Staying in the Game:
Exploring Options for Urban Sustainability

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

Resources for Dialogue and Action
Created by the Urban Sustainability Learning Group with support from the Joyce Foundation
A project of The Tides Center

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Table of Contents

Table of Contents

I. Introduction

What is the purpose of this material?

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:

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

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

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

*   ***Measure and assess*** *the sustainability of current use patterns in the region;*

*   ***Build ongoing networks*** *capable of continuous learning and shared action;*

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

What is the Urban Sustainability Learning Group?

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.)

Why did the Learning Group create this material?

*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 turned out not to be the case. We found that we needed to spend a significant amount of time developing a **shared language** to talk about sustainability. This meant exploring issues such as:*

*   *What is our definition of "sustainability"?*

*   *Is the purpose of sustainability just to support human activity? What about other species? What is the place of human beings in the evolutionary process?*

*   *Are there purposes beyond simple physical survival which are important?*

*   *What are the end human and ecological conditions we are trying to achieve?*

*   *What data can we use to measure the sustainability of current systems and practices?*

*   *What capacities are needed in a community to support sustainability?*

Without a shared language and shared framework, it was impossible to effectively organize for action.

*This Handbook was created in the hope that our experience building a common language and framework would be useful to other sustainability networks and help them get more quickly to the point of being able to act together. **It is important to understand that each group needs to craft their own organic understanding of sustainability. While the work of others can be useful to you, it will not be "yours" unless you break it up and make something new of it.***

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6

II. Sustainability and Learning:
Thinking About Sustainability as a Process of Learning

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A Focus on Learning

We found that thinking about sustainability as a process of learning (as opposed to coercion, advocacy, education or teaching) provided a useful focus to our work. In this context, **learning is the process we use to change our capacity to:**

* **detect,**

* **interpret, and**

* **act on**

information about our environment. Our work as a group thus concentrated on:

* our ability to recognize sustainable conditions when we see them **(detect)**;

* our ability to think about sustainability in urban regions more coherently **(interpret)**; and

* our capacity to organize to act in support of sustainability **(act).**

We think of learning as *the process of creating new knowledge*. Knowledge is understood as *a meaningful relationship between an organism and the environment.* Thus learning is a creative process that restructures our relationship with the world. As we learn, we create a "worldspace" that determines what we can and cannot "see" in the world around us. Learning is the process by which we invent our reality. In this approach, knowledge is:

* *RELATIONAL.* IT IS DEFINED BY THE RELATIONSHIP BETWEEN THE KNOWER AND THE KNOWN.

* *EMBODIED.* IT IS NOT ABSTRACT. IT IS EMBEDDED IN

THE CYCLE OF LEARNING

DETECT
Using our "mental models" of the world to take in new information.

ACT
Taking action based on our mental model.

INTERPRET
Making "sense" of new information by connecting it with our model.

LEARNING.CYC
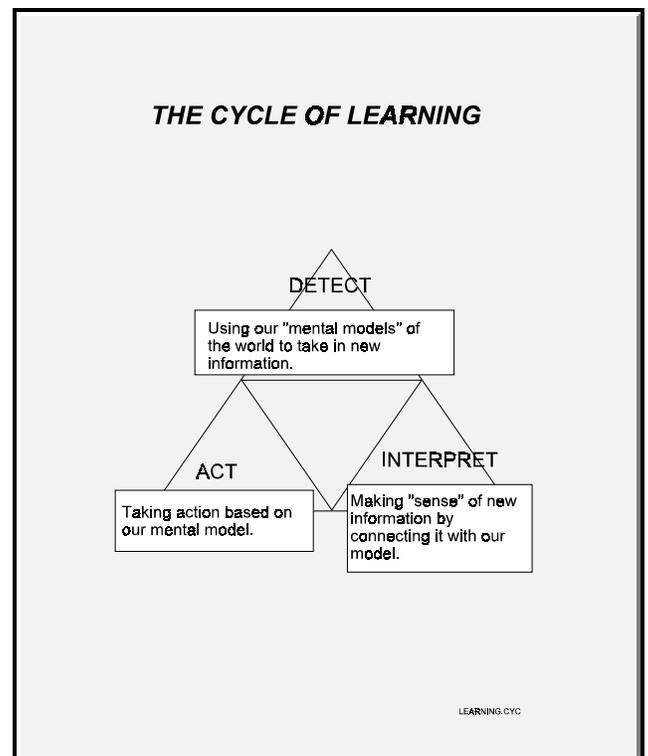
REAL, FUNCTIONAL RELATIONSHIPS.

*   *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

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.

The Evolutionary Perspective on Human Learning

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 press, and more recently digital information technology) have led to a rapid spiraling of new knowledge creation that has created ever-increasing gaps between our capacity to exploit environmental resources for our own growth and preservation, and the similar capacities of other species. If the growth allowed by this advantage is not self-constrained, it will lead to a cycle of dominance and ultimate collapse as our resource niche is exhausted. Rapid and catastrophic reductions in population will occur through death, disease, starvation and natural disaster.

The good news is that the very same endowments that give us the ability to consume ourselves into oblivion also give us unique capacities to peer into the future and alter our current behavior based on potential future consequences. The test of our success as a species will be whether we

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 Revolution in Our Understanding of Human Learning

The last three decades have produced revolutionary new insights into how human beings learn and how we can best design learning experiences and environments that accelerate our natural capacity for learning. These new insights have come from a diverse range of disciplines, including neuroscience, cognitive science, psychology, physics, systems theory, philosophy, sociology and organizational theory.

Our new understanding of the process of learning has profound implications for how we design our schools, workplaces, communities and other social learning systems. It also leads to some rethinking of the role, strategy and tactics of environmental organizations and other groups working to support environmental sustainability.

The Traditional View Of Learning

The traditional view of learning is largely based on behaviorist models of the mind. In this view of learning, learners are passive "receivers of wisdom" who learn mostly by listening and repeating what the "teacher" or "expert" has told them. Teaching is the simple process of transferring information from the teacher or a textbook to the learner. Knowledge is broken down into small, separate pieces and "fed" to the learner in a precise and linear order. The purpose of the learning is for the student to be able to get the "right" answer to questions asked by the teacher. Learning occurs entirely independent of the context in which it is to be used, and it is assumed that the learner will be able to transfer his or her knowledge to new situations. Both the content and the process of the learning are tightly controlled by the teacher or expert -- the learner has little or no say in either. Cooperation between learners is discouraged (it is "cheating"), and all learners are presumed to learn in basically the same way, at the same rates.

The old view of learning could be called the "machine" view of learning. It treats the learning

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

The New View of Learning

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.

In this new view of learning, knowledge is actively "constructed" by the learner as a way of making sense of his or her world. Learners struggle with a rich variety of information and have to actively work with it to create patterns that they can understand. Because they work with real situations, knowledge cannot be broken down into small, separate parts, but has to be treated in an integrated and holistic manner. Students are actively engaged in the content and design of the learning experience. Material and delivery are designed to cover a diversity of learning styles. Students work on "big" concepts in nonlinear and "messy' ways -- much the same way learning happens in real life. Learners are encouraged to cooperate and draw up the diversity of the whole group. Learning is organized around real problems and real situations that reflect the context in which the learner will have to use his or her knowledge.

The following table contrasts these two different views of learning.

