Exploring Options for Urban Sustainability

Resources for Dialogue and Action

Created by the Urban Sustainability Learning Group with support from the Joyce Foundation

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This material is intended as a resource to support the development of local and national networks to learn about and act on sustainability in densely populated industrial regions. It includes materials intended to help groups:

* *about sustainability, including a common definition of what it is, what it looks like and what it means for urban communities;*

* *and values around sustainability, including the nature of evolution and the role of human beings in the natural environment;*

* *in their regions and define the key energy, matter and information flows in those systems;*

* *the sustainability of current use patterns in the region;*

* *capable of continuous learning and shared action;*

* *at the local level, in ways that engage businesses, education, individuals and government in the process of creating conditions for sustainable urban environments.*

The Urban Sustainability Learning Group was formed with support from the Joyce Foundation to achieve three purposes around sustainability in urban industrial regions:

* *recognize it when we see it;*
* *think about it more coherently;*
* *organize to act in support of it.*

The focus of the Learning Group was the southern region of Lake Michigan encompassing the Chicago regional economy.

The Learning Group involved individuals from business, economic development, education, federal laboratories and neighborhood organizations. (A list of participants is included in attachment A.)

Our initial expectation was that we would be able to quickly get down to the "nuts and bolts" about what needed to be done to support sustainability in the Chicago regional economy. This

Thinking About Sustainability as a Process of Learning

[redacted]

REAL, FUNCTIONAL RELATIONSHIPS.

* *SELF-REFERENT.* IT IS BY DEFINITION SUBJECTIVE AND DEPENDS ON THE INTERNAL STRUCTURE OF THE KNOWER.

* *HISTORICAL.* IT IS SHAPED BY THE HISTORY OF RELATIONSHIPS BETWEEN THE KNOWER AND THE WORLD.

* *DYNAMIC.* IT IS CREATED THROUGH THE DYNAMIC INTERACTION OF THE KNOWER WITH HIS OR HER WORLD.

IT SHOULD BE NOTED THAT THIS CONCEPTION OF KNOWLEDGE AND LEARNING CONTRASTS WITH THE MORE TRADITIONAL UNDERSTANDING OF KNOWLEDGE AS A "REPRESENTATION" OF OBJECTIVE, EXTERNAL REALITY, AND LEARNING AS A PROCESS OF "COMPUTATION" OR CALCULATION THAT IMPROVES OUR REPRESENTATIONS OF THE EXTERNAL WORLD. *THUS, IN THE CONTEXT OF SUSTAINABILITY, THE PURPOSE OF LEARNING IS NOT FOR CITIZENS TO PASSIVELY "RECEIVE" INFORMATION FROM ENVIRONMENTALISTS OR OTHER "EXPERTS," BUT RATHER TO ACTIVELY ENGAGE IN THEIR OWN INQUIRY AND RESTRUCTURE THEIR OWN RELATIONSHIP WITH THEIR ENVIRONMENT.*

Defining sustainability can be a frustrating and elusive experience. After much discussion, the Urban Sustainability Learning Group settled on the following principles for understanding sustainability:

* **Sustainability means the capacity to "stay in the game of evolution."** Thus a sustainable system is one that is continuously creating "chances to continue" -- the ability to renew rather than die out.

* **Sustainability is a dynamic, not a static concept.** Living systems maintain a condition of *dynamic equilibrium* with the environment by constant change and adaptation. Sustainability means striving for the dynamic conditions that are normal for human and nonhuman systems to maintain themselves and evolve. Thus sustainability is not about stopping change, but rather about accelerating the right kinds of change.

* **Sustainability means creating opportunities for other species to also "stay in the game of evolution."** Sustainability is not an exclusively human-focused objective. It requires that we honor the right of other species to also continue to evolve and change. *The purpose of evolution is to continually improve the overall capacity of the system to produce new things of higher structure and complexity* A sustainable ecology is not an ecology in equilibrium. It is an ecology that is constantly changing, growing and producing new forms of life.

* **Sustainability is not just about physical survival.** A truly sustainable society is one that honors the human need for self-actualization as well as providing the conditions for physical survival.

From this perspective, evolution is itself an open learning process that occurs at the level of species and ecosystems. Achieving sustainability of the environment for the human species means nurturing and accelerating our capacity for learning -- for creating meaningful relationships between ourselves and the environment.

Our ability to dominate and degrade environmental systems that took millions and even billions of years to develop is made possible by the extraordinary capacities of the human brain, particularly our capacity for self-reflective thought and our ability to encode our knowledge in symbol systems such as language and mathematics. These features of our intelligence allow us to rapidly exploit short-term stabilities in the environment (often to the detriment of the environment's long-term stability).

The emergence of human learning processes literally rewrote the rules of evolution. Before the evolution of language and other symbol systems, learning from one generation could only be transferred to another generation through the mechanism of genetic inheritance. Human beings, on the other hand, can create "cultural DNA" that is stored in our memories, our stories, our values, our laws, our social institutions, our scientific research and other vehicles for information conservation, thus allowing us to evolve our adaptive capacities outside of the genetic code. Successive innovations over the last 10,000 years (language, mathematics, writing, the printing

can take the same capacity for self-reflective, analytical thought that gave us the power to dominate natural systems, and use it to better understand our *dependence upon and interconnection to* those same natural systems. If we can, then perhaps we stand a chance of surviving another 10,000 years. If we can't, we will surely kill the very systems that sustain us, and the human species will become another of the legions of species that have become extinct. Our path will have become a dead evolutionary path, due to our inability to adapt to changing environmental circumstances. This fate would only prove us to be typical of all other species -- an estimated 99.9 percent of which are extinct.

Just as evolution has endowed us with the capacity to dominate and destroy, it has equally endowed us with the capacity to learn and grow. The rest of this section explores what it would mean to put this natural capacity fully in the service of our increasing efforts to create a sustainable future for ourselves and the planet.

The last three decades have produced revolutionary new insights into how human beings learn

process like a mechanical process -- closed, linear, externally designed and controlled, static and repetitive. It is hierarchical and authority-driven.

Contrast this with the emerging view of learning which treats learning as an organic, natural process -- open, emergent, self-organized, full of messy, nonlinear connections, constantly changing and adapting, and frequently using cooperation as the most powerful learning tool.

Linear:	

very effective at stimulating *learning* -- they rarely change our "mental models" of the world and how we interact with it.

An alternative is to shift the conception of the environmental organization from that of advocate to that of designer of social learning systems focused on environmental sustainability. Such a shift would entail a number of strategic changes.

