reduce ones impact within the watershed. It is about living with the natural processes of the ecosystem instead of trying to marginalize them, and about accepting and appreciating the natural boundaries and constraints of that system, along with its capacities to give and take.

---

[1] Conservation Authorities are a network of 36 community-based environmental organizations dedicated to conserving, restoring, developing and managing natural resources on a watershed basis.

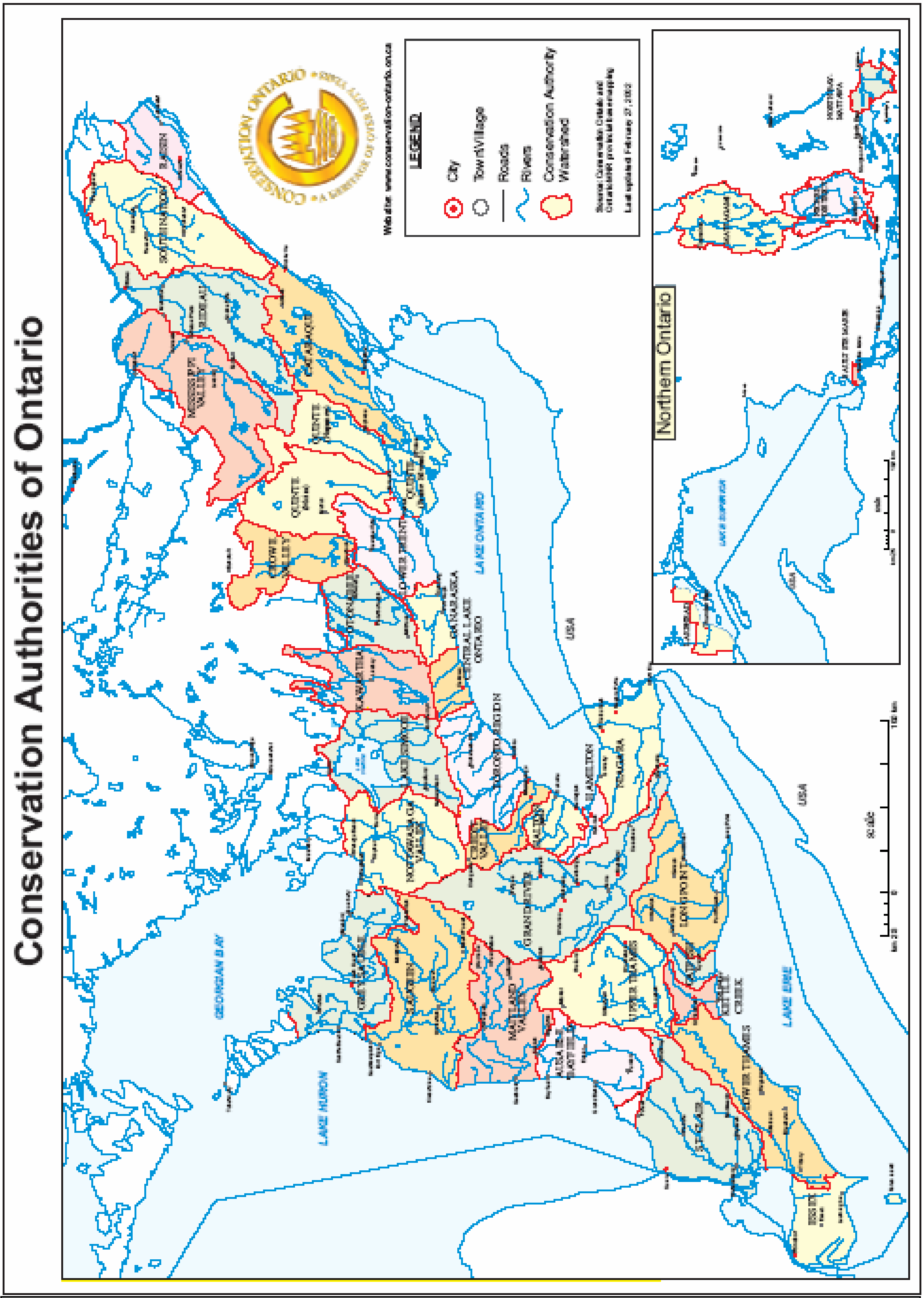

Fig 2: Secondary Watershed s and Conservation Authorities in Ontario

Bioregions

"Watershed consciousness and bioregionalism is not just environmentalism, not just a means toward resolution of social and economic problems, but a move toward resolving both nature and society with the practice of profound citizenship in both the natural and social worlds. If the ground can be our common ground, we can begin to talk to each other (human and non-human) once again." (Snyder, 1995)