OLD LEARNING	NEW LEARNING
Closed: Inputs are carefully controlled.	**Open:** We are provided a rich variety of inputs ("immersion").
Serial-Processed: All learners are expected to follow the same learning sequence; learners only learn one thing at a time.	**Parallel-Processed:** Different learners simultaneously following different learning paths; many types of learning happening at the same time for individual learners.
Externally Referent and Designed: Both knowledge and the learning process are predetermined by others.	**Self-Referent and Emergent:** Knowledge is created through the relationship between the knower and the known. The outcome cannot be known in advance.
Controlled: The "teacher" determines what, when and how we learn.	**Self-Organized:** We are active in the design of curriculum, activities and assessment; teacher is a facilitator and designer of learning.
Discrete, Separated: Disciplines are separate and independent; roles of teacher and student clearly differentiated.	**Messy, Webbed:** Disciplines are integrated; roles are flexible.
Static: Same material and method applied to all students.	**Adaptive:** Material and teaching methods varied based on our interest and learning styles.

Linear: Material is taught in predictable, controlled sequences, from simple "parts" to complex "wholes".	Nonlinear: We learn non-sequentially, with rapid and frequent iteration between parts and wholes.
Competing: We learn alone and compete with others for rewards.	Co-Evolving: We learn together; our "intelligence" is based on our learning community.

Modern learning theory leads us to an "ecological" approach to learning -- it tells us that rapid and powerful learning happens best in the same kinds of circumstances that characterize healthy ecosystems: messy, webbed systems with moderately dense connections, rich information and participants who act independently based on their rules for survival and growth.

The traditional view of learning underlies the design of many of our social institutions -- including our schools, government structures and business organizations. It has resulted in the creation of hierarchical, bureaucratic and authority-driven institutions that are incapable of adapting to rapid environmental change. These environments are often "brain-antagonistic" and are designed in ways that function directly counter to how we naturally learn; instead of accelerating learning, these environments actually decrease and diminish it, opting instead for control and predictability. Much of the turmoil, for instance, in the business environment is a reflection of urgent efforts to radically redesign work organizations that are more conducive to the support of human learning and knowledge creation that is so essential to economic survival in today's information-driven markets. To greater or lesser degrees, similar revolutions are creating crises in many educational and governmental institutions.

Some Problems With Advocacy

Advocacy has been one of the most favored tools of environmental organizations. From the perspective of learning theory, advocacy sometimes has more in common with traditional teaching than it does with self-organized learning:

*   *It is expert-driven.* The environmental organization takes on the role of the teacher and is presumed to possess the "real" knowledge about the environment.

*   *It is one-way.* The advocate "teaches" those they are trying to persuade. Success constitutes a one way transfer of information from the advocate to the constituent.

*   *It is directive.* Advocates positions themselves as having the "answers" to how the target audience should change its behavior.

In short, the dynamics of the typical advocacy process look a lot like the dynamics of the traditional classroom -- an expert seeking to control a one-way transfer of information from themselves to a passive audience that will lead to predictable behaviors on the part of the "students." It is not surprising therefore, that advocacy efforts may be successful at connecting with people who already agree with the advocate, but rarely change minds or behavior in significant ways. In other words, they may be an effective method for *teaching*, but they are not

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

Moving Beyond Advocacy

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 characteristics associated with powerful learning -- open, emergent, self-organized, messy, nonlinear and coevolving. They require not teachers, but designers and facilitators of learning. Facilitators provide the following kinds of support for learners:

    -- <u>Rich information</u>. They bring to the learning environment an abundance of informational resources the learner can use in their exploration. This information needs to be in diverse modalities to appeal to different learning styles.

    -- <u>Summing to coherence</u>. They periodically stand back and help the learning network "notice" the patterns that are emerging in their knowledge.

    -- <u>Stimulate active inquiry</u>. Learning facilitators continuously push learners to explore deeper and deeper patterns in their exploration. They help craft the "questions worth asking" that guide the creation of new knowledge.

    -- <u>Make connections</u>. Facilitators of learning help make connections to between people, ideas and resources.

* *A focus on changing our own behavior before seeking to change the behavior of others.* Engaging a community of learners in the restructuring of their own relationships with the world is a far more powerful impetus to long-term change than "preaching" to others. Environmental activism will increasingly depend on local citizens taking control of their own systems instead of waiting for others to protect them from themselves.

* *Exploring opportunity as well as documenting threats.* Much of the information from the environmental movement is designed to change behavior through fear or guilt, creating a feeling of crisis and threat. Unfortunately, people do not learn well when they are feeling threatened. Brain research indicates that under conditions of threat we "downshift" and move the locus of our mental processing from our newer neocortex brain (the seat of our reasoning, planning and abstract thinking) to our older and more primitive "reptilian

14

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 Example of The Natural Step

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 organization or institution. It will not become political. It will not give advice. And it will not criticize. It will only praise. It will seek advice from everyone including any and all critics. It will be a learning organization."* ("Taking the Natural Step"; In Context, Volume 41.)

Community Learning Infrastructures

Learning is not an isolated individual phenomenon. Most learning happens in a social context and is a function of the learning networks we are part of. Historically, we have tended to confuse "learning" with "teaching" and therefore tend to think exclusively about schools when we think about learning in the broader community. Estimates are, however, that more than 95 percent of what we learn that we use in life is not learned in school. Learning happens everywhere, all the time and is a core function of many social institutions.

A holistic approach to sustainability would pay attention to the health of the human social infrastructure as well as natural systems. The long-term coevolution of human and non-human ecologies requires that the human systems be capable of rapid learning and adaptation. This means embedding the principles of powerful learning in the social infrastructure. Some of the characteristics of such communities will include:

*   *Shared sense of values, history and "identity."* These are the "boundaries" that allow rapid parallel processing to occur without excessive fragmentation.

*   *Social structures for collective dialogue.* There need to be processes for members of the community to come together, reflect on their conditions and develop a shared vision of

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.")

Coming to Public Judgement -- The Cycle of Community Learning

Daniel Yankelovich, one of the deans of American public opinion surveys, has identified seven distinct stages in the development of public opinion. Depending on which stage the public is at, polling data means very different things. Since environmental organizations are often in the business of trying to influence public opinion, it is important that they understand these stages, and seek to understand where public opinion is on environmental issues. Yankelovich's seven stages include:

1) **Dawning Awareness.** At this stage the public is just beginning to become aware of an issue. Anecdotes abound; little detailed knowledge is known.

2) **Greater Urgency.** The second stage move beyond awareness to serious urgency. Urgency does not mean having any clear sense of solutions.

3) **Discovering the Choices.** At this stage the public begins to sort out the alternative choices for dealing with an issue. This is often a messy and undisciplined process. There is still not clear demand for action.

4) **Wishful Thinking.** In the fourth stage, the public resists coming to grips with the real trade-offs involved in a solution. They often are attracted to unrealistic "quick fixes" even if it is quite obvious that they are based on unreal premises.

17

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 constituency is, very different kinds of strategies are required.

This approach has very important implications for groups working towards environmental sustainability. If, for instance, the general public is still at the "Dawning Awareness" or "Greater Urgency" stage (which is likely the case), it is unlikely that they will respond to serious proposals calling for real sacrifices. What is needed instead is much greater opportunities for people to explore the issue and begin to understand its implications.

What We Can Learn From Survey Research

A number of organizations have done survey research on the attitude of the public about sustainable development. We have summarized some of the key findings below.

* **People like the goals of sustainable development, but can't visualize how to get there.** They can't see how to alter human behavior without heavy government involvement, but don't trust government to make intelligent choices for them.

