# INTERNATIONAL LONG-TERM ECOLOGICAL RESEARCH NETWORK

ILTER

## STRATEGIC PLAN

## AUGUST 2006

ILTER

International Long Term Ecological Research

## ABOUT THE STRATEGIC PLANNING CONSULTANTS: ENVIRONMENT & ENTERPRISE STRATEGIES

ILTER commissioned **Environment & Enterprise Strategies (EES)** to guide development of its strategic plan. EES helps corporations, governments, non-governmental organizations and foundations develop solutions for combining profitability with environmental and social integrity.

**Holly Kaufman** is the founder and president of Environment & Enterprise Strategies. Ms. Kaufman was a Presidential appointee, representing the United States at United Nations' climate change treaty negotiations for the Departments of State and Defense. She developed and executed diplomatic strategy as Special Advisor to the Assistant Secretary of State for environment and the U.S. Ambassador for sustainable development. She also managed the climate change and national security portfolio for the Office of the Secretary of Defense, and served as the Defense Department's liaison to the President's Council on Sustainable Development.

Ms. Kaufman previously managed the environmental planning and community outreach for multi-million dollar commercial and maritime projects at the Port of Oakland and the fourth largest waste management company in the U.S. She taught ecological land management and sustainable agriculture at the University of California at Berkeley and the California Academy of Sciences. She has led community development projects or conducted research in Asia, Africa, Latin America and the Caribbean. She speaks fluent French and conversational Spanish.

Ms. Kaufman was awarded a Leadership Fellowship at Harvard for her Master's studies in the integration of economic, social and environmental interests. She also holds a Bachelor of Science in Conservation of Natural Resources, with Highest Honors, from the University of California at Berkeley.

**Miranda Anderson** worked with Ms. Kaufman on this project. Ms. Anderson specializes in strategic and operational non-profit management, corporate responsibility, and organizational development. Her career has spanned both the non- and for-profit sectors, holding management positions in such industries as energy and environmental development in emerging markets, international development, and wireless telecommunications. Ms. Anderson provides a range of services to environmental NGO's, Socially Responsible Investment firms, and other organizations. Her work includes: developing long-term strategic and operational plans, building climate change policies and programs, analyzing the social and environmental records of major public corporations, providing strategic and tactical guidance on shareholder climate change campaigns, and analyzing off-balance sheet risks and opportunities in specific sectors, including automobiles, electric power, banking, and insurance.

Ms. Anderson graduated magna cum laude with a B.S. in Psychology from Colorado State University, and earned a M.B.A. from George Washington University, specializing in Environmental Management and Policy, with particular research on multi-sector partnerships, market-based environmental solutions, and organizational policy at the business, NGO, and government levels.

**Contact Information**:
Holly Kaufman
Environment & Enterprise Strategies
390 Arguello Blvd., No. 8
San Francisco, CA USA 94118
Tel: 415.939.9498
holly@EnvironmentStrategies.com
www.EnvironmentStrategies.com

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## LETTER OF ENDORSEMENT

August 22, 2006

We, as the governing body of the ILTER Network, are pleased to endorse the attached 2006-2016 strategic plan. We embarked on a strategic planning process because the ILTER Network is in a major transformation, evolving from being a funded, volunteer association of networks to a self-reliant, formal international organization with a professional staff and new, diverse funding sources. Owing to the fact that the U.S. National Science Foundation will no longer be our major funder, ILTER has to thoroughly change the way it functions in order to support itself.

We are facing challenges in the areas of funding security and organizational stability, apart from scientific advancement. In order to broaden our funding sources and increase our funding level, member networks around the world have to become involved in fundraising. The organization also cannot run on volunteer labor as it has. We have to have an organizational structure in place so that when key individuals leave their posts, ILTER can continue to function smoothly. ILTER also has to now take advantage of the ecosystem and socio-economic data from hundreds of its long-term research sites across the globe to enhance our international research collaborations, be able to synthesize and compare data readily, and produce scientific results.

In the face of such challenges, strategic plans are an effective means of guiding an organization through a transformational phase and planning for the future. The primary objective of the ILTER planning effort is to establish a solid organization that will foster site-based, long-term research around the globe. One of our most crucial strategic imperatives in the coming year prior to the 2007 Annual General Meeting is to establish a legal entity through which the ILTER Network can conduct its activities. This key step will greatly improve our ability to raise funds.

The strategic plan includes two sections: (1) an overview of the context in which ILTER operates; (2) ILTER's strategic plans, which are devised after a careful re-examination of its vision, mission, and goals for the next ten years. The plan prescribes three sets of strategies for ILTER to carry out in order to achieve its goals. These are (1) organizational and fundraising strategies, (2) scientific and programmatic strategies, and (3) communication, education, and public awareness strategies. We approve the vision, mission and goals that we developed over the past year, and the prescribed strategies to achieve them.

We are committed to working together over the coming years to implement this plan and build the ILTER Network into a robust and sustainable organization consistent with the long-term nature of our important work.

The ILTER Coordinating Committee
Ratified, 14 August 2006
Annual General Meeting, Namibia

# EXECUTIVE SUMMARY

The International Long-Term Ecological Researchers Network (ILTER) was formed in 1993 to meet a growing need for communication and collaboration among long-term ecosystem researchers. In 2004, after over a decade of nearly sole financial support from the U.S. National Science Foundation, ILTER began a transition from a volunteer association of networks to become a formal international organization that will have a professional staff and diversified funding sources.

To facilitate this transition, ILTER embarked on a strategic planning process, and this document, together with the accompanying operations plan, is the culmination of that work. Key findings of this strategic plan include:

- **ILTER is a unique organization.**
  Although a number of similar organizations exist, ILTER is the only one that has the following combination of attributes: 1) a global network of research sites in a wide array of ecosystems worldwide that can help understand environmental change across the globe; 2) a focus on long-term, site-based research; and 3) a governance structure and research mandates built on a "bottom-up" rather than "top-down" approach.

- **ILTER is poised to fulfill two needs in the scientific community**.
  First, the scientific community lacks a repository for continuous, long-term ecosystem data. ILTER is in a unique position to fill this need by virtue of the ongoing, site-based monitoring and research that ILTER scientists conduct, and the data archiving and global data access that ILTER provides. Second, ILTER can contribute to solving international ecological and socio-economic problems through question and problem-driven research, and has the unique ability to design collaborative, site-based projects, compare data from a global network of sites and detect global trends.