* *Building a competence in the design and facilitation of learning processes.* Helping others identify their concerns, immerse themselves in new information, discover new patterns and opportunity, and change their own understanding of the world is the most powerful and enduring way to change behavior. These kinds of processes have the

brain," the seat of our territorial instincts. It is not possible to learn when we are in our "reptilian" brain; we can only react by following old behavior patterns. A learning-based approach to the environment would emphasize the fascinating nature of the challenges and the opening up of new possibilities as a way of promoting more rapid learning and behavior change.

The experience of the Natural Step in Sweden is a compelling story about the power of learning processes in effecting changes in environmental policy and practice. The Natural Step was created by Dr. Karl-Hendrick Robert in 1989. The purpose of the Natural Step is to get consensus on the "non-negotiable" conditions for sustainability and help individuals throughout society explore what actions they can take to bring their behavior in line with those conditions. The process started with the creation of a consensus document articulating the fundamental principles of living systems. After a lengthy process involving 21 drafts reviewed by 50 prominent scientists, the Natural Step published a document describing the four basic "system conditions" for the maintenance of life:

1) *Substances from the earth's crust must not systematically increase in nature.*

2) *Substances produced by society must not systematically increase in nature.*

3) *The physical basis for the productivity and diversity of nature ("green space") must not be systematically deteriorated.*

4) *The use of energy and other resources must be fair and efficient.*

Within four years, the Natural Step was able to:

* Distribute materials explaining the system conditions to every household and every school in the country;

* Develop 19 networks of professionals involving more than 10,000 people exploring the implications of the system principles for their practices and behaviors;

* Significantly change the strategies and environmental policies of several major Swedish corporations;

* Create 10 "consensus documents" on key environmental issues, including energy, metal flows, transportation, political measures, agriculture, ecological planning, forestry, plastics, culture and ethics, and a vision of a Sweden that would meet the four system conditions;

* Develop a “youth congress” involving tens of thousands of students in the exploration of the four system principles; and

* Hold thousands of training sessions, award ceremonies and mobile exhibitions on the four system principles.

What is powerful about the Natural Step approach is its underlying learning strategy. The Natural Step played the role of a learning facilitator. They never advocated for ideas, but rather presented the undisputed information in attractive and non-threatening ways and asked for ideas on what could be done. They sought to stimulate others to make their own choices about how to act in ways consistent with the four system conditions -- and they made available a constant stream of new information to assist and stimulate others thinking. Particularly with businesses, they appealed to their strategic sense of self-interest, helping them understand the business implications of not changing behavior and never advocating for one action over another. This philosophy is reflected in the following statement by Paul Hawken, co-chair of the U.S. Natural Step organization:

> *“The Natural Step will not compete with or supplant any existing environmental*

their desired future. Sometimes local democratic structures provide for this; often they do not. More recently, increasing numbers of communities are developing "visioning" processes that seek to serve this purpose.

* *Open social structures.* Social structures that are closed, parochial and inbred will tend to reflect and reject the new information and points of view that they need to understand where and how they need to change.

* *Members who have autonomy and "standing" in the community.* Learning cannot flourish if participants in the learning process are not self-directed and independent. Socially, this is reflected in the absence of prejudice and discrimination; economically it is reflected in distributive ownership of assets and the existence of a healthy entrepreneurial economy.

* *Diversity and interconnections.* The creation of new knowledge happens most rapidly when there is a rich diversity of information and points of view, and these difference frequently come in contact with each other. In communities, this is made possible through cultural, racial and economic diversity, and dense connections of overlapping voluntary associations among people at many different levels. (This is what is sometimes referred to as "social capital.")

5) **Weighing the Choices.** Here the public engages in "choice work." They weigh the pros and cons and connect them to their deepest values and beliefs. This stage is hard work that cannot be done by the media or experts -- it must be done by citizens themselves.

6) **Taking a Stand Intellectually.** This is the first stage of resolution. It involves clarifying fuzzy thinking, reconciling inconsistencies and grasping the full consequences of choices.

7) **Making a Responsible Judgement Morally and Emotionally.** Emotional and moral resolution is more difficult than intellectual resolution. It requires coming to grips with potential loss, sacrifice and change. It often involves choosing the interests of the whole over one's self-interest.

These seven stages can be generally grouped into three phases:

* Raising consciousness (Stages 1 and 2);

* Working through the choices (Stages 3,4, and 5); and

* Coming to resolution (Stages 6 and 7).

Yankelovich notes that the "intellectual elite" (leaders, advocates, academics, etc.) are often at a very different stage of coming to judgement than the general public. (He points out, for instance, that on education reform, most of the general public is in the "raising consciousness" stage, while educational leaders are struggling with working through the choices.) Depending on where the

* **People don't believe they have good information about the state of the environment.** They want an objective source of information. They sense that environmentalists are not always trustworthy. They are suspicious about the legitimacy of environmental messages.

* **People have faith in their local communities.** They are cynical about government from the outside, but believe in the capacity of local communities to solve problems.

* **They are concerned most about environmental problems they can see directly affect them.** Polluted air and water are considered more serious than loss of natural places, species extinction and loss of wetlands.