The shift within ecology from the individual species approach to one that looks at entire ecosystems whose parts and processes cannot be isolated from each other, led first to the awareness and protection of watersheds and, as the movement expanded, to the birth of bioregionalism. The latter, retaining the emphasis on natural boundaries and the interdependency of all within them, took one step closer to a holistic approach with the addition of a strong social and cultural dimension. Ecological conservation expanded beyond being merely about the sustainable use of natural resources in one's watershed or region, to include the concept of "living in place," the integration of the natural characteristics of one's region into all aspects of human life.

One of the key criticisms of the bioregional movement is the destructive nature of arbitrarily drawn political boundaries (Berg, 1990). The natural boundaries of an ecosystem or bioregion, such as those that demarcate watersheds, surround a set of natural conditions that shape the human activity and culture that develops within them: "Bioregion refers to both a geographical terrain and a terrain of consciousness – to a place, and the ideas that have developed about how to live in that place. Within a bioregion the conditions that influence life are similar and these in turn have influenced human occupancy" (McGinnis, 1999). It is precisely for this reason that 'locatedness' in one area is so important. The connection to the land, and the consequent acceptance of the natural restraints of the bioregion, precludes the need for the import of food or any other natural resources from other areas. A globalized food system merely ignores and suppresses what should be a cultural and ecological adaptation to the limiting characteristics of a place. Peter Berg, one of the founders of the bioregional movement, emphasizes this point: "Living in place means following the necessities and pleasures of life as they are uniquely presented by a particular site, and evolving ways to ensure long term occupancy of that site. This society keeps a balance with its region of support though links between humans lives, other living things and the processes of the planet – seasons, weather, water cycles – as revealed by the place itself." (Berg (b), 1999)

The boundaries of a bioregion are, initially, determined by biogeographical characteristics. Features such as topography (as in the case of a watershed), climatology, physiography and spatial distributions of animal and plant populations all show patterns which may help distinguish one bioregion from another (Mcginnis, 1999). However, this is merely one aspect in a series of layers that together constitute a bioregion and the concept of 'living in place". The deeply influential effect of the natural characteristics of a place on the culture and activities of its people makes the social and cultural spheres of a region a vital indicator of its boundaries. "The final boundaries of a bioregion are best described by the people who have lived within it, through human recognition of the realities of living in place. Discovering and describing the resonance of the relationships between living things is the best way to describe a bioregion" (McGinnis, 1999).

This holistic merging of ecological, social and cultural values changes the role of science as an objective representation of the 'way things work', to being merely an interpretation of natural processes. An ecological awareness of natural systems, while being essential, must be acknowledged as a subjective field, and the interpretation of a bioregion's characteristics and boundaries must not be done by one who claims an objective knowledge (McGinnis, 1999).

The importance of a subjective and holistic approach makes apparent the difficulties in identifying a fixed and rigid boundary for the bioregion to which Peterborough belongs. Topographically, the bioregion we live in may be considered to overlap the area of the Otonabee watershed, or at a larger scale, a number of the secondary watersheds of the Great Lakes primary watershed together[2]. However, the exclusion of a cohesive social and cultural indicator makes this boundary a shallow one. Additionally, the wide range of activities that take place in the region that are not organised on a localised, bioregional scale make the cultural adaptations and the local knowledge that bioregionalists emphasize less specialised, and hence provide limited guidance to the mapping of a fixed boundary.

[2] The subjectivity involved in the mapping of bioregions can be seen in the difference between this area (the Otonabee watershed as shown in Fig 2) and the bioregion as defined in Andree, 1997.

Food systems are one of the most basic human webs, and one that all members of a community participate in. The first step towards a more bioregionally sustainable way of living would be to ensure that our consumption and production patterns originate and end within the bioregion. However, from a bioregional perspective, and one which may be applied, at a practical level, to the Seasoned Spoon Café, a bioregional definition of localism is perhaps left incomplete. Along with the problem posed by having varying definitions of this boundary, it is also significant to realise that the focus of the café, while perhaps having bioregional elements within it, may be more appropriately thought of as a branch of a broader movement; one which specializes in the localisation of the food system as one way of moving closer to a socially and ecologically sustainable way of living.