- **ILTER has significant strengths and opportunities on which to capitalize.**
  ILTER's primary internal strengths and external opportunities are *scientific*. ILTER has a strong foundation of thousands of long-term ecosystem researchers, and by building on the organization's existing network of research sites in thirty-two countries, ILTER will be able to provide integrated, global research to meet scientific and policy needs.

- **ILTER has a number of weaknesses and threats that it will have to manage.**
  ILTER's key internal weaknesses are *structural.* In order to be successful, ILTER has to solve a number of organizational challenges. Additionally, ILTER suffers from a number of external threats that can be summarized as *reputational*. Few prominent scientists are familiar with ILTER, and its sites have rarely been used as a data source for key international science programs.

Based on the above findings, ILTER has developed the following vision, mission, goals, and strategies to guide its work over the next ten years. An operations plan accompanies this strategic plan, laying out objectives, action items and estimated budgets.

Vision:

***"ILTER's vision is a world in which long-term science helps prevent and solve environmental and socio-economic problems."***

Mission:

***"ILTER consists of networks of scientists engaged in long-term, site-based ecosystem and socioeconomic observation and research. Our mission is to improve understanding of global ecosystems and inform solutions to current and future environmental problems."***

The mission emphasizes ILTER's dual purposes: 1) providing a forum for collection of continuous, long-term ecosystem data, and 2) providing question- and problem-driven scientific research to help solve known and unknown environmental problems.

10-Year Goals:

ILTER's 10-year goals make the mission statement more tangible, broadly describe how ILTER will achieve its mission, and provide a framework for action. ILTER's goals are to:

1. ***Foster collaboration and coordination among socioeconomic and ecosystem researchers and research networks at local, regional and global scales***

2. ***Improve comparability of data from LTER sites around the world, and facilitate exchange and preservation of this data***

3. ***Deliver scientific information to scientists, policymakers, and the public to meet the needs of decision-makers at multiple levels***

4. ***Facilitate education of the next generation of LTER scientists***

Strategies to Achieve Goals:

The strategies below describe the path ILTER will follow to achieve its goals. These strategies provide more detail on the structure of ILTER, how it will function, and what it will do. While the 10-year goals and strategies are broad, each has measurable objectives and action items that are detailed in the accompanying 5-year operations plan.

1. ***Organizational and Fundraising Strategies.***
   ILTER will transition from a volunteer association of networks to a formal organization with professional staff and diversified funding sources by: establishing the most appropriate legal structure, developing its governance procedures and hiring a small staff, establishing a secretariat and headquarters office, developing growth plans, and creating internal capacity. ILTER will diversify its funding sources beyond US-NSF grants and member in-kind contributions to include grants from U.S. foundations, international foundations, multi-lateral institutions, member network governmental agencies, and member contributions.

2. ***Science and Program Strategies.***
   ILTER will chart its scientific and programmatic future by: setting global research agendas, developing collaborative research projects, standardizing and sharing data, creating a globally-compatible cyberinfrastructure, and determining the most appropriate mechanisms through which to deliver peer-reviewed research to decision-makers.

3. ***Communication, Education, and Public Awareness (CEPA) Strategies.***
   ILTER's communication, education, and public awareness strategies will include: convening scientific meetings, providing educational and collaborative research opportunities for junior scientists and graduate students, improving member communications, revamping ILTER's marketing and branding efforts, and conducting public outreach.

# I. SECTION I: CONTEXT AND OVERVIEW

## I.1 INTRODUCTION AND OVERVIEW

Global concerns are rising about the increasing severity and incidence of long-term environmental and socio-economic problems such as climate change, water scarcity, biodiversity loss, and sustainable development. Policymakers, scientists, and the public increasingly seek scientifically-based information about the global environment, how it affects human health, and how human activities affect the ecosystems that support life on the planet.

The 2002 World Summit on Sustainable Development's (WSSD) Implementation Plan emphasizes the importance of collaboration between scientists in developing and developed nations, as well as between policymakers and scientists globally. Likewise, in 2005, UK Prime Minister Tony Blair declared climate change and poverty in Africa to be the top two global issues for the G8[1], and the 2006 G8 priorities set by Vladimir Putin include global energy security and control of infectious disease. President Putin has called for greater collaboration and research sharing among the world's scientists.

The International Long-Term Ecological Research Network (ILTER) was founded in 1993 to meet this growing need for communication and collaboration among long-term ecosystem researchers. ILTER provides a forum for scientists working at the local, regional and national levels to share data, collaborate on global projects, integrate findings and deliver sound, peer-reviewed research to decision-makers and the public.

ILTER has achieved substantial success in helping groups of scientists create networks of long-term, site-based environmental researchers in countries and regions around the world. As of February 2006, ILTER's membership included thirty-two member networks in six regions – East Asia/Pacific, Central and Eastern Europe, Western Europe, Southern Africa, South and Central America, and North America. Thousands of scientists working in nearly seventy disciplines conduct long-term ecosystem and socio-economic research at hundreds of ILTER research sites around the world.

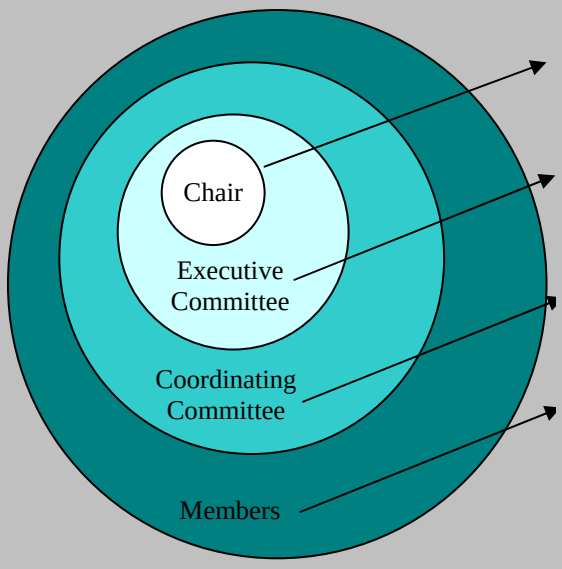
ILTER is a "network of networks." Its members are networks of scientists engaged in long-term, site-based research. The organization is managed by a Coordinating Committee comprised of one representative from each member network. The elected Chair of the Coordinating Committee also serves as the Chair of the Executive Committee which includes representatives from each ILTER region. (See Chart 1).