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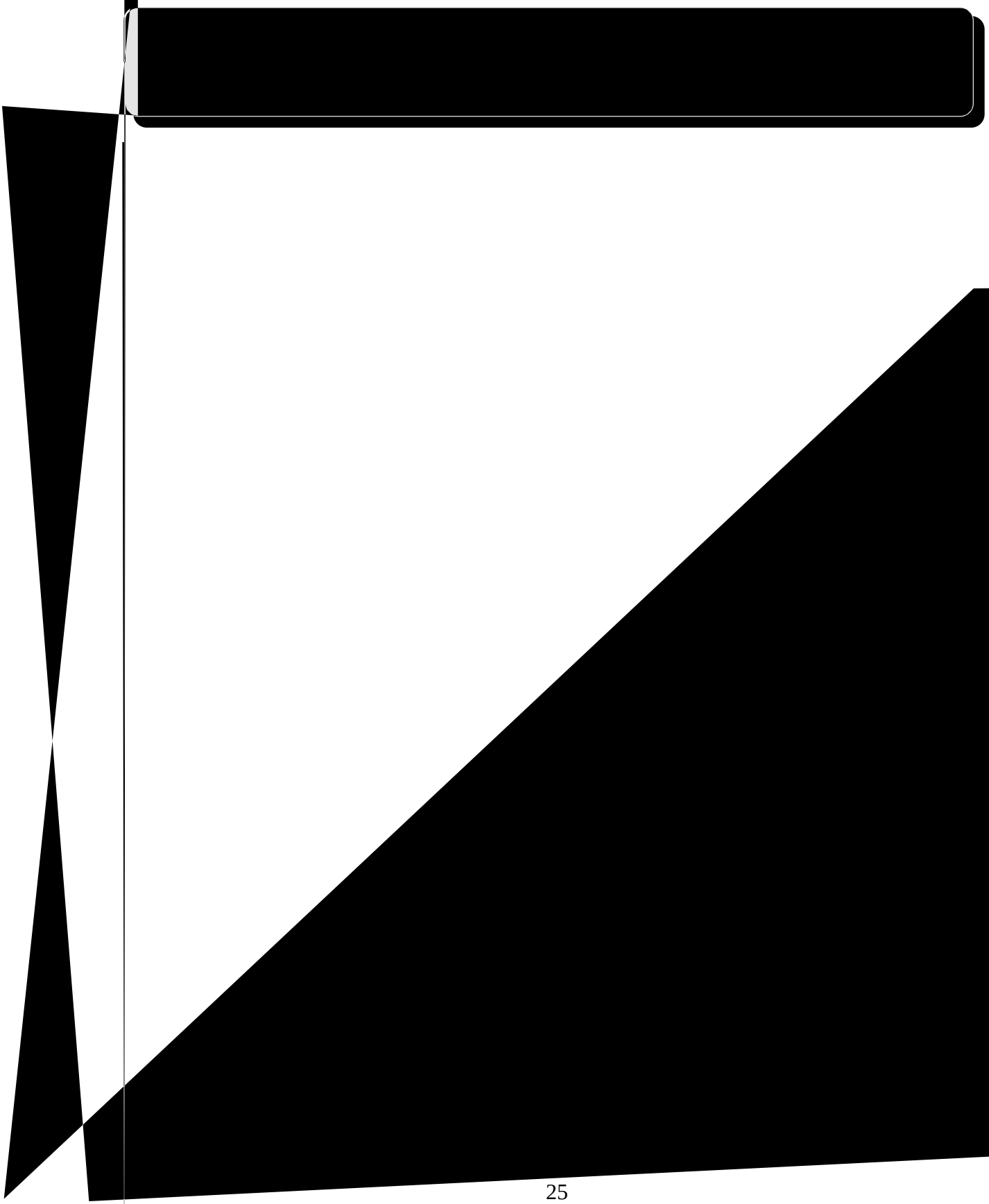
* **Demonstrate that there still are lots of choices.** Focus on the opportunities as well as the risks. Favor market-based incentives over uniform regulations.

Achieving sustainable communities will require that we build the capacity for rapid and powerful



prevailing ideas about sustainable development leave the impression that sustainability is the achievement of a "steady state" of activity. They assume that we can find a threshold of activity and stay "safe" by sticking to the right side of it. Unfortunately, (or actually, fortunately) nature is not nearly so boring and predictable. All natural systems are dynamic and unpredictable. What is sustainable today may not be so ten years from now.

The "achieve equilibrium" approach to sustainability also makes it feel to many people like survival without anything new. This does not speak to the inherent human desire to create, and the underlying openness in the evolutionary process. To stay "alive" a system need to maintain its adaptive capacity, and its capacity to create new and unpredictable things.

WHAT DOES SUSTAINABILITY MEAN?

"As part of a living system, we want to learn to succeed at being human."

allow it. We need to more deeply understand the living system of which we are a part and understand their inherent dynamism.

Any living system that survives for a long period of time has the capacity to adapt to change. Adaptive systems coevolve with other parts of the environment; they are self-organizing and decentralized; they are messy, redundant and diverse; they are interdependent and connected, with many feedback loops that provide them with the information needed to change.

system, We tend to work on sustainable development at the level of individual buildings, firms, habitats or species, without paying sufficient attention to the systems that these individual elements are complexly linked. We cannot afford to be reductionist. There are no sustainable practices, only sustainable systems. We need to explore "how the sustainable society will achieve coherence across all of its dimensions." (Ernest Lowe, Discovering Industrial Ecology) Instead of simple, separate, analytical boundaries for problems, we need complex, linked and self-organizing boundaries.

we want to learn Learning is the process of creating new relationships between ourselves and our environment. The capacity for rapid learning is essential to human sustainability. The conditions that allow communities to enable rapid learning are the same ones that living systems exhibit. Communities that can support powerful learning have members who have autonomy and standing in the community; open social structures that encourage collective dialogue, diversity of information and points of view; dense connections among people; and a shared sense of values, history and identity. We may not be able to move more quickly towards sustainability until our methods embody these conditions.

We learn from taking action and observing the results. Survey research tells us, however, that while people support the concept of sustainability, they can't see the means by which it is possible. People need help translating the concept to action.

to succeed We have become very successful at drawing resources from our environment, but this kind of success may cause us to lose out in the end. Before we can achieve sustainability, we will need fundamentally different measures of success. Our existing, non-sustainable behaviors are rational, given the measures of success that we now have.

Values, beliefs, laws and policies shape our measures of success, so they are what need to change if we want to alter the long term structure and dynamics of the system. Many strategies for sustainability tinker at the margins without changing the underlying rules and assumptions about growth or the relationship between human beings and nature. We need to begin to have dialogue about essential

purposes and goals, and establish measures for progress towards them.

at being human

To succeed at being human at the level of the species we need, at minimum, to persist. Even parasites can persist, as long as they don't kill the host. However, given our ability to draw resources from other species, persisting as a parasite seems unlikely, especially considering that 99% of all species that have gone before us are extinct. How much better it would be to become consequential to the creation and renewal of the ecosystem, an active agent that draws from and gives back to other parts of the system, like a tree within a forest system.

To succeed at being human at the level of an individual person requires far more than survival. Certainly, to avoid extinction, we have to maintain our life support systems. To feel fulfilled, we have to feed the human desire to create new things, to belong, to love and be loved.

We need to explore far more what it means to succeed as humans *within* our ecosystem. We must ask not only what people feel is essential to their humanity, but also what is essential for other parts of our ecosystem to succeed as well.

This definition builds on the following principles:

* **Sustainability means the capacity to "stay in the game of evolution."**

According to the ecologist Lawrence Slobodkin, evolution is a game in which the only rule is to stay in the game, and the game is played by adapting to change. Sustainability, then, means creating the capacity to stay in the game of evolution; creating "chances to continue"; maintaining the ability to renew rather than die out.

* **Sustainability is a dynamic process, not an end point.**

Most people associate sustainability

There were no prairies in Illinois millions of years ago. Conditions change, and so do communities. We want such habitats to have the capacity to evolve. Sustainability is not about stopping change, but rather is about accelerating the right kinds of change. Achieving sustainability is an ongoing and dynamic process.

non-human systems to maintain themselves and evolve. It means maintain the *adaptive capacity* in both human and natural systems.