*   **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.

*   **People want incremental change, and they want choices in how they respond.** They are not willing to make large sacrifices without some immediate benefit, and they want incentives that allow them to make some choice in how they respond. They do not trust government to make intelligent choices for them.

(Sources of information: "Sustaining the American Dream or a Pipe Dream?" A qualitative research report prepared for WRI by Mac Williams, Cosgrove, Snider, Smith, & Robinson, July 1995; "Public Opinion Polls: A Review of Existing Survey Data Regarding American's View on Environmental Issues", compiled for the Communications Consortium Media Center by Belden and Russonello, April 1995; "Findings from Focus Groups in Kansas City and Pittsburgh and a National Survey of 1,000 Voters," by Lake Research for the Surface Transportation Policy Project, August 3, 1995.)

These survey findings suggest some general strategies for any group working on sustainable development:

*   **Share examples.** Show people examples of communities that are successfully moving towards sustainable development.

*   **Give people information they can trust.** Avoid using information designed to frighten or shock people into action. Best of all, engage people in the community in the collection and analysis of their own information. Ground your work in thorough research and disciplined inquiry. Don't rely just on anecdotes. Use experts who have standing and respect in your community.

*   **Promote sustainable development from a community-oriented standpoint, exposing people to peers and neighbors working for a common goal.** Keep the focus on local initiatives that connect people to others in their community. Avoid too much emphasis on "far away" problems.

*   **Work on problems people can see.** This may first involve making the problem visible through local collection and mapping of information.

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

Conclusion

Achieving sustainable communities will require that we build the capacity for rapid and powerful learning in our social institutions. Modern learning theory suggests that the conditions under which powerful learning is most likely to take place mirror the characteristics of healthy natural ecologies -- open, emergent, self-organized, messy, webbed, and coevolving. To the extent that our attempts to influence public behavior in the direction of sustainable action are based on traditional concepts of teaching and knowledge transmission, they are unlikely to be effective. Instead, we should support our work toward sustainable communities with learning process that work with, not against, our natural capacities for creating new knowledge.

III. The Central Role of Urban Regions

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Sustainable development needs compact urban centers.

When people think about sustainable development, it is rarely the image of the crowded inner city that comes to mind. More likely people envision rural settings, rolling hills, and moderate or low density housing. Contrary to intuition, however, compact urban regions likely provide better opportunities for healthy ecological systems than suburban development and "ruburbs," or rural density housing. It is likely that they use fewer natural resources, are better able to produce wastes that can be used, and allow for more natural bio-diversity. In addition, they provide better opportunities for keeping people connected to the economy, and for interactions among diverse people.

This section of this resource book describes some of these environmental advantages of urban centers. (For more detail, see "Phase One Background Paper, Compact Cities: An Environmental, Economic and Social Winner," May 3, 1995.)

Cities are where most people live and where the largest problems are rooted.

In 1990, 77.5% of the population lived in urban centers. These metropolitan areas consume most of the earth's resources. They are the main consumers of forest products. They require vast quantities of water, and the produce most of the world's wastes. Thus, if we want to change behavior on a scale that matters, we have to change the behavior of people living in urban centers.

Cities are also where most of the existing industrial capacity is located. For sustainability to become a reality, the most radical behavior changes will have to occur in the management of these firms. These firms also hold the resource and system capacity to address our most difficult sustainability challenges.

Urban centers are also where pollution is most concentrated. This provides an advantage in that the need is obvious, and the effects of amelioration are felt immediately.

More efficient resource use.

Seventy percent of materials used in the US economy are for construction. The material use in urban centers is more efficient that in sprawl development because fewer roads, sewers, power lines, etc are required on a per capita basis.

Easier to reuse and recycle.

The compact nature of urban living makes recycling of consumer wastes easier to do than in

more sparsely populated areas. In addition, it allows for easier exchange of industrial wastes between firms. Increasingly, the materials of the earth are being moved out of the earth's crust and are being stored in man-made structures. Most of these structures are in urban centers. These material deposits are looked up by many as the "mines" of the future.

Energy efficiency.

There is some evidence that compact urban areas may use less energy per capita for heating, cooling and transportation. Centralization tends to reduce reliance on transportation because of the closer proximity of producers and consumers.

Surprising biodiversity.

At least in agricultural regions, urban areas may preserve the best remnants of biodiversity. In many cases, the monoculture of agriculture has removed most complex habitats. Thus some of the best uncultivated land is close to urban centers.

Dense connections and opportunities for rapid learning.

Because of their compact nature, cities offer enormous opportunities for interaction and learning between individuals and organizations.

Forces us to deal with issues of race and class.

The sustainability dialogue has been mostly a white, upper middle class dialogue, with few connections to urban, non-white and low-income populations. Looking at sustainability in urban centers forces us to deal directly with the tensions between the capacity to plan for the long-term future and the need to deal equitably with the survival needs of today.

For all these reasons, it seems to us that it urban, not rural, environments should be the focus of discussions on sustainable development.

IV. Creating a Common Language About Sustainability

IV. Creating a Common Language About Sustainability

Why bother with a framework? Don't we all know what sustainability is? Let's just get on with DOING it!

When people talk about sustainability, they generally mean the "chance to continue." This is often combined with the idea of using resources in ways that do not interfere with the opportunities of future generations. Beyond this, there is little agreement and a great deal of ambiguity. People are frequently more able to point to the kinds of strategies that they feel contribute to sustainability than to say what it is.

When tools and strategies are the initial focus of efforts to seed fundamental change, people tend to end up in the same place as they started, with little or no fundamental change. Practice needs theory and theory needs practice. This is why we decided to start our exploration of sustainability with some principles rather than projects and tools. We wanted to experiment with actions in the context of a framework.

> **Perspectives on Theory and Practice**
>
> *"Practice without theory is no basis for improvement."*
> Edwards Deming, Quality Guru
>
> *"Theory without practice is mental masturbation."*
> Kioshi Suzaki, Business Consultant

Frameworks are maps of information whose layout is guided by theory. Frameworks shape our perception of reality. They reveal one body of information in the world and suppress others. Changing a framework changes what you think is possible, and what resources you can see to make it happen. (See John D. Morecroft and John Sterman, Editors, Modeling for Learning Organizations, Productivity Press, 1994.)

Creating a shared framework turned out to be a much more frustrating process than we anticipated. We wanted to just "get on with it and do something," but found that we didn't in fact have a coherent theory to explain what we would be doing. There are hundreds of things we *could* do to support sustainability, of course, but how do they connect together? How do we choose among them? How do we know if they are working? How do we know that we are not just reducing the pain of non-sustainable paths rather than creating truly sustainable ones? To answer these questions, we found that we had to explore a number of broader issues:

*   Why are we unsatisfied with current approaches to sustainability?

*   What is our definition of sustainability?

*   What are some principles that should guide sustainability efforts?

*   What are the characteristics of sustainable communities?

What we share in this section is the result of our dialogue on principles and framework. We hope that this will accelerate your process, and let you get to "just doing it" faster than we did! **We have provided some suggestions for exercises at the end of this Section to help you explore build your framework in a group.**

Some Shortcomings of the Current Approach to Sustainability.

Here is what we found dissatisfying about the current sustainability frameworks:

*   **The links to action are fuzzy.** A wide variety of projects are described as "sustainable development" regardless of whether they lead to sustainable behavior. In fact, some projects make unsustainable activities more tolerable in the short run and therefore delay consideration of more effective actions.