Building on over a decade of work, this strategic plan marks an important step toward ILTER's next phase of development. ILTER is at a critical juncture, maturing from a project of the United States' National Science Foundation (NSF) to an independent, international organization with a professional staff and diversified funding sources. The strategic plan's primary objective

[1] The Group of Eight (G8) consists of Canada, France, Germany, Italy, Japan, Russia, the United Kingdom, and the United States. Together, these countries represent about 65% of the world economy. The hallmark of the G8 is an annual political summit meeting of the heads of government with international officials, though there are numerous subsidiary meetings and policy research.

is to map the beginning phases of this development, and guide its longer-term direction and sustainability as an organization.

## Chart 1: ILTER Membership and Governance Structure




**Chair of ILTER's Coordinating Committee & Executive Committee:**
Elected every four years by the ILTER Coordinating Committee. Ensures that ILTER's work is carried out effectively and in accordance with its committees' decisions. May appoint standing and ad hoc committees.

**ILTER Executive Committee:**
Composed of eight members, including a representative of each ILTER region. Interfaces with funding agencies. Develops recommendations for ILTER activities.

**ILTER Coordinating Committee:**
Composed of one scientist from each member network. Currently, there are 32 members of the Coordinating Committee, each one representing his/her LTER network. Manages the affairs of ILTER. Develops and implements ILTER's strategies and actions.

**ILTER Members:**
Research networks of scientists engaged in multi- and interdisciplinary long-term research and monitoring in ecological and social sciences. Currently there are 32 member networks of ILTER, with thousands of researchers at hundreds of sites.

This document is divided into two sections. The first is an overview of the context in which ILTER operates, and the second describes ILTER's plan for the future.

**Section I includes:**

- **Introduction and Overview.**
- **ILTER's History.** This short section describes ILTER's history since 1993, including its successes, challenges and growth.
- **Rationale for the Strategic Plan.** This section describes the reasons why ILTER undertook a strategic planning process.
- **Value of ILTER.** This section describes ILTER's value to the scientific and policymaking communities and to its members. It examines ILTER's strengths and weaknesses and the major issues the organization will face in coming years.

**Section II includes:**

- **Mission.** ILTER's revised mission that will guide the organization for the next ten years.

- **Goals.** The four goals that will help ILTER achieve its mission.
- **Strategies.** The actions ILTER will take to achieve its goals.

While this document may be of interest to a range of stakeholders including scientists, policymakers, and natural resource managers, the two primary audiences are:

1) **ILTER members.** The strategic planning process helped build a culture of self-reliance in an organization that depended largely on one funding source and whose administration was conducted by the staff of the U.S.-LTER. By agreeing on a common path for the future, ILTER members will be the primary beneficiaries of this work and of subsequent strategic planning activities as ILTER becomes a more robust organization with its own professional staff and a diversified funding base.

2) **ILTER funders.** This strategic plan is designed to help funders, both past and future, understand ILTER's unique niche in the scientific research world and the developmental steps the organization has taken and will take to ensure its viability and value in the future.

This strategic plan is accompanied by an operations plan that further disaggregates the 10-year goals and strategies into specific objectives and detailed action items to guide the way.

## 1.2 HISTORY OF ORGANIZATION

The International Long-term Ecological Research network (ILTER) was founded in 1993 during the United States' Long-term Ecological Research (U.S.-LTER) All Scientists Meeting at Estes Park, Colorado. ILTER was formed to meet the growing need for global communication and collaboration among long-term ecosystem researchers. Thirty-nine scientists and administrators representing sixteen countries participated in this meeting.

ILTER grew out of a realization within the U.S.-LTER that it was not broad enough to effectively describe long-term ecological phenomenon in the context of global change. If the scientific community was going to be able to provide the information necessary to implement Agenda 21[2], it would need long-term data from a diversity of ecosystems across the globe. With this realization emerged an interest on the part of the U.S. National Science Foundation (NSF) to help catalyze the development of long-term ecosystem research programs in other parts of the world. NSF funded U.S. scientists to reach out to colleagues throughout the world to help them establish long-term ecological research networks. Using its existing and new bilateral relationships, NSF throughout the 1990's funded efforts several dozen countries to support travel of U.S. scientists to help establish networks and joint research programs.

Since ILTER's establishment in 1993, global long-term ecosystem research programs have expanded rapidly, reflecting the increased appreciation of the importance of long-term research in assessing and resolving complex environmental issues. As of February 2006, 32 countries have established formal LTER programs and joined the ILTER network. Several more are actively pursuing the establishment of national-level networks and many others have expressed interest. ILTER began grouping its national-level networks into regions in 1996, and now has six regional networks – East Asia/Pacific, Central/Eastern Europe, Western Europe, Africa, North America, and Central/South America.

The ILTER Coordinating Committee, the governing body of the ILTER Network, convenes annually at a meeting hosted by one of its member networks.

[2] Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which human impacts on the environment. Agenda 21, the Rio Declaration on Environment and Development, and the Statement of principles for the Sustainable Management of Forests were adopted by more than 178 Governments at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janerio, Brazil, 3 to 14 June 1992.

## 1.3 RATIONALE FOR STRATEGIC PLAN

From ILTER's establishment in 1993, NSF was the virtual only source of funding, along with in-kind contributions from members. The U.S.-LTER Network Office (originally in Seattle and then in Albuquerque) managed ILTER's administrative functions.

ILTER held global and regional meetings to support member communications and exchange of research results, with NSF subsidizing member travel to these meetings. The strong support of the U.S. NSF allowed ILTER to get established and promote the idea of ILTER internationally. The first decade of ILTER's existence was marked by a broad expansion of interest in the long-term ecosystem research concept. With NSF providing financial and logistical support, ILTER was not focused organizational structure or financial independence issues. Thus, in 2003, NSF recognized that the long-term survival of the ILTER required that it develop a formal organization separate from the U.S.-LTER and diversify its funding sources. Recognizing that such an organizational transition was going to take time, the U.S. NSF, in consultation with the U.S.-LTER, funded a two-year ILTER transition effort that included three major components:

- Development of a strategic and organizational plan for the long-term financial and organizational stability of ILTER;
- Establishment of a U.S.-LTER committee focused on international collaborations through the ILTER; and
- Short-term logistical support for ILTER – in order to ensure a long-term structure had time to evolve.