For example, wetlands near lakes that fill in disappear, but new lakes are created and wetlands appear near them. We don't want to preserve every wetland. We want to keep the capacity for old ones to evolve and new ones to be created. Firms also come and go,

> "In other words, man does have a place in the world, but it's not his place to *rule*. The gods have that in hand. Man's place is to be the first. Man's place is to be the first *without being the last*. Man's place is to figure out how its *possible* to do that -- and then to make some room for all the rest who are capable of becoming what he's become. And maybe, when the time comes, it's man's place to be the teacher of all the rest who are capable of becoming what he's become."
>
> Daniel Quinn, Ishmael

shared interpretation of them, and act in a coordinated manner. (The sociologist Robert Putman has documented the importance of these informal association in the wealth creation and economic development processes.)

A sense of place occurs at many different scales:

* the organization;
* the street;
* the neighborhood;
* the city;
* the region.

At each higher level, the sense of place is an agglomeration of sense of place in smaller units. The sense of place is a factor in the "identity" of a region. This sense of identity is often what allows a community to organize around sustainable development.

* **Sustainability requires rapid human learning.**

Because evolution is a dynamic process, sustainability requires the capacity for rapid adaptation. It is not a matter of "getting it right" (e.g. the "right" kind of energy policy or the "right" kind of agricultural production), but rather a matter of being resilient and able to quickly adapt and create. This is the process of *learning* -- continuous cycles of detection, interpretation and action.

The continuous interactions between multiple players in the process of coevolution. The quality of the learning process (speed and sophistication) determines whether a player gets to "stay in the game." In human systems, all such learning occurs in a social context -- in the context of different communities. The "learning capacity" of a community can be linked to the different stages of the learning process:

* **Detect.** Does the community have a good "nervous system" to detect changes in the environment, or is it "numb"? Are there recognized indicators of sustainability progress? Are the indicators visible to residents of the community? Do they understand them? Do they agree that they are important? (See Section V -- "Measuring and Assessing.)

* **Interpret.** Does the community have standards for what a "sustainable" community is, and what kinds of changes in conditions (air, water, flora, fauna, human equity, etc.) should trigger action? Are there shared values about what end conditions are desirable? (See Section V -- "Measuring and Assessing.")

* **Act.** Is the community socially organized to act when required? Is control decentralized enough that there are multiple ways to precipitate action?

In this context, sustainability is as much about building the capacity for rapid social learning as it is about the natural environment.

Our definition and principles suggest some "minimum conditions" for sustainable human behavior:

* **Organize Around Ecosystems.** *We need to reorganize our "boundaries" so that they match the natural systems we depend on for our survival. This will require institutions that have an ecosystem focus.*

* **Make Room For Others.** *We need to preserve native ecosystems and restrain encroachment of habitat.*

* **Thrive On Less.** *We need to develop consumption patterns that don't draw down a finite stock of materials, but still enable us to meet human needs.*

* **Convert Waste Into Food.** *We need to eliminate the build-up of materials that cannot be used as food by natural systems.*

* **Build Human Capacity for Growth and Renewal.** *We need to worry about the health of human "ecologies" in the same way we worry about natural systems.*

So what are the characteristics of communities that have a high "adaptive capacity" -- that can learn rapidly? Not surprisingly, we believe that these characteristics are the same characteristics that you find in healthy natural systems -- coevolution, adaptation, self-organization, messy diversity, interdependence, connectivity and learning.

On person who intrigued us was Jane Jacobs, whose definition of economic development is *the process of continually improvising in a context that makes injecting improvisations into everyday life feasible -- constantly drifting into new kinds of work that carry unprecedented problems, then drifting into improvised solutions.* So to be prosperous, she suggests a place must provide many different niches for people's differing skills, interests and imaginations and provide capital for the development of new niches. It must rapidly create new products and put old ones to new uses. To do so, it must allow easy breakaways of workers to create new work and organizations, many small suppliers who are connected to final markets and physical arrangements that promote duplicate and diverse enterprises.

In sum, she spoke of linkage, interaction, interdependence, freedom, feedback, duplication, and diversity. These are the same kinds of condition that ecologist use to talk about the adaptive

capacity of ecosystems. Similar concepts are used to describe learning processes in the human brain. And high performance work organizations. And economic opportunity for low-income communities.

In all of the cases, there is duplication that reduces the risk of collapse from single-point failure. There are multiple alternative paths for activity. There is self-organization -- no central organization to optimize outcomes or blow the whole game. There are dense interrelationships between the parts.

We decided it would be useful to be able to judge progress towards sustainability not just based on the specific end conditions desired, but also based on the inherent adaptive capacity of the social systems mediating our interactions with the natural environment. To this end, we took a stab at defining a sustainable community. This definition is presented in the following tables in the hope that it might stimulate your own discussion.

1) **Is Both Adaptable and Stable**	Is constantly changing through continual interdependent fluctuations in order to maintain itself as the environment changes. It is constantly creating new products and services and finding new uses for old ones.	High rates of entrepreneurship and innovation; a lot of variety in types of work done by members; high rates of new business formation; flexible and adaptive organizations that are open to new information.
2) **Nurtures Self-Organization and Autonomy**	Is not centrally controlled, but rather relies on multiple local decision-making processes guided by common values. It gives all of its residents standing to exercise their autonomy through the accumulation of assets, which in turn increase responsibility to the community.	Strong democratic governance processes; many opportunities for citizen participation in visioning processes and design teams; a minimum of "good old boys" networks; absence of dramatic differences in wealth and prosperity between citizens; high home ownership; high rates of family-supporting employment; high rates of voter participation; decentralization of community decision-making.
3) **Is Messy, Redundant and Diverse**	Has institutions that are loosely coupled, decentralized and open to new members, and have shifting and overlapping membership. Has multiple elements and pathways that fulfill its functions. It facilitates the efforts of its members to participate and develop unique niches.	Many different levels of social organization that interact with each other in multiple ways; high levels of volunteerism; diversity in population mix, religion and other social indicators; vast array of voluntary organizations; people who participate in many different networks; has a diverse economy.
4) **Nurtures Interdependence and Connectivity**	Is interdependent through a vast network of loose relationships among its people and institutions and between the whole economy and other parts of the environment. The network is supported by easy and continuous trading of information and goods.	Strong sense of community identity; a sense of history and place that provides continuity; community is well connected to the surrounding political, social and economic environment; easy physical access to jobs, shopping and recreation; easy access to the natural environment.

* Brainstorm as a whole group what the lessons about sustainability were from these experiences. (10 minutes.)

* Assign a member of the group to write up the lessons.

3)

* Pick a natural system (a swamp, seashore, lake, river, forest, etc.) to go and observe as a group.