*   **People are considered "unnatural."** Sustainability efforts tend to focus on the preservation of "pristine" areas (although there are technically no such areas left). This tends to position human beings as "unnatural" creatures. There has been very little analysis of sustainable paths for a modern industrial economy where people have a central place. People are part of nature, not outside of it. Sustainability must seek ways for people to live with the rest of the environment rather than apart from it.

*   **The focus is on the parts, not the whole system.** Work on sustainability tends to fall into "disciplinary silos." (See Ernest Lowe, "Discovering Industrial Ecology: An Overview and Strategies for Implementation," discussion draft, Change Management Center, Oakland CA.) We focus on individual habitats, firms, buildings, industries or locations, without an understanding of the systems within which these parts function, and how these systems are complexly linked to each other.

*   **The focus is on marginal fixes, not fundamental changes in assumptions.** Values and beliefs are what our policies and laws are based on. If we want large policy changes, we need to change our assumptions about our relationship to the natural world. Our current behavior is rational, given the set of assumptions that we are working from.

*   **They assume "one size fits all."** Many approaches to sustainability ignore the fact that what is sustainable depends on *where and when*. Different places have different ecologies and economic capacities. Therefore different places require different approaches to improve their environmental performance.

*   **They are based on a static, not dynamic definition of sustainability.** Finally,

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.

Our Definition of Sustainability.

There is no shortage of opinions on the definition for sustainability, and subtle differences can have major consequences in how efforts are prioritized and investments are made. Even in the small group that led to this paper, there was no absolute agreement. We did, however, come to some consensus around the following definition of sustainability:

WHAT DOES SUSTAINABILITY MEAN?

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

The meaning of this definition is expanded below:

As part   People are part of nature, not outside of it. Sustainability must seek ways for people to live with the rest of the environment rather than apart from it. Many sustainability efforts focus on the preservation of "pristine" areas. There must be more analysis of sustainability paths for the places where most people live -- modern urban centers.

Being a part of a larger system also means we are located at a unique time in a unique space. Any sustainability strategy that ignores the fact that what is sustainable depends on "where and when" misses an essential point. Different places have different ecological and economic capacities and require different approaches to improve their environmental performance. In short, region is important.

of a living   Sustainability is not really about staying in limits. Systems -- ecological or economic -- are dynamic. We cannot simply define thresholds for consumption and try to stay below them. The natural variation within ecosystems will not

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, <u>Discovering Industrial Ecology</u>) 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 with the achievement of some kind of equilibrium -- a point of balance and stability. But evolution does not seek equilibrium. Instead, it seeks to continuously create new things of higher and higher complexity. In this context, *sustainability means maintaining the dynamic potential for further evolution.* Living systems survive by maintaining a condition of *dynamic equilibrium* with the environment through constant change and adaptation. In the game of evolution, equilibrium is death. Thus sustainability means striving for the dynamic conditions that are normal for human and

> ***"Grow or die."***
>
> 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, and we want it to be easy for new firms to be formed and existing ones to evolve. Rather than stopping change, we want to maintain the potential for the right kinds of change.

* **Sustainability involves coevolution -- creating opportunities for other species to "stay in the game" also.**

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. This means listening and learning closely -- honing our capacity to perceive what is happening in the systems of which we are a part, and to understand how we are affecting them.

> "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

Evolution doesn't happen in isolation. Evolution of any species is inseparable from the evolution of other parts of its environment. All of the parts of the system adapt to each other to get their needs met. (The evolutionary biologist Stuart Kauffman uses the image of a "rubber fitness landscape," where every step you take, and every step another species takes, changes the contour of the landscape. Instead of cooperating and competing in a fixed environment, we are evolving in a rubbery, undulating context.) This is the concept of *coevolution*, where organisms or systems are simultaneously shaping and being shaped by parts of their environment.

* **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. Abraham Maslow suggests that human needs form a "hierarchy," ranging from physical survival and safety to self-actualization. Gratifying lower levels (e.g. ensuring safety from harm) creates less resistance to focus on higher levels (e.g. self-actualization).

Work on sustainability needs to be done in this context of the full range of human needs, not just the needs for physical survival. This broader focus is the natural outgrowth of the connection between sustainability and human learning. Learning cannot happen if our higher needs are not met. Thus building the "adaptive capacity" of human beings requires worrying about more than just our physical survival.

*   **Sustainability is based on a sense of place.**

Roger Bolton, professor of economics at Williams College, suggests that a sense of place is: *"...a combination of characteristics that increase people's attachment to a place and influence their behavior in labor markets, retail markets, migration, political decision-making and non-profit activity."* ("An Interpretation of a "Sense of Place," Research Paper No. 130, Roger Bolton, Department of Economics, Williams College, January, 1989.) A sense of place arises from cooperation and community spirit and feelings of trust, reciprocal obligation and loyalty to other members of the community. It is shaped by a *particular geographic setting*, including natural and built environments, culture and past history. A sense of place is organized around sets of social relationships -- it is an asset created by repeated transactions among people in a particular setting.

A sense of place is important to the sustainability movement because it is this connection to a location that allows people to make the sacrifices necessary to radically change their patterns of consumption and production. Thus sustainability efforts ultimately happen in the context of a *community*.

The existence of a sense of place causes a web of reciprocal obligations. This "social capital" has important implications for the capacity of a community to engaged in shared learning that allows it to detect changes in its environment, come to a

Maslow's Hierarchy of Human Needs

Self-Actualization
Self-Esteem
Love
Belongingness
Safety
Physiological

31
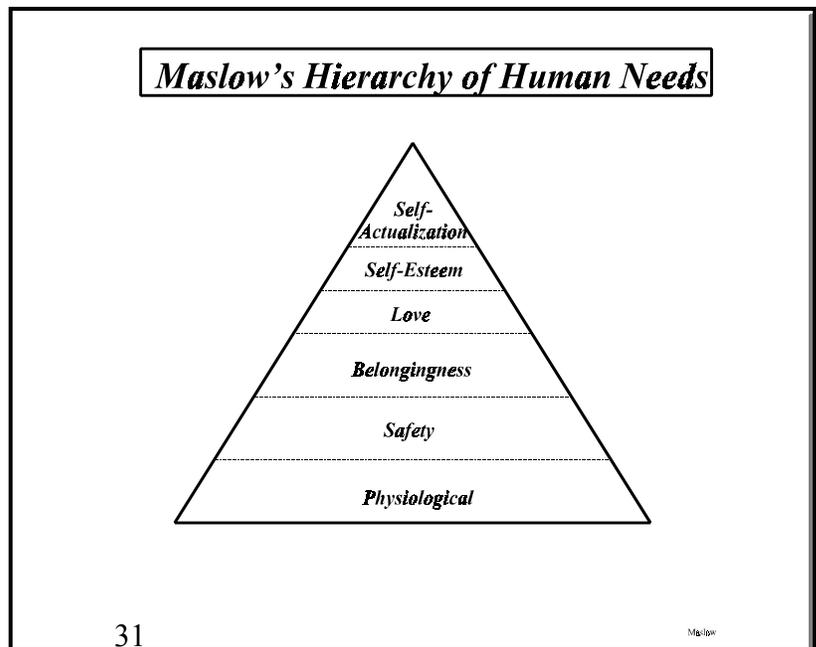
shared interpretation of them, and act in a coordinated manner. (The sociologist Robert Putman has documented the importance of these informal association in the wealth creation and economic development processes.)

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.

Minimum Conditions for Sustainability.