ILTER's Chair, Hen-Biau King (Taiwanese Ecological Research Network), initiated a series of meetings critical to the planning process, including in Taipei in April 2004; the 2004 annual meeting in July in Manaus, Brazil; the 2005 annual meeting in October in Colima, Mexico; and the 2006 annual meeting in August in Gobabeb, Namibia. ILTER recognized that it needed to hire an external consultant to guide ILTER's planning process and help it produce its strategic, organizational and funding plans. Through a grant from NSF to Brown University, ILTER conducted an international search which led to the hiring of Holly Kaufman, President of Energy and Environment Strategies, to implement a strategic planning process.

That process had two primary goals:

- Developing a vision and mission to frame ILTER's work for at least 10 years;
- Increasing member-network involvement in ILTER governance, operations and funding.

## I.4 VALUE AND RELEVANCE OF ILTER

Through interviews with ILTER members, prominent scientists, and other stakeholders (see Appendices D and E), ILTER's purpose, niche, strengths and weaknesses, and internal and external value emerged. ILTER has the opportunity to meet unique needs in the scientific and policymaking communities, but will have to overcome a number of organizational shortcomings to fulfill its potential.

### I.4.a *Operating Context*

ILTER operates in a globally-competitive environment, and a number of international governmental, private or quasi-governmental organizations exist whose mission and/or goals are similar to ILTER's. (Please see Table 1 on the following page for an overview of the main organizations with attributes similar to ILTER's. Note that it is not an exhaustive list.)

For example, other organizations foster scientific collaboration and networking among scientists, exchange data, and inform policymakers and the public about emerging scientific findings and their possible implications. One of the most prominent of these groups is the International Council for Science (ICSU[3]), which is the parent organization or co-sponsor of a number of global environmental programs such as DIVERSITAS, the International Geosphere-Biosphere Program (IGBP), and the International Human Dimensions Program (IHDP), the Global Terrestrial Observing System (GTOS), the Global Climate Observing System (GCOS), and the Scientific Committee on Problems of the Environment (SCOPE).

Some organizations also fulfill similar goals, such as conducting long-term and site-based research, but on a regional or topic-specific basis. These include the Smithsonian Tropical Research Institute which conducts long-term biological diversity studies in the tropics, the International Center for Research in Agroforestry's "Alternatives to Slash-and-Burn Program," and Conservation International's Center for Applied Biodiversity Science (CABS) that is implementing the Tropical Ecology Assessment and Monitoring Program that will use fifty field stations worldwide (six of which are in operation).

ILTER, however, has a number of attributes that together make it a unique organization among its peers:

- **ILTER is the only organization that has a global network of research sites in a wide array of ecosystems worldwide that can help understand environmental change across the globe.** This unique trait enables scientists to work on the local, national or regional scale, draw on information from sites and scientists in other parts of the world to bring insight to their work, and collaborate on interdisciplinary projects that can help detect global trends. ILTER is one of the few organizations that hold meetings where research from national and regional networks is presented and discussed with the

[3] Note that ICSU's name changed from International Council for Scientific Unions to International Council for Science in 1998, but the acronym has remained the same.

objective of detecting trans-boundary issues and increasing trans-boundary mitigation cooperation.

- **ILTER is one of the few organizations that focus on <u>long-term</u> research.** Two-thirds of all ecosystem studies conducted are based on data spanning only one to two years[4]. The results and conclusions from short-term studies can be misleading, and long-term projections from these studies are often inaccurate. Many scientists who design "long-term" studies anticipate that their projects will generally continue beyond their personal research careers, for possibly thirty to fifty years. Data from long-term research will be necessary to solve long-term and large-scale environmental problems and questions.

- **ILTER's governance is built on a <u>"bottom-up"</u> rather than "top-down" approach.** ILTER scientists determine the core of ILTER's research, monitoring and data-generation, all of which takes place at the site level. The local research sites belong to national-scale networks which in turn belong to informal regional groupings. Though coordination of some activities such as the annual ILTER meeting takes place at international, i.e. ILTER, level, neither ILTER nor any governmental or inter-governmental group dictates to members what research they should conduct. (One subject under consideration in upcoming years, however, will be the extent to which members will participate in common research in order to augment ILTER's value in detecting global trends, capacity to compare data, and ability to generate policy-relevant information). ILTER's decision-making power is vested in its Coordinating Committee, which is comprised of representatives from each of ILTER's member networks. ILTER's Executive Committee is tasked with implementation of the Coordinating Committee's (i.e. the members') decisions.

[4] According to Hen-Biau King, ILTER's Chair, and the Director of the Taiwan Forestry Research Institute. Colima, Mexico October, 2005.

## TABLE 1 : ORGANIZATIONAL COMPARISON

| | Site-based | Network of sites | Network of people/groups | Long-term research | Long-term monitoring | Scientific collaboration | Measurement and data standardization | Data sharing | Data integration | Long-term data preservation/access | Global trend detection | Country or regional trend detection | Teach/train next generation | Inform scientists, policymakers, public |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ILTER** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **ICSU** | | | ✓ | | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ |
| **IGBP** | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ |
| **GOSIC** | | | | | | ✓ | ✓ | ✓ | | ✓ | | | | ✓ |
| **GBIF** | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| **GEOSS** | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| **START** | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | ✓ | ✓ | ✓ |
| **CEISIN** | | | | | | ✓ | | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| **MA** | | | ✓ | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |

ICSU = International Council for Science
IGBP = International Geosphere Biosphere Program
GOSIC = Global Observing Systems Information Center
GBIF = Global Biodiversity Information Facility
GEOSS = Group on Earth Observations System of Systems
START = System for Analysis, Research and Training
CIESIN = Center for International Earth Science Information Network
MA = Millennium Ecosystem Assessment
Note: see Appendix G for descriptions of these organizations.

In addition to reviewing other organizations, ILTER conducted an analysis of its internal strengths (S) and weaknesses (W), as well its external opportunities (O) and threats (T). This "SWOT" analysis is summarized in the table below.