* Have each participant take notes about what is and is not sustainable about the system.

* Share the notes and use them to build a definition of sustainability.

The learning process involves being able to *detect* information in the environment, and being able to *interpret its meaning.* For sustainability networks, this means:

* Defining the geographical area you are focusing on;

* Identifying the key physical, biological and human systems in your region;

* Clarifying your desired end goals for these systems, and the indicators you will use to track them;

* Collecting and tracking data on the indicators; and

* Sharing the results with others in the community.

This process at the community level is essentially the same as continuous improvement processes used within organizations to improve work processes. The only differences are that the systems are larger and less well defined; responsibility for the q-0.000defined; reuofsyste54.36 l5k5nformatio3-2501e13.

* **A sense of place.** A sense of place increases the capacity of a population to make commitments to change. As the polling data in Section III of this Handbook indicated, people still have a high sense of confidence in their communities, suggesting that sustainability should be promoted from a community-oriented standpoint. Citizens have the strongest desire to steward places that are nearby. Place matters.

* **Manageable scale.** By limiting the geographic scale, it is easier to deal with the breadth of information required. In fact, the metropolitan region may be the smallest scale at which it is possible to capture most of the key flows and meaningfully resolve problems in an integrated and holistic fashion. At the same time, it may be the largest geographical unit that people can grasp and around which they may come together.

* **Fits a lot of existing data collection.** There is an abundance of data that is already collected on a regional level. This can help the data collection efforts of local networks.

So how do you define a region? First, recognize that any boundaries that you choose will be to some extent arbitrary. You need to select boundaries that are most appropriate to your purpose. In the simplest sense, the boundaries of a region are where the connections between various systems begin to thin out. You can look for "ridges" -- the equivalent of physical ridges for watersheds that define the direction in which the water will flow. The boundaries of a region are defined by "ridges" in water flow, employment patterns, land use patterns, commuting patterns, etc. In reality, of course, all of the systems will overlap each other, and the circumstances under which the boundaries are clear are unusual.

One way to look for regional boundaries is to map the boundaries of multiple systems on clear transparencies, and lay them on top of each other, looking for the areas of greatest overlap. Some of the characteristics that can be used to identify natural regions include:

* Soil type;
* Vegetation patterns;
* Watersheds;
* Climate patterns;
* Land use;
* Wildlife habitats;
* Human energy and consumption flows;
* Labor markets;
* Culture;
* Commuting patterns;
* Transportation flows;
* Industrial clusters.

It is rare that these patterns of natural and human activity closely map political jurisdictions. This means that almost all public policy actions on sustainability end up being cross-

jurisdictional in nature.

In the process of identifying a region for your focus, you will have identified a number of key systems that sustainability depends on. Here are some ideas for categorizing the systems in your region:

The Natural Ecology

* Water systems (lakes, rivers, streams, swamps, oceans, aquifers, groundwater, etc.)
* Surface land masses (forests, prairies, marshes, cleared land, etc.)
* Sub-surface land (minerals)
* Air
* Vegetation (flora)
* Animal life (fauna -- birds, fish, mammals, reptiles, etc.)

The Economy

* Agriculture
* Manufacturing
* Retail and service
* Mining
* Tourism

The Community

* Government (federal, state and local)
* Education
* Non-profit associations and organization

* Neighborhoods

As we note in the following section, most actions on sustainability focus on effecting change in one or another of these sectors -- ecology, economy and community. In contrast to starting with a broad approach such as this, it is much more likely that your network has come into being because it is focused on a distinct problem in one of these sub-systems. We recommend that you create a map of all of the systems, and track how the problem you are working on is connected to each of them.. Usually, you will find a dense set of connections, calling for action in multiple sub-systems simultaneously.

Creating good visual representations of the key systems in your region is a powerful way to focus your sustainability efforts. Mapping can be done in a wide variety of ways. It can sometimes involve geographic maps, numerical and visual displays of day, computer simulations, or simple text descriptions. The purpose of a mapping process is to help participants share their information with each other and come to a common enough "picture" of their region that they can agree on where to act. Here are some ideas related to mapping:

* *Make it visual.* If it involves data (for instance, information from Standard Industrial Classification codes about the different sectors of your economy) make sure that you display it graphically; if it involves ideas (for instance, your ideas about sustainability) display it in "mind-map" format; and use geographic maps to display physical and natural systems.

* *Start using available technologies.* Mapping technologies such as the Geographic Information Service (GIS) are starting to be used by many communities to provide detailed descriptions of land use and other dimensions of their ecosystems. (See "Internet Resources" for some sources of information on mapping technology.)

* *Explore simulation models.*

Lessons on Public Indicators from the Corporation for Enterprise Development's "Development Report Card for the States"

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Seattle's "Instrument Panel"

In Seattle, several hundred citizens took five years to develop 40 "indicators of sustainability." Their first

will feel more realistic to your community.

* **Use public improvement processes to act on the indicators.** Again, the "technology" of continuous improvement is a useful guide to community sustainability efforts. Consider forming community improvement teams around key indicators. Have the teams report to the community in an annual sustainability conference.

		(See end of Table for Key)
ECOLOGY: Environmental		

	Changes in species that are indicators for stream and estuary condition, such as salmon	WA, YORK, NS
	Changes in species that are indicators for biodiversity	SS
	*Changes in land use mix	WA, YORK, NS

	Solid waste produced and recycled (M tons)	CfED, WA, SS, JF, York, Puget, NS
	Local sales of locally produced food	Puget
	Septic system failure and leakage	WA
	Percentage of students passing an environmental education test	MM
	Vehicle miles traveled per capita	SS
	Percent of commuters driving alone	Puget
	Gasoline consumption per capita	York
	Protected area as a percent of total area	WRI
	Changes in population density	York
	Changes in population	SS, Puget
	Number of dwellings per acre	York
	Amount of underground metals, fuels, and other minerals per unit output and overall	NS
	Amount of persistent toxic substances per unit of output and overall	NS
	Resources used per unit of output	NS
	Sales of environmental household products per capita	
ECONOMY: Strong Economic Performance		

	Manufacturing capital investment	CfED
	New companies	CfED
	New business job growth	CfED
	Percentage of companies that adopt high performance work organizations, student structured work experience programs, etc.	OPB
	Rates of environmental business formation	Friedman
ECONOMY: A Diverse Economy	Sectoral diversity	CfED, WA
	Dynamic diversity	CfED
	*Share of employment in 10 largest employers	WW, SS, Puget
ECONOMY: Broad Access to Infrastructure Required to be Economically Viable	Primary care physicians per 10,000 people in nonmetro areas	MM
	Rank in telecommunications technology	MM
	Backload of roads and bridges in need of repair and preservation	OPB
	Percent of total highways and bridges rated below quality standards for designated use	
	Percent of public dollars spent on infrastructure maintenance as compared to new investments	Tufts
	Percentage of nonmetro population in communities served by two or more options for freight transport	MM
	Ph.D. scientists and engineers in the workforce	CfED
	Science/engineers graduate students	CfED
	Patents issued	CfED, OPB
	University research and development	CfED
	SBIR grants	CfED