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.*

Defining the Characteristics of Sustainable Communities.

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.

CHARACTERISTICS OF SUSTAINABLE COMMUNITIES

	Characteristic	What It Means	What To Look For In Your Community
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.

5)	Learns as a Community	Has feedback loops that allow it to self-regulate -- i.e. the consequences of actions that are not in the interest of the community or its environment spread through the network and return to the source so that it can make adjustments. It has some common values about desired community and environmental conditions.	There are social structures that allow for collec issues; some common community values; share "health" of the community and its natural envir community indicators; processes for acting on t

Some Exercises for Exploring Your Definition of Sustainability

1) *Affinity Diagram of Definitions*

   * Have each person write down on Post-It Notes the words they associate with the term "sustainability." (About 5 minutes.)

   * Randomly post them on large sheets of paper on the wall.

   * Have the group silently sort them into like groupings. (10 minutes.)

   * Name the groupings. (10 minutes.)

   * Discuss the connections between the groupings. (10 minutes.)

   * Assign one or two people to write a definition and bring it back to the next meeting.

2) *Sharing Personal Experiences*

   * Have each participant write down an experience they have had that helped form their thinking about sustainability. They should describe what it was, where and when it happened, and how it affected them. (5 minutes.)

   * If it is a large group (such as a community meeting) break the participants into small groups and let them share their experiences. (15 minutes.)

* 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) *Go See It.*

   * 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.

   * Repeat the process, but visit a human environment instead.

   * Compare the differences between sustainability in both environments.

   * Discuss the differences and similarities between the behaviors of human beings and plants and animals.

   * Develop a definition of sustainability for human environments.

V. Measuring and Assessing Sustainability

V. Measuring and Assessing 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 quality of the systems is often fuzzy; data is hard to develop; and there are no clear standards for what constitutes "quality" in the systems. If you have participants in your network who have experience with organizational continuous improvement (Total Quality Management, Kaizen, Reengineering, etc.) you will find it valuable to use their knowledge about problem-solving processes, measurement and visual controls in your efforts to measure and assess sustainability in your region.

Defining Your Region.

Regional approaches to sustainability make sense for a number of reasons:

*   **Locally unique characteristics.** Each region is different. From an ecological perspective, each region has its own attainable qualities driven by its physical environment. Each region also has its own unique mix of economic activity. These local characteristics need to be understood in order to fashion solutions to human and environmental problems.

*   **Dense connections and flows.** Regions have dense interconnections that need to be understood. These can best be understood at a regional level. A full watershed, for instance, may need to be understood to grasp the dynamics of a particular wetland. And regional agglomerations of firms and markets often have as much to do with the dynamics of economic activity as the intentions of individual business owners.

* **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.

Identifying the Key Systems.

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.

Some Ideas on "Mapping" Systems.

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.* If at all possible, check with local university resources or other sources of technical expertise to explore the possibility of simulation models that can show community members the possible future implications of current trends. These can be powerful tools for changing perceptions and catalyzing action. (The MacArthur Foundation's Sustainable Everglades Initiative is working with the University of Florida to develop simulation models of water flow and land use in the Everglades, using fairly simple and inexpensive technology.)

* *Keep it simple.* A good map doesn't have to be any more complicated than a piece of flip chart paper with the outlines of your region and picture of the key systems that are most threatened by unsustainable practices. A simple technique to use it to color code the systems red, yellow or green, depending on how threatened they are.

Creating a "Scoreboard" of Community Sustainability.

If we want to achieve a change in our natural and human systems, we have to have ways to measure it. Public measurements can be used to define how sustainable our current practices are, and reveal opportunities for action that move our communities toward a sustainable future. Indicators organize for us the information that we use to change our behavior. They substitute organized data for the myriad of impressionistic and anecdotal information we otherwise use to come to conclusions about how to act.

A public sustainability scoreboard can help you:

*   Measure progress towards goals, or slippage away from them;

*   Provide information about the conditions of your systems to residents;

*   Suggest what it is possible to do;

*   Build a sense of place;

*   Help accelerate the learning process.

Here are some general principles for developing indicators of sustainability in your region:

*   **Start with what people care about the most.** Instead of worrying about a comprehensive indicators system, begin with things that are highly visible to people in your region (e.g. salmon populations; bad air days; wild bird populations; open space, etc.).

*   **Make it visual and visible.** Craft the indicator into a "scoreboard" or "dashboard" format, to that it is very easy to understand it. Avoid the use of complicated raw data.

*   **Keep it simple.** Don't use too many indicators or they will lose their meaning.

*   **Make it easy to judge the status of the indicators.** Consider using simple symbols (e.g. "grades" or simple coloring systems such

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

U   *It can work.*

U   *The media love report cards as long as the story is fairly simple, and controversial.*

U   *The framework is more important than the indicators. Indicators can be refined over time if the framework is right.*

U   *Numbers can make intangible values more real.*

U   *Grades evoke a visceral response.*

U   *Environmental measures tend to be among the most difficult to obtain and develop.*

U   *Don't underestimate the ability of people to be confused. Be very clear about your purpose.*

Source: Robert Friedman, CfED Chairman of the Board

as red=system near collapse, yellow=system in danger, green=sustainable system) that allow users to understand where you are in your progress, even if they don't understand the data.

* **There are no "right" indicators.** You will need to tailor your indicators to your community and region. (We have provided a list of the kinds of indicators we have come across to demonstrate the wide variety in use.)

* **Use public processes to develop the list of key indicators.**   The dialogue about the indicators can be a very powerful learning tool for a community. This is part of the community learning process. If citizens have not had an opportunity to participate, they will not "own" the indicators, and therefore will not act in response to them.

* **Make sure that the people who have the capacity to change an indicator are involved in their development.** Avoid creating indicators designed to get others to act, without them being involved in the process. If you seek changes in the business community, for instance, involve them in the process. If farmers need to change their practices, have them participate in the indicators that the will peg their behavior to.

* **Encourage a wide variety of "scoreboards" on a variety of scales.** Don't worry too much about "alignment" of indicators. If you have 10 communities in your region, encourage each to develop its own scoreboard, and then have them compare with each other. Encourage scoreboards at the neighborhood level, or at the level of a stretch of river, a single lake, etc. The more the better!

> ### Seattle's "Instrument Panel"
>
> *In Seattle, several hundred citizens took five years to develop 40 "indicators of sustainability." Their first report was published in January of this year. Sponsored by a volunteer organization called Sustainable Seattle, the process involved 6 months of work just to define the word "sustainable."*
>
> *The indicators cover both human and natural systems, ranging from salmon populations to children in poverty and the cost of health care. Eight of the forty indicators show improvement; 18 show no discernable trend; fourteen show declining sustainability.*
>
> Source: The Systems Thinker, Vol. 7, No. 1, February, 1996

* **Involve the community in the collection of the data.** Consider using "citizen monitors" to collect and track some of the data for your indicators. These are trained citizens who monitor actual environmental conditions (water flow, water pollution, air pollution, species migration, etc.). For every citizen involved, you gain a large number of advocates.

* **Agree on desired directions and targets for each indicator.** Use benchmarking processes with other communities or ecosystems to decide what is a desirable target value for each indicator. Particularly if it is something that another community has achieved, it

44

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.

Indicators of Sustainability.

The table on the following pages summarizes the wide variety of community sustainability indicators that can, or are being used. These are provided as an "ingredients list" for the development of your own scoreboards.