**CHART 2 :**
**ILTER'S STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS**

| INTERNAL | EXTERNAL |
|---|---|
| Strengths:<br><br>ILTER:<br>▶ Has an existing network of hundreds research sites via thirty-two member networks<br>▶ Seeks to integrate local data into larger geographical contexts<br>▶ Helps identify whether environmental change drivers are local or global<br>▶ Has independent, open governance<br>▶ Is interdisciplinary<br>▶ Produces quality, unbiased information and data through member research<br>▶ Strengthens country and regional networks<br>▶ Helps leverage funding at national or regional levels | Opportunities:<br><br>External opportunities include:<br>▶ Policymakers seek continuous data and information to inform decisions<br>▶ Scientific community has a need for long-term data<br>▶ International conventions and initiatives could benefit from ILTER's data and information<br>▶ Public awareness is growing about ecosystem change<br>▶ Other research and monitoring initiatives seek mutually-beneficial partnerships with long-term scientists and sites<br>▶ There is a trend toward globalization of science<br>▶ There is a need for forecasting trends in ecological processes to help decision-makers weigh choices |
| Weaknesses:<br><br>ILTER:<br>▶ Lacks diversified funding sources<br>▶ Lacks a legal entity, budget, and physical location<br>▶ Has poor branding and marketing<br>▶ Has a difficult and confusing name and acronym<br>▶ Needs to improve output of data to other scientists, policymakers and the public<br>▶ Has unequal gender and age diversity<br>▶ Lacks clarity about scientific and information programs, internally and externally<br>▶ Does not emphasize social sciences enough<br>▶ Lacks global cyber-infrastructure to collect, integrate, access and archive data systematically<br>▶ Has not realized potential to help detect global trends | Threats:<br><br>External threats include:<br>▶ Competition for funding with other organizations<br>▶ Poor communication with other organizations<br>▶ Lack of partnerships outside of ILTER<br>▶ Poor acceptance from purist scientific community<br>▶ Politicization of research & data by decision-makers<br>▶ Lack of name recognition by scientists or policymakers outside of ILTER |

ILTER's primary internal strengths and external opportunities can be characterized as **scientific** (as opposed to structural, organizational or reputational). By building on the organization's solid network of research sites, ILTER will be able to provide integrated, global research to meet scientific and policy needs. The stepped-up scientific capacity of ILTER's members will be a crucial element to the organization's success. In order to capitalize on these strengths and opportunities, this strategic plan helps hone ILTER's focus through the mission and goals, and identifies a process for achieving those goals through carefully crafted strategies, which are

spelled out in Section II of this strategic plan. Specific objectives and action items are provided in the accompanying operations plan.

ILTER's key internal weaknesses are **structural.** In order to be successful, ILTER has to solve a number of organizational challenges that have resulted from over-reliance on the U.S. National Science Foundation for funding, as well as over-reliance on the U.S.-LTER network office for infrastructure and administrative staffing. Other weaknesses include the lack of a legal structure, lack of staff, lack of IT capacity, and poor branding. Additionally, ILTER suffers from a number of external threats that can best be summarized as **reputational.** Few prominent scientists are familiar with ILTER, and its sites are rarely a source for data for key international science programs[5]. (See the summary of external interviews in Appendix E).

I.4.b *Scientific Trends*

A unique aspect of ILTER is its intent to collect, integrate and provide access to the data from its scientists' research. No one knows for certain what future environmental problems will arise, or what data will be needed to solve those problems. Therefore, continuous, long-term data collection from sites around the world is valuable in its own right, and no other organization is filling this need.

In addition to collecting data that may be useful for solving future problems, ILTER also needs to produce research that can help answer current scientific problems and research questions. Of particular importance is the need to develop collaborative research efforts to address important global ecosystems questions (such as biological diversity assessment and conservation, or primary production patterns). The following research and technological trends were identified during the strategic planning process by the ILTER members and by external scientists.

**Research Trends**

- **Climate Change.** Human-induced shifts in global climate are occurring at an ever-increasing rate, with rises in sea temperature and glacial melt happening more quickly than previously anticipated. Policymakers, scientists, businesses and citizens are trying to understand this phenomenon and prepare for the resulting changes in human health, societies and ecosystems. ILTER can play an important role in the mitigation and management of the risks posed by climate change. By integrating the findings of local research sites that examine a range of ecological systems, ILTER can help detect and record the climate-induced alterations on ecosystems and biodiversity, and synthesize that data to inform policies and management.

- **Sustainable Development.** Human health, education, and economic opportunities are linked to environmental conditions, particularly in less-developed countries where water scarcity, lack of electricity, and environmentally-induced diseases prevail. By bringing together scientists from all over the world, ILTER can improve understanding of how humans interact

[5] ILTER members provide information from their research sites to the United Nations for preparation of national UN "state of the environment" reports. The Millennium Ecosystem Assessment project also used information from some ILTER sites.

with the natural environment, how biodiversity and ecosystem services and functions affect human well-being, and how societal needs impact ecosystems. ILTER members' global data and research can help to develop strategies and inform solutions to ameliorate negative effects on ecosystems as a result of natural resource utilization for economic development.

- **Biodiversity Loss and Sustainable Use of Biodiversity.** The diversity of life on earth (biodiversity) is one of the key natural resources on which human societies depend[6]. Used carefully, biodiversity is a sustainable resource available for future generations. Used carelessly or over-exploited and it can be lost and degraded until we reach the point at which essential ecosystem services (e.g. agricultural production, forestry, water quality, water quantity, pest control, tourism and cultural and aesthetic aspects of landscape and wildlife) are reduced. Long-term ecological research (LTER) sites and networks provide the infrastructure, experimental facilities, databases, information and knowledge required to study whether biodiversity is being lost or gained, to determine the main drivers and pressures on biodiversity and to evaluate the effects of biodiversity loss on ecosystem processes and ecosystem services. In all ecosystems, including those heavily modified by human activities, these processes can be complicated and slow; therefore, long-term approaches are essential if we are to manage and reverse current trends of biodiversity loss and ecosystem degradation on a global scale.

- **Sustainable Use of Resources and Ecosystem Management.** In upcoming years, it will be increasingly important to study the degradation, conservation and management of different ecosystems including forests, grasslands, croplands, wetlands, and urban environments. In particular, policymakers and the public will be seeking global, regional, and local data on land use changes, water resources management, and global energy demands.

- **Environmental hazards and disasters.**

**Technological Trends**

- **Technological Advances.** Rapidly advancing technology will continue to affect ILTER's members and activities. For example, ILTER's ability to integrate global-scale GIS data collected locally over long-term time periods (perhaps with inclusion of situ research) is a niche that no other organization currently fills. And integrating remote sensing data with on-site monitoring data will be increasingly important. Development of ecotechnologies (e.g. restoration of degraded ecosystems, bioremediation, and pollution prevention) are needed and ILTER monitoring programs constitute a reliable way of checking changes.