Y	Financial resources (Commercial and industrial loans, venture capital investments, Microenterprise capital	CfED, OPB
	SBIC financing	CfED

	Achievement test scores	MM, JF
	*High school graduation rates	CfED, WA, OPB, JF, York
	Participation of high school graduates in higher education programs	JF
	College graduation five year rates	MM, CfED, JF, York
	Percentage of h.s. graduates who are pursuing advanced training one year after high school	MM
	Percentage of adults who have completed high school or equivalent program	OPB
	Percentage of adults who have completed a baccalaureate degree	OPB, MM, CfED
	Prose and quantitative intermediate literacy rate for all adults	OPB, SS
COMMUNITY: Good Basic Health	*Infant mortality rate (per 1000 births)	MM, CfED, WA, JF, York
	Percentage of low birthweight babies and across groups	MM, WA, SS, Puget
	Percentage of children who are adequately immunized	MM
	Share of mothers who receive prenatal care in the first 3 months	WA
	Percentage of Minnesota adults who do not smoke	MM

	Suicide rates	WA, York
	Rate of heart disease	CfED, JF
	Cancer rates	CfED, JF
	Infectious disease rates	CfED
	Per capita health expenditures	
With Which to Invest In		

	*Percentage of new residential development where occupants are within 1.4 mile of services	OPB, York
	Percent of residents who have access to alternative transportation modes (mass transit, bicycles, walking)	CfED, OPB
	Percent of streets that meet "pedestrian friendly" criteria	SS
	People reporting commuting time 25 minutes or less	JF, OPB
	Distance or travel time to transit	York
	Unemployment rate	CfED, WA
	Information available about the condition of the community	Friedman
COMMUNITY: High Volunteerism/Sense of Community	*Percentage of residents who volunteer for at least 50 hours per year of community activities	MM, WA, OPB, JF
	Percentage of youths who volunteer at least an hour a week	MM, SS
	Percentage of people who feel they can rely on another person in their community for help	MM
	Percentage of people who feel they are part of their community	OPB
	*Percentage of eligible voters who vote	MM, WA, OPB, JF
	Percentage of population voting in odd year (local) primary elections	SS
	Percentage of dollars contributed to campaigns coming from small contributions	MM
	Participation in community meetings	WA
	Number of community organizations	WA
	Percent of parents/guardians who are involved in school activities	SS
	People keeping up with local government news frequently	JF
	Public library book circulation per capita	JF

	Teachers holding advanced degrees	JF
	Public school expenditures per student	JF
	Cost of college tuition	MM
	Percentage of recent technical college graduates employed in a job related to their training	MM
	Public library materials per capita	JF
	Zoo, symphony, and museum attendance per 1000 population	JF
COMMUNITY: Government that is Effective	Percent of the budget for which goals and outcomes have been established	MM, OPB
	Percent of residents who say they get their money's worth from taxes	MM
	Fiscal stability	CfED
	Resident participation in local vision and design processes	

* Asterisk indicate most frequently used indicators.

CAMP provides technical assistance to small and

*

The Center for Neighborhood Technology in Chicago is working to introduce a new kind of non-toxic cleaning technology into the Chicago area drycleaning market. The technology comes from Europe and is referred to as "wet cleaning." CNT is sponsoring a rigorous testing and demonstration process, and is working with the cleaning industry to make information, training, financing and market information available to local cleaning establishments to encourage conversion to the new technology.

When the 3M Camarillo facility in Ventura, California, reduced its VOC emissions by 78 tons/year, it sold its pollution credits to another company and donated the proceeds ($1.5 million) to the Ventura County Community Foundation. The funds are to be used to create a Community Clean Air Fund to "spark broad, creative emission reduction programs throughout the whole community."

imposing charges (i.e. taxes) for the emission of certain kinds of pollution, on the assumption that such charges will create incentives to produce less pollution.

-- *Virgin material charges.* Similar to pollution charges, these charges create incentives to reduce the rate of use of virgin materials and instead substitute recycled materials.

ecycrrte

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The Center for Neighborhood Technology has been working with banks in the Chicago area to develop favorable mortgage terms for housing located in the city with easy access to public transportation. The mortgages would reflect the lower household expenses of reduced travel costs and would encourage investment in the inner city.

The STPP is a national transportation policy project that is trying to operationalize the concept of sustainability into an action agenda for reconstructing the transportation system. It is based on a set of sustainable transportation goals:

* **Make transportation systems conservative in nature.** *Don't disrupt the natural or built environments unless absolutely necessary.*
* **Make the goal accessibility, not mobility.** *This means locating shopping, jobs and housing in proximity to each other.*
* **Integrate the system.** *Link freeways, transit, local roads, bikeways, etc. into a community context that improves overall system efficiency.*
* **Promote redundancy and flexibility.** *Design the system so that it can accommodate changes and adjustments.*
* **Incorporate feedback into the system.** *Create systems to allow users to understand use patterns and implications of various strategies.*
* **Promote the public right to know.** *Create information for individuals to have a good understanding of what their public transportation dollars are being spent for.*

-- *Solid waste strategies.* Local recycling is one example of how communities have used a public services (waste disposal) to support sustainability.

-- *Public buildings.* Public buildings can be a showcase for environmentally sustainable building practices and demonstrate their feasibility to a broad public audience.

-- *Changing design requirements.* Communities can use the tools of zoning and other land-use strategies to stimulate energy and material-efficient building designs

2)

Sustainable communities also utilize strategies to protect, preserve and restore the adaptive capacity of natural ecosystems. Most of these strategies involve *altering property rights to favor the preservation of natural systems.* These can include:

* **Regulating private land use.** There is a wide variety of tools that communities can use to control what citizens can do with their private land. Tools include:

-- *Zoning and land use regulations.* These can create incentives and restriction for sustainable development.

-- *Preserving natural areas.* This involves prohibiting development in natural areas and protecting them from intrusive human use (e.g. public forests, parks, greenways, nature preserves, etc.).

-- *Best management practices.* Land owners can also be encouraged to use best management practices in the use of their private lands. This is often combined with tax incentives (e.g. for woodlot management).