COMMUNITY SUSTAINABILITY INDICATORS		
System/Feature	*Measure*	*Source* (See end of Table for Key)
ECOLOGY: Environmental Quality	*Number of days per year that air quality standards are met.	MM, JF, OPB
	Number of days that air quality is good.	SS
	*Percentage of river miles and lake acres that meet fishable and swimmable and other standards (metals, dissolved oxygen, etc.)	MM, CfED, JF
	Percent of area where groundwater is used that has been assessed over the past 10 years and found to not meet drinking water standards.	OPB
	Percent of residents with drinking water that doesn't meet standards.	
	Percent of monitored wells showing ground water contamination.	MM
	*Soil erosion per acre of cropland.	MM, SS, WRI
	Toxic chemical released or transferred (millions of lbs per year).	MM
	Quantity of hazardous waste generated. (Mill pounds/yr)	MM, CfED
	Number of Superfund sites identified and cleaned up	MM, CfED
	Number of hazardous waste sites identified and cleaned up	
	Water Quality: The condition of oysters in Willapa Bay	WA
	Fecal coliform counts	WA
	Episodes of Flooding	
ECOLOGY: Environment Supports Diverse Plant and Animal Life	Diversity of song birds	MM
	Waterfowl count	WA, Puget
	*Number of threatened, endangered or special-concern native wildlife and plant species	MM, OPB

	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
	Percentage of agricultural land in 1970 still preserved for agricultural use	OPB, NS
	*Percentage of forest land in 1970 still preserved for forest use	MM(acres of forest land), OPB, NS
	Percentage of wetlands in 1990 still preserved as wetlands	OPB, ns
	Changes in vegetation cover (ex. forests age classes)	WA
	Acres of natural and restored wetlands (in millions)	MM, SS
	*Land area in parks and wildlife refuges (mill of acres)	MM, OPB, JF
	Miles of recreational trails (in thousands)	MM
	Number of public access sites on lakes and rivers	MM
	Percentage of total land within the areas which if open space	OPB, York
ECOLOGY: A Preserved Stock of Natural Capital and Environmental Capacity	Harvested timber in relation to standing stock	WA, OPB
	River miles not in compliance with water quality standards and therefore unable to accommodate additional development	OPB
	Areas not in compliance with air quality standards and therefore unable to accommodate additional development	OPB
ECOLOGY: Environmental Stewardship	Average annual energy use per person (m BTU/person)	MM, WA
	Renewable and nonrenewable energy use per person	SS, Puget
	Highway litter (bags collected per mile)	MM
	Total water use and per capita	MM, Puget, SS

47

	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	Per capita gross state product as a percentage of U.S. per capita GNP	MM
	Short term and long term net employment growth	CfED, JF
	Hours of paid work at the average wage required to support basic needs	SS
	Buying income per capita	JF
ECONOMY: A Vital Business Sector	Traded sector strength	CfED
	Business closings	CfED

	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

	Financial resources (Commercial and industrial loans, venture capital investments, Microenterprise capital	CfED, OPB
	SBIC financing	CfED
	*Low energy costs (energy bills as a percentage of the national average	OPB, CfED, JF
COMMUNITY: Children not in Poverty	*Percentage of children living in households below the poverty line	MM, WA, SS, OPB
	Percentage of parents who receive full payment of awarded child support	MM
COMMUNITY: Children Coming to School Ready to Learn	Percentage of sixth graders watching TV or videos more than 40 hours per week	MM
	Percentage of parents satisfied with their child care arrangements	MM, OPB(number of slots available)
	Percentage of children who have healthy diets	MM
	Abused or neglected children under 18 (per 1000 children)	MM, OPB
	Substance exposed newborns per 1000 live births	JF
COMMUNITY: Stable Families	*Teen pregnancy rate (per 1000 girls 10 to 17)	MM, CfED, OPB, JF
	Runaways (per 1,000 children)	MM
	Percentage of 12th-grade students who have ever attempted suicide	MM
	Apprehensions of children (per 1000 children)	MM
	Percentage of children who use alcohol or illegal drugs at least monthly (12th graders)	MM
	Rates of divorces involving children	MM
	Percentage of students who move more than once a year	MM
	Percentage of two-parent families	Friedman
COMMUNITY: Strong Basic Academic Skills	Percent of 9th graders who complete high school	Puget
	Percentage of eleventh grade students who achieve established skill levels	OPB

	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
	Packs of cigarettes sold per capita	JF
	Incidence of substance abuse	WA
	Hunger rates	
	Student fitness test scores	JF
	Life expectancy (in years)	MM
	Years of potential life lost (rate per 1000 population)	OPB

	Suicide rates	WA, York
	Rate of heart disease	CfED, JF
	Cancer rates	CfED, JF
	Infectious disease rates	CfED
	Per capita health expenditures	
COMMUNITY: A Reasonable Standard of Living and Assets With Which to Invest In Themselves	Median family income or per capita income as a percentage of U.S.	MM, WA, OPB
	Average annual pay and pay growth	CfED
	*Percentage of population living in households with incomes at least 150 and 200 percent of the poverty line	MM, CfED, OPB (150%)
	Percentage of population living in households with below the poverty line	Puget
	Percentage of public officials who are female	MM, York
	Number of discrimination complaints filed	MM
	Segregation by race at public schools	OPB
	Percentage of people who say they have been discriminated in the past year	MM
	Employment discrimination complaints filed with agencies	JF
	Local business ownership	
	Minority and women business ownership	
	Percent of public facilities that are accessible to people with disabilities	MM
	Percent of students accepted to higher education who cannot afford to go	Tufts
	Percent of people of color vs whites of the same economic status who received home mortgage loans	Tufts

	*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

53

	Percentage of residents who use public libraries	MM, York
	Community center usage rates	SS
	Participation in the arts	SS
COMMUNITY: A Diverse Citizenry	Changes in the share of people in the 25-44 year old age group	WA
	Changes in the out migration of the 18-25 year old age group	WA
	Changes in the share of people over 65 years old	WA
	In-migration and out-migration	WA
	Distribution across sex, age, race and ethnicity	
	Occupational segregation	
	Geographical segregation	
COMMUNITY: Choices	Per capita sports, leisure, clubs museums, etc	York
	Mix of building ages and styles	York
COMMUNITY: People who Need Help Receive It	Number of people using homeless shelters	MM
	Percent of recipients of AFDC on assistance more than 24 consecutive months	MM
	Percentage of unemployed people remaining unemployed more than 26 weeks (5 year average)	MM, CfED
	Quality of life for people with long-term limitations	MM
	Ratio of money spent on drug and alcohol prevention and treatment to money spent on incarceration for drug and alcohol related crimes	SS
COMMUNITY: Broad Access to High Quality Education and Culture	Student/teacher ratios	York
	Number of school districts with a 12th grade dropout rate over 10 percent	MM
	Average public-school teacher salary	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.

MM = Minnesota Milestones, 1993 Progress Report
CfED = Corporation for Enterprise Development, The 1995 Development Report Card
WP = Willapa Alliance, Willapa Indicators for a Sustainable Community
SS = The Sustainable Seattle, Indicators of Sustainable Community, June, 1993
OPB = Oregon Progress Board, Oregon Benchmarks, December 1994
WRI = Developing Indicators of Sustainable Development, From Issues and Ideas, August 1991
York = York University, Institute for Social Research, Modeling Quality of Life Indicators in Canada, October, 1992
Tufts = Elizabeth Kline, The Consortium for Regional Sustainability, Tufts University, 1992
Puget = A Sustainable Community Roundtable Report on Progress Towards A Sustainable Society in Puget Sound, 1993
Friedman = Suggestions from Bob Friedman

VI. Taking Action

VI. Taking Action

Because so much of our current behavior is non-sustainable, the range of potential actions is enormous. You should spend some careful time assessing the conditions of your physical, biological and human systems to determine where the best opportunities for leverage and change are. (See Section V -- "Measuring and Assessing.") It is less important that you "get it right" than that you "get going" on something people care about, in a way that is consistent with your operating principles and your definition of sustainability.