For the sake and practicality of having an all encompassing vocabulary and mapping tool with which to determine a practical sourcing policy then, it is perhaps relevant to shift our focus to a concept that reflects both the environmental aspects of a watershed and the social and cultural emphases of living in place, as well as the socioeconomic needs that specifically accompany the sustainable production and consumption of food.

Foodsheds

Headwaters, the streams that grow from them, and the tributaries that join them all flow through an area, or a "watershed", providing on their way a variety of habitats, landforms, soils and that essential life-giver, water. Food is not very different. A modification of the concept of the watershed led to the coining of the term foodshed, a "sphere of land, people and businesses that provides a community or region with its food" (Halwiel, 2002). The term invokes an image of food as flowing from a source, and through a physical landscape as well as through the various levels of the trophic system. This "replacement of "water" with "food" […] connects the cultural (food) to the natural (shed)" and hence "becomes a unifying and organizing metaphor for conceptual development that starts from a premise of the unity of place and people, of nature and society" (Kloppenburg et al, 1996). Additionally, the key focus of the watershed approach, the interconnectedness and interdependency of all members of the "shed" is retained in this term. Consequently, "like its analogue the watershed, the foodshed can serve us as a conceptual and methodological unit of analysis that provides a frame for action as well as thought." (Kloppenburg et al, 1996)

The foodshed also incorporates the bioregional emphasis of "living in place" by including the need to contain the food cycle from production to waste absorption within its boundaries, while at the same time merging the socioeconomic and cultural aspects of this cycle with its ecological base: "The foodshed can provide a place for us to ground ourselves in the biological and social realities of living on the land and from the land in a place that we can call home, a place to which we are or can become native." (Kloppenburg et al, 1996)

Like the boundaries of natural systems, those of foodsheds cannot be rigidly or objectively drawn, and the "extent of any particular foodshed will be a function of the shapes of the multiple and overlapping features such as plant communities, soil types, ethnicities, cultural traditions, and culinary patterns" (Kloppenburg et al, 1996). The foodshed that is catering to the needs of the Seasoned Spoon may be drawn by combining the ecological boundary of the Otonabee watershed with the socio-economic patterns in the area. It is important to recognise, however, that the process of creating an ecologically sustainable, local foodshed from which to source should focus not only on the drawing of a 'local' boundary, but also on being aware of the natural system's characteristics and capabilities, and on supporting methods of production that are minimally demanding on that system.

A fixed mapping and defining of the local foodshed, then, may be replaced by an elaboration of a set of principles, or priorities, that when combined, represent the underlying values of the concept of a foodshed, while still allowing the flexibility necessary for an adaptable sourcing model. This paper suggests three values, as coined by Brewster Kneen, and adapted and modified here to reflect the ecological characteristics of this foodshed, and the needs of the Seasoned Spoon. These are proximity, balance and diversity (Kneen, 1993).

Proximity

"The current industrial-capitalist food system is efficient only according to corporate bookkeeping. The externalization of costs such as energy depletion, land degradation, water depletion and pollution, deforestation, loss of genetic resources, destruction of rural communities and, on top of it all, malnutrition, must lead the unbiased observer to the conclusion that the corporate accounting is simply fraudulent. But fraudulent accounting is necessary to maintain the claim that a food system based on distancing is efficient, since every bit of distance is a cost." (Kneen, 1993)

The need to for a community to shape its activities and production and consumption patterns based on the natural limitations and characteristics of the natural system it is embedded in has already been elaborated. This ecological, local approach is a direct challenge to the 'distancing' that is a fundamental character of the global food cycle today (Kneen, 1993; Kloppenburg et al, 1996). Distancing refers not only to the increasing physical distance between the source of food production and its ultimate place of consumption, but also the numerous steps of processing and packaging that remove it from its original form. Environmentally, these processes of 'travelling', packaging and processing and distancing all have negative impacts, both at the local and the global scale. These impacts range from increased fossil fuel and energy consumption, to increased waste generation, decrease of environmental responsibility, and decreased nutritional value.

“The ecological consequences of clearing rain forests for short-term cheap beef production, the consequences of over-fishing with deep-sea factory-freezer trawlers, the erosion of land resulting from continuous corn production, and the pollution of our sources of water through the gradual leaching of agricultural chemicals have been all but invisible to our short-sightedness. (Kneen, 1993)

The biggest limiting factor in the transport of food from one place to another has been the available technology of the time. The relatively recent developments in refrigeration, faster transport, preservation and packaging of food for longer times and over longer distances have arisen with the industrialization of agricultural processes (Kneen, 1993). These methods, while making the food system economically “efficient”, ignore the high fossil fuel subsidies, energy consumption, and other environmental costs that come with them (Halweil, 2002).