* **Acquisition and management.** Organizations like The Nature Conservancy have pioneered the strategy of purchasing

The Chicago Wilderness project is a coalition of 35 Chicago area organizations dedicated to preserving the region's biodiversity. Contrary to popular perception, the Chicago area is home to some of the best remnants of the original prairies and open woodlands that historically characterized central North America. The project emphasizes restoration of pre-European settlement conditions in local ecosystems through policy changes, outreach and education and research. The project emphasizes four principles:

* *Conservation efforts need to focus on ecosystems, not individual species.*
* *Ecosystems are continuously changing, so strategies need to change with them.*
* *Linkages are extensive and do not respect administrative boundaries.*
* *People need information to understand ecosystems and make more sound decisions.*

key land parcels, thereby taking them out of the development path, and managing them in ways that preserve their natural features.

* **Restoring natural systems**. In some cases, communities have attempted to reverse the effects of human development and restore developed areas to their natural states. This can involve removing dams, canals and other artificial barriers to water flow; reestablishing the natural flow of rivers; replanting mined areas; etc.

3) Increasingly, communities are understanding that sustainability includes the development of opportunities for all citizens to participate in the shaping of their future. This means the building of new kinds of social infrastructure that simultaneously help individuals develop their own unique capacities and allow citizens to voluntarily connect with each other to accomplish shared goals. This means social infrastructure that allows for *rapid learning at all levels of the community*. These community learning strategies encompass a wide range of activities:

   * **Creating awareness and urgency.** This involves a wide range of activities designed to raise the awareness of citizens about sustainability issues. It can involve media campaigns, public seminars and workshops, outside speakers, local conferences, lobbying efforts and other strategies to increase the information that citizens have about sustainability.

   * **Visioning and strategic planning processes.** Many communities are experimenting with broad-based visioning and strategic planning processes that:

      -- Create a shared "picture" of the kind of community the residents want to live in (often involving visual preference surveys, GIS mapping and other strategies to develop literal visual representation of the desired future);

      -- Developing a shared definition of sustainability and what it means for each segment of the community;

      -- Defining the strengths and weaknesses of the community from a sustainability perspective;

      -- Identifying key areas for action;

      -- Creating action teams to implement recommendations; and

      -- Creating a "sustainability scoreboard" to measure progress.

      These visioning and planning processes are often positioned under the broad goal of

creating "learning communities."

Willis Wharf is a village of 300 residents on Virginia's eastern shore. They engaged in a planning process that developed a shared vision of what kind of community they wanted to be. The process involved:

* *Forming a steering committee and hiring a facilitator;*
* *Conducting a community assessment and holding a community retreat;*
* *Organizing working groups and outlining action steps and responsibilities;*
* *Creating indicators to measure progress.*

The process brought the community together around a shared sense of the future based on sustainable behaviors.

(See "A Citizen's Guide to Achieving Healthy Ecosystems, Economies and Communities" by the Center for Compatible Economic Development for more detail on this process.)

* **Local leadership development.** Community sustainability requires a "leaderful" community -- a large number of individuals with the capacity to articulate their vision of the future and facilitate learning and dialogue with others. Many communities have invested in the deliberate development of their local leadership base -- usually involving citizens from all walks of life, as opposed to just individuals who occupy formal leadership positions.

* **Creating and strengthening local institutions.** Broad civic capacity requires healthy formal institutions as well as active individuals and voluntary associations. Communities therefore often invest in the creation of new formal institutions (such as community organizations, development banks, adaptive learning centers, etc.) as well as the strengthening of exisitng institutions. This frequently involves basic organizational development for public, non-profit and volunteer organizations.

* **Grass roots organizing.** Using a variety of contact methods (door to door, e-mail, newsletters, etc.) sustainability advocates seek to engage a broad range of the citizenry in actions on sustainability. The use of "citizen monitors" to track water quality is one example.

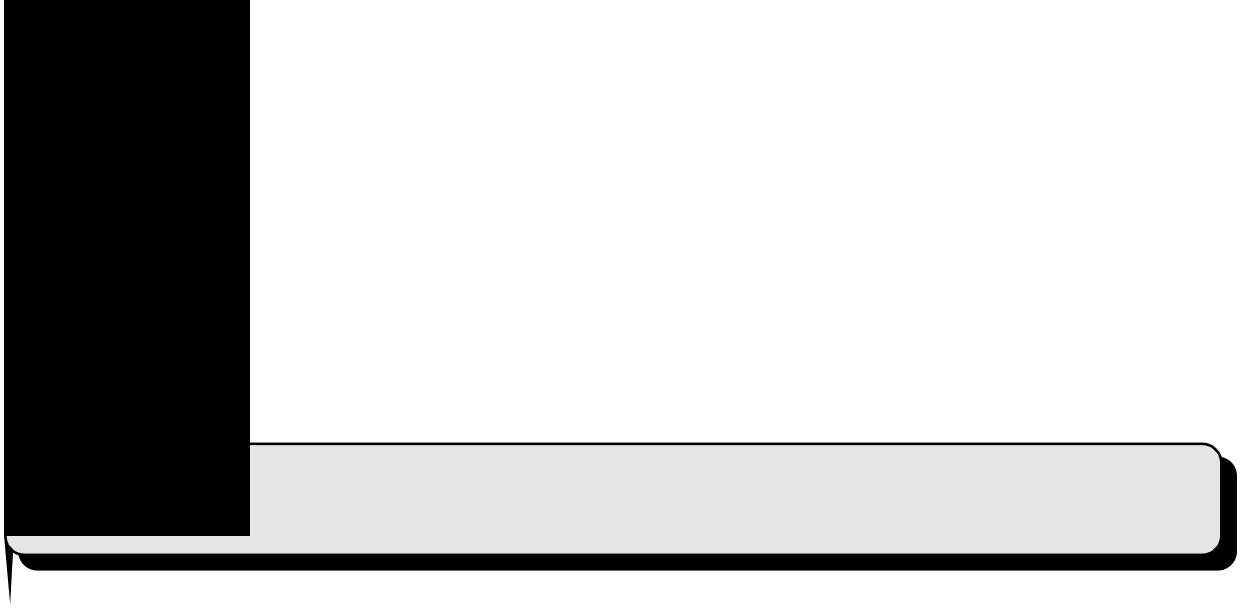
* **Transforming education.** The education system of a community is a key strategic resource for sustainability. It is critical for many reasons:

  -- It touches almost every child in the community;

The Pine Jog Environmental Center in Palm Beach County, Florida is developing a shared community vision about an environmental education in curriculum for sustainability. The process will involve extensive community involvement, shared visioning, and the integration of school-based learning with environmental action.