What we have provided here is a taxonomy of emerging sustainability practices. We hope that you will be able to use this as a "menu" of opportunities to stimulate your thinking. These are summarized in the attached tables. The broad categories of action are described below.

ECONOMY -- Supporting Sustainable Wealth Creation:
Supporting ways for people to create wealth without harming natural systems or human beings.

ECOLOGY -- Protecting Natural Systems:
Protecting, preserving and restoring the adaptive capacity of natural ecosystems.

COMMUNITY -- Building Civic Capacity:
Creating opportunities and capacity for citizens to participate in the shaping of their future.

Creating an Integrated Approach.

There are many individual examples of creative work on sustainability around the country. What is usually missing is an *integration* of efforts in all three areas -- understanding and connecting together the workings of the economy, the protection of ecology, and the nurturing of social fabric in communities. The integration is important, because **success in each area is contingent on success in the other areas.** A strong economy depends on both an available natural resource

base, and a strong community; it is impossible to preserve the natural ecology without changing basic production patterns in the economy; and you can't come to consensus on ecological protection and economic restructuring if you don't have a healthy social infrastructure. Communities that are developing sustainability strategies need to simultaneously:

* Create extensive **experimentation** in multiple arenas; and

* **Connect** the experiments together so that the whole is greater than the sum of the parts.

Not surprisingly, of course, this kind of strategy mirrors the trial and error process of natural learning, where random, unpredictable and often opportunistic engagements with the world are iterated against an evolving "mental model" of how things work.

Creating Cross-Disciplinary Dialogue and Expertise.

Creating an integrated strategy requires developing a common language so people with many different kinds of backgrounds can understand each other. This is why the development of a common set of principles about sustainability is so important. (This was the essential genius and power of the Natural Step process in Sweden.) Individuals whose competence lies in one of these spheres of action often have little understanding of the basic dynamics of the other spheres. For instance, environmentalists and ecologists who have deep knowledge of the working of the natural ecology are often unfamiliar with the dynamics of running a business in a competitive market. They don't understand the languages of product development, strategic planning, market positioning, quality management, and other domains of expertise that business leaders live in and take for granted. On the other hand, business leaders often know little about the actual dynamics of natural systems, and find the language of the ecologists confusing and intimidating. Likewise, individuals who work in community development often understand neither the logic of the business world, nor the workings of the ecology. In turn, they would argue that neither environmentalists nor business leaders have much appreciation for the problems of poverty, racism, and neighborhood disintegration that they struggle with on a daily basis.

Thus, while we may all live in the same geographic community, and may ultimately all depend for our continued survival on the same natural systems, we live in very different "communities of practice" and bring very different kinds of "mental models," language and values to the business of building sustainable communities. A major challenge then, is to establish enough cross-disciplinary understanding and common language to begin to talk and act together. One of the valuable "natural resources" that a community needs to look for, leverage and develop is those individuals who have the capacity to "talk across the disciplines." A cross-disciplinary group of community leaders who can model for the community the process of understanding each others practice environments can have an enormous impact on the credibility of integrated sustainability strategies.

The table below displays a sampling of the different kinds of skills you will want to assemble for

your community sustainability efforts.

A SAMPLE OF "SKILLS FOR SUSTAINABILITY"

ECOLOGY	*ECONOMY*	*COMMUNITY*
* Resource management * Hydrology * Ecological restoration * Pollution analysis * Mapping * Geology * Endangered species management * Habitat protection * Forestry * Land use planning	* Market research * Strategic planning * Product development * Process improvement * Quality systems * Engineering * Sales and marketing * Financial management * Distribution * Site location * Business attraction * Enterprise development * Taxation * Workforce development	* Community organizing * Housing development * Asset mapping * Crime prevention * School reform * Healthcare * Zoning * Public infrastructure * Growth management * Civic dialogue

Understanding the Spheres of Action and Their Relationships to Each Other.

As a way of helping sort out the "blizzard" of possible strategies, we have created a framework for looking at how these three spheres interact. The basic outlines of this framework are represented in the attached graphic and described below.

The Notion of "Capital" and "Living off of Interest, Not Principal."

One way of thinking about sustainablility in each of these spheres is embedded in the idea of capital or asset formation. This use of the term capital connects most closely to the following Webster's definition:

> **capital:** *wealth, in whatever form, used or capable of being used to produce more wealth.*

Using this metaphor, one can think of different kinds of capital or assets in each of the three spheres:

Economy:

*   *Financial capital (cash, stocks, credit, etc.)*
*   *Physical capital (buildings, machinery, etc.)*
*   *Intellectual capital (patents, worker knowledge, etc.)*

Ecology:

*   *Natural capital (air, water, forests, soil, minerals, animal stocks, etc.)*

Community:

*   *Human capital (individual knowledge, skills, desires, insights, etc.)*
*   *Social capital (voluntary associations, trust, social norms, networks of civil engagement, etc.)*

From this perspective, sustainability is the act of living off of interest or dividends, while increasing, not depleting, your capital base.

Some Cautions With This Metaphor.

The utility of this metaphor is that it connects sustainability to a language that many people in the community already find familiar, and it easily highlights the long-term stupidity of many of our practices. (No successful business person would sanction the "eating your seed corn" strategy that is reflected in our rapid depletion of natural capital if it were their own business.)

The danger of this metaphor is that it can encourage extreme forms of "instrumentalist" thinking, leading us to value human beings and other living things not for their inherent value, but for their utility in creating various forms of "wealth." As with any good tool, be careful that you don't use it for the wrong things.

1)   *ECONOMY --Supporting Sustainable Wealth Creation.*

The creation of material wealth almost always involves the conversion of natural resources into artifacts that are useful to and valued by human beings. This is what the business world calls "value creation."   The economy extracts resources from the natural ecology, and transforms them into products that are consumed by people. It affects the natural ecology by returning unused wastes to it, and in many cases reshaping it (e.g. dams, roads, canals, etc.). The wealth creation process depends on the availability of social and human "capital" -- individuals with the desire, skills and resources to create new things, and both physical and social infrastructure that connect people together (communications, transportation, protection of private property, regulations, etc.).

Any approach to sustainability therefore requires substantial changes in the wealth creation process. Most of these strategies involve *changing market incentives* or *introducing new information* into market systems. Some typical strategies include:

* **Encouraging voluntary changes in the behavior of existing firms.** There are a number of strategies that communities are experimenting with to stimulate production practices that reduce resource draws on the economy, reduce that amount of waste production, and increase the ease of recycling of products. These include:

    -- *Pollution prevention and reduction* -- strategies that reduce the amount of non-biodegradable waste that is a by-product of the production process.

    -- *Designing for the Environment (DFE)* -- integrating waste reduction considerations into the product development and design process (similar to Design for Manufacturing or DFM strategies). These strategies look at the impact of the production process, packaging, transportation, product life span, recyclability and disposal requirements on the air, water, soils, oceans, atmosphere, and natural resource consumption.