Modern, conventional methods of farming are often very input-intensive. Large scale cultivation of commercial monocrops, for instance, requires high inputs of chemical fertilizer and pesticide, as well as the use of mechanized equipment. The consequent rise in the overall energy consumption can be seen by the fact that one kilocalorie of food produced in the US today requires an energy subsidy of 10 kilocalories (Kneen, 1993). Additionally, the transportation of these foods through the global food market greatly increases this fossil fuel and energy consumption, making an imported diet consume 4 times as much energy as a locally produced one (Halwiel, 2002). At a global level, and in the present context of the global warming issue, increasing fossil fuel consumption, increasing green house gas emission, and reducing sink area for carbon sequestration, this need to reduce energy consumption is a serious one (Rees & Wackernagel, 1996).

Another impact of distancing is the large scale adoption of long term preserving and packaging of food. The need for a greater-than-natural shelf life for food products has led to a higher use of chemical fumigants, fungicides and preservatives, as well as adoption and development of techniques such as food irradiation and ultra-high temperature processing. The risks associated with hazardous waste and toxic contaminants that these applications pose are exacerbated by the increase in waste production by the materials used in the packaging that follows them (Halweil, 2002).

Reducing long distance transportation of food, then, reduces the fossil fuel consumption, the chemical contamination, and waste disposal of the processes mentioned above. Along with this, staying within the local foodshed ensures better quality food, whose nutritional value has not diminished from processing or from traveling, as well as an increased responsibility and connection to the consequences of our choices (Kneen, 1993; Halweil, 2002). The principle of proximity, reflected by growing crops that are suited to the natural conditions, and by confining food-consumption largely to these crops and as close to the point of production as possible, may be one of the keys to an environmentally sustainable food cycle (Kneen, 1993).

Diversity

Ecological diversity is one of the fundamental indicators of the integrity of an ecosystem. A system or region with a high species and genetic diversity, and hence complex webs of interactions between its components, is a lot stronger and more capable of adapting to change or dealing with stressors, as well as being less draining on the natural system (Krebs, 2001). A low diversity system, with more specialised crops is less equipped to adapt and hence has a higher chance of being disfavoured in natural selection (Kneen, 1993; Krebs, 2001). Today, the seemingly wide range of food products available through the global food system is deceptive. Although brand names are increasing, production methods are being reduced to large scale monocultures, which shrink the genetic diversity and species richness (intra- and inter-specific varieties of crops that are being grown) of an area. This goes hand in hand with a loss of the multitude of production methods and traditional and local environmental knowledge that are not needed for single crop cultivation (Kneen, 1993; Kloppenburg et al, 1996). The awareness of the natural characteristics and limitations of the system, the crops that may be grown on the soil and the most sustainable ways to produce them, is reduced to the knowledge that ensures large yields of one kind of crop, irrespective of the needs and opportunities of the land. In this situation, a stressor, such as drought or pest attacks catch both the agroecosystem and the cultivator incapable of saving much of the produce or the balance of the ecosystem (Altieri, 1995).

Furthermore, the demand for unnatural uniformity in order to produce large yields of a single crop, which matures at the same time and has little diversity in shape and size, increases the need for external inputs. Agro-toxins such as growth regulators, as well as various breeding processes are used to produce food that may be easily and efficiently transported and stored. Once again, this definition of efficiency is not all inclusive, and ignores the polluting effects of toxic contaminants and other environmental impacts (Sachs, 2000).

Balance

Another underlying ecological principle that extends to all natural communities, but that seems to often be ignored by global food systems is that of balance. Natural systems, irrespective of their successional stage, always strive for balance and for a maintainable equilibrium, even if it is a dynamic one. Positive and negative feedback loops indicate the natural capacities and tendencies of the various components of the system, and ensure that the inputs and outputs do not stray too far from this mean (Krebs, 2001). At the level of the food cycle and the agroecosystem, this could be developed by ensuring a balance between the agricultural inputs, the demands on the land and the return of nutrients through diverse cyclical patterns. Natural, healthy ecosystems reinvest a major portion of their productivity to maintain a suitable soil and biotic structure (Altieri, 1995). A system that is losing nutrients from its soil, being contaminated with pesticides and chemical fertilizers and giving up fossil fuels to a process that returns nothing to it is not getting a balanced ratio of inputs and outputs. This one-way, linear energy and nutrient flow is exacerbated when the all the invested energy (which, in the case of agricultural crops, is stored almost entirely above ground) is harvested and removed from the system. On the other hand, the region to which this food travels then receives more waste that it can assimilate and more carbon that it can possibly sequester (Rees, 1996; Kloppenburg et al, 1996).