- **Information Technology.** For data to be shared, and synthesized efficiently and effectively among scientists, research sites, and member networks, a common cyber-infrastructure, or information management system (IMS), is a requisite. In other words, the IMS of all member networks should be compatible, if not the same. Cyber-infrastructures promote the free sharing of data, which is a major cultural change in the scientific community where data

[6] www.millenniumassessment.org

territoriality has dominated. The new wave is creating the possibility of publishing and referencing metadata and even datasets, leading to improvements of data quality. GEOSS is likely develop this trend, and ILTER will be a major provider of reliable data. One issue that ILTER must address is the inequalities among countries in Internet access and information technological capacity.

I.4.c *Internal Value of ILTER*

ILTER provides unique value to its members, and they feel that as the network matures and strengthens, its value will increase, as described in the chart below.

**CHART 3 : ILTER'S VALUE TO ITS MEMBERS**

| CURRENT | IN FIVE YEARS | IN TEN YEARS |
|---|---|---|
| • Collaboration, cooperation, data sharing<br>• Increased understanding of global environmental phenomena<br>• Extended influence, strength, and relevance of national and regional networks<br>• Increased credibility over operating independently | • Improved ILTER infrastructure to support long-term, cross site-based research<br>• Increased fundraising capabilities<br>• Proof of concept that local and national, site-based research data can be integrated on a global scale to inform solutions to known and unknown environmental and socio-economic problems<br>• Expanded incorporation of social scientists | • Access for ILTER members to wide-ranging ecosystem information, databases, publications<br>• Shared approaches and methods, and standardized data<br>• Potential development of ecosystem theory<br>• Ability to establish and measure effect of collaborative actions on decisions<br>• Effective knowledge transfer among all members regardless of wealth<br>• Increased utilization of ecosystem data to solve human problems |

I.4.d *External Value of ILTER*

A number of prominent global scientists[7] provided assessments of ILTER's value or potential value to the wider scientific and policymaking community. Most agreed that ILTER could play a unique role in addressing global scientific needs not currently met by existing organizations; however, some questioned whether ILTER was currently living up to its potential. (See Appendix E for a summary of the interviewees and interview responses). Through the external interview process, two key niches for ILTER emerged:

**1. A need exists for continuous, long-term ecosystem data.** Interviewees felt that ILTER is in a unique position to fill this need by providing data collection and archiving, international research collaboration and global information management.

> *"[ILTER's] real niche is to promote and maintain continuity of research over a long period of time."*

> *"There is a clear need for long-term research internationally."*

> *"One of the constant barriers in major global research projects is the lack of continuous data over time from sites around the world and the ability to do comparisons among them."*

**2. A need for scientifically-based, peer-reviewed global research to help answer pressing ecosystems questions.** To this end, interviewees felt that ILTER networks should be driven by the key scientific and socio-economic trends identified in the previous section, specific scientific questions and research agendas. Some interviewees felt so strongly that ILTER must be driven by definable scientific questions that the organization might not survive without this focus.

> *"ILTER's comparative advantage is its research focus."*

> *"Measurement institutions that do not have a research question focus tend to fade or lose caliber over the years."*

ILTER members likewise acknowledged the importance of two distinct roles, 1) to provide a forum for collection of continuous, long-term ecosystem data and discussion of findings, and 2) to provide scientific data to help solve known and unknown scientific problems. These roles form the basis for the organization's new mission statement and goals.

[7] External Experts: Dr. William Clark, Harvey Brooks Professor of International Science, Public Policy and Human Development, Harvard University Kennedy School of Government; Dr. Henry Gholz, Program Director, Directorate of Biological Sciences, National Science Foundation; Dr. James Gosz, Senior Program Manager, National Science Foundation; Dr. Pamela Matson, Co-Chair National Academy of Sciences Roundtable on Science & Technology for Sustainability, Stanford University; Dr. Frances Li, International Office Director, National Science Foundation; Dr. Walter Reid, former Director, Millennium Ecosystem Assessment, and Director of Conservation and Science, Packard Foundation; Dr. Thomas Rosswell, Executive Director, ICSU.

# II. SECTION II: STRATEGIC PLAN

## II.1 VISION

ILTER's vision statement is a broad description of the organization's hope for the world. It is not intended to describe what ILTER does.

> ***"ILTER's vision is a world in which long-term science helps prevent and solve environmental and socio-economic problems."***

## II.2 MISSION

ILTER's mission statement describes ILTER's reason for existence, the contribution the organization wants to make in the world, and why ILTER is a collaborative network. The organization's mission is the guiding framework for all of ILTER's activities, though individual member networks may pursue missions that vary from that of the international network.

> ***"ILTER consists of networks of scientists engaged in long-term, site-based ecosystem and socioeconomic observation and research. Our mission is to improve understanding of global ecosystems and inform solutions to current and future environmental problems."***

This mission statement was developed through a process that included review of several previous versions, brainstorming sessions with the ILTER Coordinating Committee, interviews (both verbal and written) with ILTER members, and interviews with external stakeholders. The mission encompasses the dual ILTER purposes of 1) providing a forum for collection of continuous, long-term ecosystem data, and 2) providing scientific data to help solve identified and as-yet unidentified environmental problems.

## II.3 GOALS

ILTER's goals make the mission statement more tangible, broadly describe how ILTER will achieve its mission and provide a framework for action. ILTER's goals are specific to ILTER even if its mission is similar to other groups.

In order to develop goals that will guide ILTER's endeavors over the next decade, the Coordinating Committee and other stakeholders reviewed past versions of goals, examined their relevance going forward, and assessed ILTER's success to date at reaching them. (See Appendix D for a summary of the findings.) Through this process, members articulated four overarching goals that are more concise, consistent with ILTER's work at the international level rather than the local or national levels, more focused on what ILTER can best provide to its members and external constituents, and that will guide the organization towards achieving its mission.

While the 10-year goals are broad, each goal has clear, measurable deliverables that are detailed in the 5-year operations plan that accompanies this document.

## ILTER's 10-year goals are to:

- ***Foster collaboration and coordination among socioeconomic and ecosystem researchers and research networks at local, regional and global scales***
- ***Improve comparability of data from LTER sites around the world, and facilitate exchange and preservation of this data***
- ***Deliver scientific information to scientists, policymakers, and the public to meet the needs of decision-makers at multiple***
- ***Facilitate education of the next generation of long-term scientists***

***Goal 1: Foster collaboration and coordination among socioeconomic and ecosystem researchers and research networks at local, regional and global scales***

ILTER members consistently rank collaboration and coordination as top priorities for the organization, and as one of its greatest assets. It is one area where the organization feels it has had at least some level of success, although there is room for considerable improvement.