> ### *Cleveland Advanced Manufacturing Program*
>
> *CAMP provides technical assistance to small and medium sized companies to help them comply with environmental regulations. They emphasize that environmental compliance is just plain good business practices. All pollution is waste, and world class manufacturing practices focus on the elimination of all waste in the production process. CAMP is particularly focused on reducing the use of chlorine compounds in the Great Lakes Region.*

These kinds of changes in firm behavior are often accelerated by *shared learning among firms*. This can involve the development of networks of firms that share best practice with each other and learn by visiting each other's facilities. Other methods of stimulating firm behavior includes direct business assistance using private

> ### *Ecotrust*
>
> *Ecotrust is a non-profit development organization focused on conservation-based development in the temperate rain forests of the Northwest, particularly the Willapa Bay region. Ecotrust supports business development that creates wealth without reducing the regenerative capacity of the ecosystem, including furniture produced from sustainably harvested hardwoods, oyster production using integrated pest management, and ecotourism opportunities.*

consultants; the development of business assistance centers; focused business loans, and developing training programs for businesses.

*   **Encouraging new "sustainable" business formation.** Many communities are encouraging the formation and development of new businesses that are "environment-friendly." These include:

--   Companies that produce products that reduce pollution; reduce waste; or accelerate recycling;

--   Companies that produce products with environmentally-friendly production processes and materials use; and

--   Companies that make money by exposing people to the natural environment in ways that do not damage it ("eco-tourism").

From Dry Cleaning to Wet Cleaning

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.

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*   **Creating new markets and incentives.** Markets have proven to be powerful tools for leveraging wide-spread behavior changes. The difficulty with most existing markets for environmental resources is that there are too many "externalities" -- costs (e.g. pollution, depletion of productive capacity, etc.) that are not included in the price of the product, therefore leading to skewed market behavior. Sustainability advocates are increasingly looking to the creation of new market mechanisms that reward sustainable business practices. Some examples include:

--   *Creating new materials markets.* These strategies seek to create economically-viable connections between waste produced in one sector of the economy and raw materials inputs in another sector. The emergence of a healthy recycled paper market (including trading of recycled paper futures on the Chicago Board of Trade) is one example of such a market being created. Other examples exist in the metals, construction, energy (e.g. use of waste heat) and other sectors.

--   *Pollution charges.* This involves

Ventura County Clean Air Fund

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."

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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.

-- *Creation of pollution credit markets.* This involves the setting up of markets within which firms can buy or sell environmental credits for actual or potential quantities of pollution.

> **Location Efficient Mortgages**
>
> *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.*

* **Changing public infrastructure and services.** The public sector has its own "economic activity" that it conducts and controls, mostly in the area of public infrastructure (roads, bridges, housing, utilities, etc.). Many sustainable community efforts focus on these elements of public infrastructure, including:

-- *Transportation strategies.* This involves the redesign of transportation systems to have a minimal impact on the natural ecology and patterns of human development.

> **Surface Transportation Policy Project (STPP)**
>
> *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)   ***ECOLOGY -- Protecting Natural Systems***

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***
>
> *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)   *COMMUNITY -- Building Civic Capacity*

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."

*   **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;

> **A Community Vision for Environmental Education**
>
> *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 students in community sustainability projects; changes in building and maintenance practices and use of schools to create sustainability learning centers.

*   **Community health strategies.** Sustainable communities are physically healthy communities. Increasingly, communities are engaging in community-wide health and wellness strategies designed to improve overall health in the community and reduce specific health risks. While not usually oriented to the perspective of environmental sustainability (much of this action is being driven by new price incentives in the health care market) these efforts provide and excellent complement to other community sustainability strategies and offer the opportunity to explore the impact of environmental deterioration on community health statistics. In this context, changing environmental practices becomes a key community-wide prevention strategy.

VII. Building a Network

VII. Building a Network

What is a "Learning Network"?

Behavior changes when people who share a common vision get together and begin to change their own behavior. A Learning Network is a group of people who have come together to learn and act in ways that support their shared purposes. This section of the Handbook shares some ideas about how to build such networks. One of our colleagues developed the following definition of a Learning Network:

> ### The Purpose of a Learning Network is to:
>
> *   *Facilitate conversations that enable people to invent something new together; and*
>
> *   *Create a space for people to develop new knowledge and for new things to quickly emerge.*

As can be seen from this definition, a Learning Network seeks to develop an environment of *creativity* that generates new knowledge about, and new actions toward the shared purposes of the group.

Clarifying the Purpose of Your Learning Network.

It is important that you spend some time getting clear about what it is that you are trying to accomplish. The Urban Sustainability Learning Group focused its work on three purposes:

*   **Detecting sustainability** -- Being able to recognize "sustainability" when we see it (requiring a common definition);

*   **Interpreting sustainability** -- Being able to think more coherently about sustainability (requiring a common conceptual framework);

*   **Acting on sustainability** -- Organizing to act on it (requiring a "taxonomy" of possible kinds of action to take).

Your network may want to organize around these purposes, or it may want to organize around a completely different set of goals. It is likely however, that you will eventually have to spend

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)   *Agreeing on principles for working together.*

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.

Principles for Working Together:

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.

Identifying What People Care Enough About To Act On.

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:

> *"You can only do your own work."*
>
> 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 **act in incremental ways**, 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. Communities need to generate lots of experimentation, not lots of consensus."* ("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.

Mapping Your Assets.

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.

Expanding the Conversation.

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.

Staying Focused On The Learning Process.

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."*

Building a Learning Network:
## Exercise for Mapping Member Assets

Purpose:

To understand the resources within your network, and what kind of action they are interested in engaging in.

Outcomes:

1) *An asset map for each member.*
2) *A visual list of interests, assets and potential projects for the group.*

Process:

1) **Have each member of the Network take a 10 minutes to fill out the asset mapping form.**

2) **Go around the room and have each member talk about their interests, assets, and potential actions.**

3) **Notes similarities and differences among the group.**

4) **Create a visual "map" for the group as a whole, showing the assets and potential areas of action.**
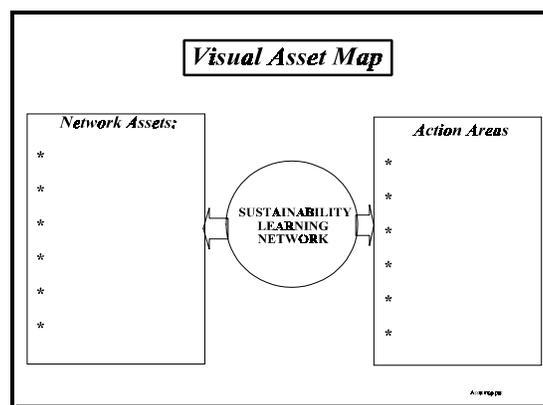
LEARNING NETWORK MEMBER ASSETS

NETWORK MEMBER:

WHAT ASPECTS OF THE NETWORK'S PURPOSE ARE MOST COMPELLING TO ME:	ASSETS I BRING TO THE NETWORK:
L L L L	U U U U

MY PERSONAL ACTION PLAN		
I Can Engage These People...	*On This Issue...*	*With This End Result:*

Setting Priorities

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

System Feature/Indicator	Health Red=danger Yellow=caution Green=healthy			Importance 1=low 2=moderate 3=high	Readiness 1=low 2=moderate 3=high	Total

VIII. Resources