Added to this, the natural limitations placed on production cycles by natural conditions such as seasonal characteristics are often overridden by the global movement of food. Along with the numerous negative environmental impacts of this year long transportation and preservation of food, as mentioned above, this process also requires the receiving system to assimilate the wastes and nutrients generated from a food that does not belong within it.

The input intensive approach to agriculture, as previously discussed, consumes large quantities of fossil fuel, produces high levels of waste and pollution, and is also one of the main contributors to the organic contamination of water bodies. Contamination through agricultural runoff containing high phosphorus, nitrogen and other agrochemicals leads to eutrophication of aquatic habitats, the biomagnification of toxics in aquatic organisms, and a spread of these pollutants to the soil and consequently to terrestrial organisms. Increased use of pesticides may also lead to the development of pest resistance, which further increases the need for pesticide applications, perpetuating this vicious cycle (Andree, 1997; Altieri, 1995). Additionally, input intensive and highly mechanized methods of farming lead to soil erosion and declining soil fertility (Andree, 1997). Reversing this cycle means that a “system must be organic, that is, based on what occurs naturally within the local ecosystem. This means relying on the natural systems that have evolved over very long periods of time, during which organisms and components have interacted and reproduced on a continuing basis without depending on foreign or imported inputs" (Kneen, 1993).

A more balanced picture then, may be created not only by making food cycles limited to a locally defined region, but also by shaping the demands on this foodshed to cater to only the needs of the local community, while also minimizing the need for external artificial inputs as much as possible. This model of ecological sufficiency and self reliance that is based on using "nature as a measure" – using the capacity of the natural parameters to determine and shape the human consumption patterns of that system (Kloppenburg et al, 1996) – reduces the overall demand on the foodshed, and encourages the development of an ecologically balanced ecosystem.

Conclusion

"A self-reliant food system that is organically, bio-regionally, and community based […] will mean seasonality in foods, more labour input in production and processing, and greater genetic diversity coupled with much less superficial diversity." (Kneen, 1993)

The local foodshed that Peterborough falls in is has an extensive capacity for food production. Within the aims of the Seasoned Spoon café, to provide local, organic and vegetarian food, the assortment of foods and food products that the foodshed can provide is wide ranging (See Appendix, List 1). Additionally, there is further potential for the specific needs of the café to be catered to, by local farmers, on request (See Appendix, list 3). A potential research project lies in finding a way to bridge this gap between the foods that the Seasoned Spoon sourced this past year, and those that they would like to be able to use in the coming years (See Appendix).

For the purpose of the creation of a sourcing policy, and for future planning and research, it is useful to be able to define a region, or local foodshed. However, it is not always possible to demarcate a rigid boundary that may be strictly adhered to. Maintaining ecological sustainability implies a more complete set of actions than merely staying within the boundaries of a watershed. This may be represented by a model that prioritises the consumption of foods that have been produced within the foodshed in order to cater to the needs of only that foodshed, as well as under methods that respect the natural capacity of the land, and hence use minimal inputs. This approach allows for the adaptation and flexibility needed by natural systems by accepting the boundaries of the watershed to be "porous and permeable" (Snyder, 1995), and uses the foodshed not as a map or "doctrine to be followed" but as a "conceptual vocabulary" (Kloppenburg at al, 1996).

A sustainable model of food production and consumption should include ecological, social and economic aspects of human interactions with each other and with the natural ecosystem. While the above ecological principles may be used to delineate a local foodshed from within which the seasoned Spoon would be able to source their food, this area and these principles must be merged with the socio-economic goals of the vision of sustainability in order to produce a whole and complete picture.

Literature cited:

Altieri, M. 1995. Agroecology: The science of sustainable agriculture. Westview Press, Colorado.

Andree, P. 1997. Strategies for agricultural sustainability employed by farmers in the Kawartha bioregion of Ontario, Canada. Thesis Trent University.

in Plant, C. 1990. Turtle talk : voices for a sustainable future.
Philadelphia, PA : New Society Publishers.