Historically, researchers around the world have worked in relative isolation, gathering data that may or may not be comparable to similar research conducted elsewhere in the world. ILTER is committed to being a stable forum for international researchers to come together, agree on common research topics, and develop methodologies for comparing data.

***Goal 2: Improve comparability of data from LTER sites around the world, and facilitate exchange and preservation of this data***

While goal 1 pertains to the activities of *researchers*, goal 2 pertains to research *data series* from specific *sites*. ILTER's mission contains two distinct, but interrelated pieces: informing solutions to scientific problems, and improving general understanding of ecological systems. The literature and knowledge base as a result of short-term studies are biased toward short-term results, and may provide results that are potentially misleading. Longer temporal extrapolations from short-term data are often inaccurate.

Coordinated, comparable, long-term ecosystem data will enable improved understanding of complex global ecosystems and provide decision-makers with an increased capacity to solve global-scale environmental problems. Through the archiving of long-term data from site-based research and global monitoring programs, ILTER will become the repository to which decision-makers, scientists, and the public will turn when ecosystem data is needed. Likewise, ILTER will assist in the integration of data to help detect global environmental trends.

***Goal 3: Deliver scientific information to scientists, policymakers, and the public to meet the needs of decision-makers at multiple levels***

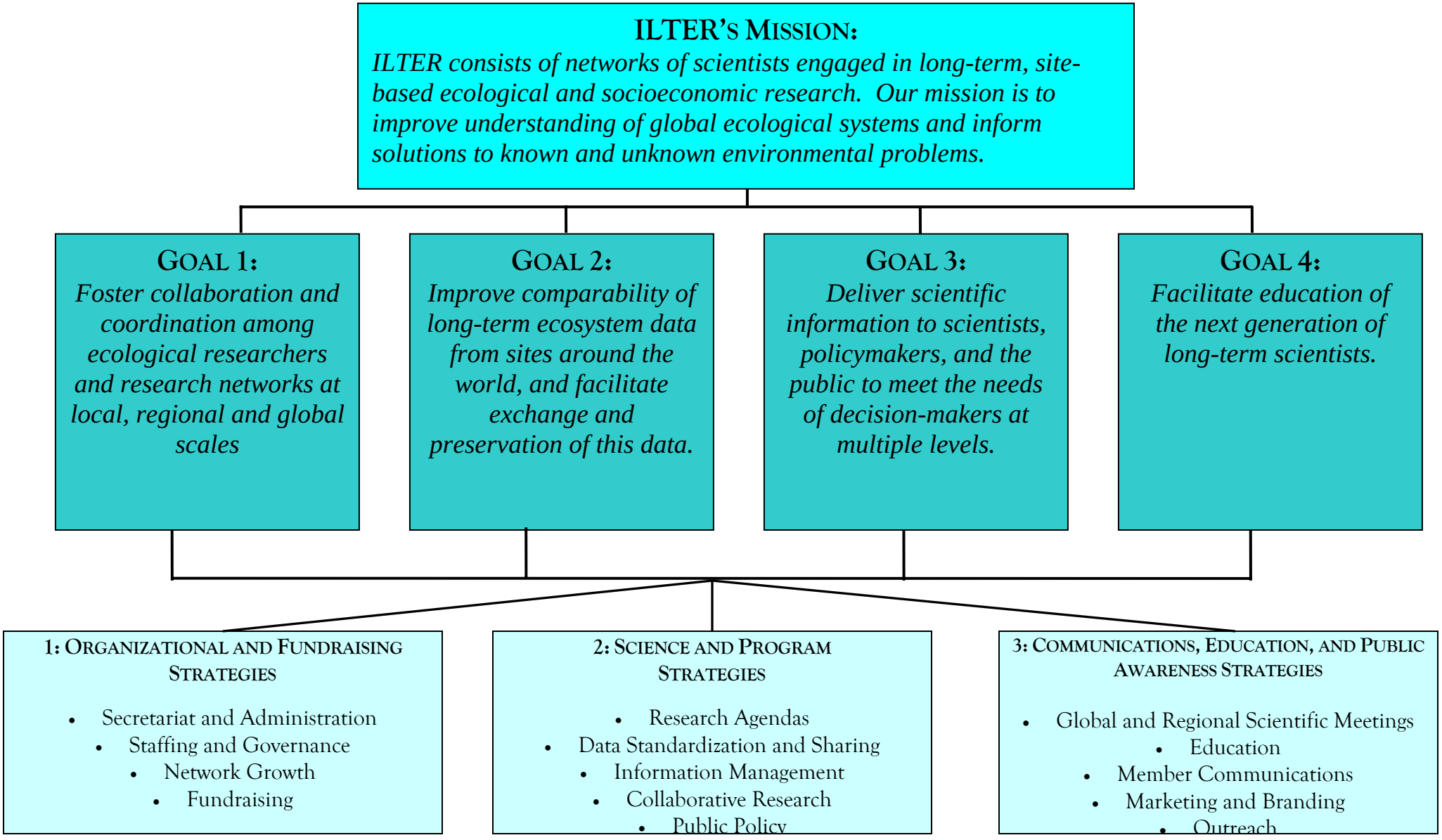
ILTER will be driven not only by the inherent value of supporting long-term monitoring and research, but also by the value of addressing specific research questions. The external interviewees emphasized the importance of addressing the enormous unmet need of the scientific and policymaking communities for access to continuous, long-term ecosystem and socio-economic data gathered at the local, regional, national, and international scales. At the same time, scientists and policymakers are seeking solutions to specific environmental questions and problems, such as rapid biodiversity loss, sustainable use of biodiversity, global climate change, sustainable development, and energy and water shortages.

ILTER can contribute to informing decisions about how to manage, mitigate, or solve these and other vital problems that contribute to declining human health, ongoing poverty, drought, famine and similar issues.

***Goal 4: Facilitate education of the next generation of LTER scientists***

ILTER will promote the development of the next generation of long-term scientists by involving junior scientists in collaborative research and by providing a forum for student exchange programs, student attendance at ILTER conferences, and other mechanisms to enhance scientific training, particularly in developing countries.