-- It is often the primary institution for connecting parents with each other (along with churches);
-- Its curriculum has a strong influence on the next generation's ideas about sustainability;
-- It can have an enormous impact on the "adaptive capacity" of children and young adults; and
-- It is itself a large user of resources (energy and materials).

Strategies to transform education can involve changes in curriculum; involvement of



some substantial time clarifying your own values and definitions of sustainability. The material in Section IV -- "Creating a Common Language" is designed to help you do this.

2)

Acting together requires some principles of behavior that you agree to abide by. These principles articulate the things you will not violate in the pursuit of your purpose. They should seek to create conditions within the learning group that support rapid learning and change. We have suggested some below.

1) *Any person or organization heavily and directly involved in the group should be entitled to membership rights.*

2) *The group must offer enough advantages to gain and retain voluntary participation.*

3) *The group should seek as diverse participation as possible.*

4) *The group should encourage the formation of new relationships between group members and the creation of new products (i.e. things the group creates that are of value to someone).*

5) *No participant should have an intrinsic advantage over any other participant. All advantage should be gained by desire, innovation, and competitive ability.*

6) *No participants should be able to control deliberations or decisions.*

7) *Power, function and authority should be decentralized to the maximum degree. Nothing should be centralized that can be handled in a decentralized manner.*

8) *The group should seek to be infinitely malleable, yet extremely durable. It should be capable of constant adaptation without sacrificing its essential nature.*

These principles are intended to match the "human ecology" of the Learning Network with the characteristics of sustainable natural systems -- messy, redundant, diverse, self-organized, interdependent, connected and capable of rapid adaptation, learning and creativity.

The source of energy for any learning network is the passion and commitment of its members. The first step for any learning network is to identify those things that the participants care deeply enough about to act on, *whether or not they can get extra resources or anyone else changes their behavior.* This will often mean starting with small, doable steps and "growing into" a full dialogue on sustainability. Rapid and vigorous iteration between small actions and large visions provides for a vibrant learning environment. We find the advice of June Holley at the Appalachian Center for Economic Networks (ACENet) to be right on target:

> The danger of many change-oriented groups is that they immediately focus on the changes needed in the behavior of others -- behavior that they usually have no hope of controlling. The only behavior that you can (usually!) reliably control is your own. Therefore, focus on your capacities and assets, and let your successes change the behavior of others.

> *"At the same time that people are encouraged to keep in mind the big picture, they need to be able to join together with others to , noticing how those small pieces impact the community as a whole, and using that awareness to guide their next steps. In complex systems, we cannot know ahead of time what the impact of a particular activity will be. We have to try it in an experimental way and then notice how it works, modifying it and building off it. The rigid, heavy, resource-intensive strategic planning processes employed by many communities need to be replaced by relatively small, intensively interactive and collaborating demonstration projects where much attention is given to what is working and then changes are made to improve and expand the projects on a continual basis.*
>
> " ("Growing Sustainable Communities", ACEnet, 1994)

The most powerful kind of experimentation is experimentation with your own behavior. Figure out what you can do to change your own patterns of resource consumption that will send signals to others. People learn from what we do, not what we say.

You can use a simple process for assessing which opportunities are the best to work on. At the end of this section, we have provided a simplified version of our indicator list to help you assess the ecology, economy and community dimensions of your region and focus in on those issues that are most critical to your ecology and that you are most prepared to start working on.

The only resources a Learning Network usually has is the knowledge, skills and assets of its members. Whoever you attract to your network comes with a set of capacities you need to be able to take advantage of. One of the ways to do this is to map the assets of your members. (See attached exercise.) Asset mapping creates a shared visual display of the resources each member brings to the work of the group. These assets are the beginning point for your work. This keeps you from becoming focused on getting resources from others before you can begin to do something. As soon as we start to worry more about getting more resources than doing something with what we have, we have begun to get caught in the "dependency trap" that gives others power over our own destiny and limits the scope of our imagination.

You can only influence the systems that you are part of or have some leverage with. This leads to the principle of "Get the whole system in the room." In other words, if you want to influence the development community, make sure you talk with developers; if you want to influence the business community, engage business owners in the dialogue; if you want to change education, get educators in the room.

If you are successful in your work, you will eventually want to expand the conversations beyond the bounds of your community. Here are some ideas about how to do this:

* Organize site visits with other communities. This is a practice that has been used in the business community for a long time. They call it "benchmarking." Create a relationship with citizens in another community, and design organized opportunities for information sharing.

* Create an electronic hub on the World Wide Web. This is a great way to connect with others doing similar work. (See below for some useful web sites to visit.)

* Create "User Groups" organized around professions, sectors, or other natural interest groupings. This is what the Natural Step did in Sweden. They now have over 10,000 people engaged in professional dialogue on the implementation of their system principles.

People who have engaged in a rich and compelling learning process usually synthesize information in ways that lead to powerful insights. The immediate instinct is then to *share these insights with others and convince them of their value.* Thus if we work together on sustainability in our communities, we end up processing a lot of complicated information about our environment and the impact we are having on it. We *construct new knowledge* that changes the way we think about the world. The mistake we then make is to try to "teach" these insights to others, forgetting that what led us to the insights was our own messy, unpredictable and self-

directed learning process. In other words, we move from being learners to being advocates. The power of a learning network is in maintaining its focus on learning, not advocacy. Get leverage through knowledge. Let others find their own solutions and come to the work of sustainability naturally, based on their own self-interests. For sure, share your work with others, but heed the principles of the Natural Step in Sweden: *"Don't become political; don't give advice; don't criticize; only praise."*

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The attached table is provided to help you set some overall priorities about where to focus your sustainability efforts. Remember of course, that people will mostly work on what they care about. You can use this table to see where people's interests and your ecosystem needs overlap. Here are some suggestions about how to proceed:

1) Select the key indicators and/or the feature of your ecosystem that best apply to your community. (Feel free, of course to add ones that are not on the list.) You can do this either at a more general level (e.g. water quality) or at a more specific level (e.g. percent of river miles that meet fishable and swimmable standards).

2) Rank that indicators according to a simple coloring scheme:

   * Red = danger
   * Yellow = caution
   * Green = healthy

   It is recommended that you actually color in the boxes instead of marking them, for best visual effects.

3) On a scale of 1 to 3, make a judgement about how important this indicator is to your human and natural ecology.

4) On a scale of 1 to 3, make a judgement about how well prepared your group is to act on that particular feature of your ecology.

5) Multiply the Health score (green=1, yellow=2, red=3) by the Importance score, by the Readiness score for a total score. Then rank all of the options by their total score. This will give you a prioritize list of where to start working.

PRIORITIES FOR ACTION

	Red=danger Yellow=caution Green=healthy