Berg, P. 1999 in McGinnis, M V. 1999. Bioregionalism. Routledge Publishers, New York

CEE, Centre for Environmental Education, Washingotn State University. Last updated 2000. http://ceed.wsu.edu/watersheds/Watershed_Education/erosion.htm

Conservation Ontario. http://www.conservation-ontario.on.ca

Halweil, B. 2002. Home grown, the case for local food in a global market.. Worldwatch paper 163. State of the World Library. Washington.

Kloppenburg, J., J. Hendrickson and G. W. Stevenson. 1996. Coming Into the Foodshed. Agriculture and Human Values 13(3): 33-42, 1996

Kloppenburg, J., S Lezberg. Getting It Straight Before We Eat Ourselves to Death: From Food System to Foodshed in the 21st Century. Society and Natural Resources 9: 93-96 University of Wisconsin-Madison.

Kneen, Brewster. 1993. From Land to Mouth, Understanding the Food System. NC press Limited. Toronto.

Krebs, C. 2001. Ecology : the experimental analysis of distribution and abundance. 5th edition. Benjamin Cummings Publishers, Toronto.

McGinnis, M V. 1999. Bioregionalism. Routledge Publishers, New York.

MNR, Ministry of Natural Resources. www.mnr.gov.on.ca

Otonabee Region Conservation Authority. http://www.otonabee.com/

Rees, W & M Wackernagel. 1996. Our Ecological Footprint: Reducing Human Impact on the Earth.

Sachs, W. 1999. Planet dialectics: Explorations in Environment and Development. Halifax, N.S. Fernwood Pub., 1999.

Snyder G. 1995. Coming into the Watershed, in A Place in Space: Ethics, Aesthetics and Watersheds. Counterpoint publishers, Washington DC.

Trent University, Watershed Science Center. 2000. Water Budget Analysis on a Watershed Basis. http://www.trentu.ca/wsc/Anchor-Water-49575, Peterborough, Ontario.

MOE, Ministry of the Environment. 2004. White Paper on Watershed-based Source Protection Planning. http://www.ene.gov.on.ca/programs/3585e01.pdf

Appendix

Seasoned spoon list 1: What the spoon uses now.

Mushrooms (shiitake, brown, oyster, white, portabella)
Corn
Carrots
Potatoes
Sweet Potatoes
Turnips
Parsnips
Beets
Squash (Acorn, Butternut)
Tomatoes
Pumpkin
Cabbages
Kale
Garlic
Ginger
Green beans
Onions
Leeks

Cilantro
Basil
Parsley
Dill
Oregano
Rosemary
Thyme

Apples
Pears
Strawberries

Chickpeas
Navy beans
White kidney beans
Red kidney beans
Green lentils
Red lentils
Black beans
Yellow and green split peas

Whole Barley
Pot Barley Brown rice
Millet
Quinoa
Buckwheat
Spelt noodles

Spices:
Cumin seeds
Coriander
Curry powder
Cayenne
Mustard seeds
Paprika
Turmeric
Cinnamon
Cloves
Nutmeg
Chili powder
Garam Masala
Anise seeds
Caraway seeds
Ginger powder

Other:
Milk
Cream
Maple syrup
Vinegar
Oil
Soymilk
Tofu
Tahini
Lemon juice
Tamari soy sauce
Miso

Flour (whole wheat, spelt)
Oats
Cocoa powder
Carob chips
Raisins

List 2: Locally available produce from the farmers market

Mushrooms (shiitake, brown, oyster, white, portabella)
Beets
Brussel sprouts
Cabbage
Corn
Carrots
Potatoes
Sweet Potatoes
Turnips
Parsnips
Beets
Squash (Acorn, Butternut)
Tomatoes
Pumpkin
Cabbages
Kale
Garlic
Ginger
Green beans
Onions
Leeks
Green and red peppers
Potatoes
Spinach

Apples
Pears

Produce available in the summer only:
Cucumbers
Corn
Zucchini
More tomatoes
Greater variety of peppers
Green beans
Cauliflower
Broccoli
Strawberries

List 3: Future needs of the seasoned spoon

Greater Quantities of
Chipotle peppers
Corn
Tomatoes
Sweet potatoes
Kale
Spinach
Chard
Leeks
Onions
Sweet Potatoes

New Additions:
Red onions
Red/green/yellow peppers
Eggplant
Cauliflower
Asparagus
Eggplant
Collard Greens
Swiss chard
Lettuce

Romano beans
Pinto beans
White kidney beans

Wild rice