## CHART 4 : ILTER'S MISSION, GOALS, AND STRATEGIES



## II.4 STRATEGIES

The strategies below outline the path ILTER will follow to achieve its goals. These strategies provide more detail on the structure of ILTER, how it will function, and what it will do. While the 10-year goals and strategies are broad, each has measurable objectives and action items that are detailed in the accompanying 5-year operations plan.

- **Organizational and Fundraising Strategies.** ILTER will transition from a volunteer association of networks to a formal international organization with professional staff and diversified funding sources by: establishing the most appropriate legal structure, developing governance and staffing, establishing a secretariat/headquarters office, developing growth plans, and creating internal capacity. ILTER will diversify its funding sources beyond U.S. National Science Foundation grants and member in-kind contributions to include grants from U.S. foundations, international foundations, multi-lateral institutions, member network governmental agencies, and member contributions.

- **Science and Program Strategies.** ILTER will chart its scientific and programmatic future by: setting global research agendas, developing collaborative research projects, standardizing and sharing data, creating globally-compatible cyberinfrastructures, and determining the most appropriate mechanisms through which to deliver peer-reviewed research to decision-makers.

- **Communication, Education, and Public Awareness Strategies.** ILTER's communication, education, and public awareness strategies will include: convening scientific meetings, providing educational and collaborative research opportunities for junior scientists and graduate students, improving member communications, revamping ILTER's marketing and branding efforts, and conducting public outreach.

### II.4.a *Organizational and Fundraising Strategies.*

As ILTER transitions from an organization that was largely dependent on only one member (the United States) for funding and secretariat functions, it will establish itself as a formal international organization. A secretariat will be formed to administer the network's activities. The organization's professional and voluntary governance structures will be revised and strengthened. ILTER growth plans will be developed, and fundraising will become a core function, with funds sought from diverse sources.

- **Secretariat and Administration.** In the last quarter of 2006 and into 2007, ILTER will establish a legal entity, or will establish an alliance with another organization through which ILTER will carry out its activities. A number of options exist, each with pros and cons. Options include (but are not limited to): establishing a stand-alone legal entity, co-housing with an ILTER member network other than the U.S.-LTER, remaining at Brown University, or co-housing with another international science organization. ILTER

members will weigh the options carefully to ensure that the legal structure chosen will best serve ILTER's ability to achieve its mission and goals, and become a robust and sustainable organization, and one that thrives as long as its members' research projects.

ILTER will also establish a secretariat with a professional staff to provide the network with administrative and operational support. The location of the headquarters will be examined carefully to ensure that ILTER's needs are best met by the choice. A member institution may provide interim secretariat functions if ILTER's members so choose.

- **Staffing and Governance.** ILTER will hire a professional staff, and will also strengthen and expand its existing volunteer governance structure. In 2004, ILTER developed by-laws, establishing the organization's bottom-up governance approach (see Appendix B). As the organization adds professional staff and expands its volunteer governance, the by-laws will be amended to reflect new roles, duties and reporting structures.

  *Staffing.* One of ILTER's weaknesses is that it is almost completely reliant on volunteer labor, and has no staff. Though it is appropriate for the organization to maintain and expand its volunteer governance as described below, ILTER will hire a professional staff to carry out day-to-day operations. ILTER will need at least an Executive Director, an information management director, a fundraising and marketing director, and an administrative support person.

  *Volunteer Governance.* In addition to the Executive Committee and the Coordinating Committee, ILTER's volunteer governance structure will include four new committees composed of ILTER member representatives.

  1. Science and Program Committee (SPC).
     This committee will be an essential piece of the organizational strategy to reach all of the goals, with specific importance to goal 3: *deliver scientific information to scientists, policymakers, and the public*. It will also be important to help guide strategic collaborations among researchers to achieve goal 1: *foster collaboration and coordination among researchers.*

     The main role of this committee will be to help identify and coordinate ILTER-wide research (see Section 1.4.b). Themes will be identified on the basis of reviews of current research activities among ILTER members; an assessment of emerging environmental issues among national and international stakeholders; and the emergence of new scientific theories relevant to the development and use of LTER. The science committee will be composed of scientists from within ILTER's membership. The committee will be diverse in geographic representation and scientific discipline. The committee will be guided by an advisory council of five to ten committed scientific leaders from outside ILTER membership, and perhaps former ILTER leaders.

2. Public Policy Committee (PPC).
   The Public Policy Committee will be focused on steering ILTER toward fulfillment of goal 3: *deliver scientific information to scientists, policymakers, and the public.* The PPC will scope potential relationships with major international environmental agencies and recommend courses of action to the full Coordinating Committee, which will have authority to approve or disapprove of policy-driven research and projects that bear the ILTER name.

3. Fundraising and Marketing Committee (FMC). The Fundraising and Marketing Committee will be tasked with coordinating and spearheading fundraising and marketing efforts of the organization, and will include representatives from each ILTER region, both developed and developing. This committee will work closely with ILTER's professional staff and the Coordinating Committee.

4. Information Management Committee (IMC). This committee will be a key driver toward success in goal 2, *improve comparability of data from LTER sites around the world, and facilitate exchange and preservation of this data.* The IM committee will coordinate the development of ILTER's cyberinfrastructure (CI). The IMC will identify and help ensure the implementation of the most efficient and effective data collection, archiving, access and other information management strategies, and help conduct information management training and other capacity-building exercises for ILTER members and associated junior scientists and graduate students.

- **Network Growth.** In order to fulfill ILTER's mission, the organization will determine its optimal number of member networks and will develop a strategy to identify and fill gaps in the network. ILTER's growth should be guided by criteria which might include the following:

  *Addition of member networks and sites that add value to answer critical scientific, research-driven questions.* This growth strategy will help fulfill the first part of ILTER's mission to inform solutions to known and unknown scientific problems. As the Science and Program Committee develops scientific imperatives for the organization, the gaps in membership will become clearer.

  *Addition of member networks and sites to cover every major ecosystem on Earth.* This growth strategy will help fulfill the second part of ILTER's mission to improve understanding of global ecological systems.

  In order to help develop ILTER's growth plans, it will develop a global directory of LTER research sites. ILTER will then identify existing and potential LTER sites worldwide, based on the two criteria above. Electronic and hard-copy versions of an ILTER directory will be updated regularly, or ILTER site data will be added to the existing GTOS directory.

- **Fundraising.** ILTER will diversify its fundraising base, moving beyond U.S. National Science Foundation funding and in-kind member contributions. As described above, ILTER's Fundraising and Marketing Committee (FMC) will be charged with spearheading and coordinating fundraising. As laid out in ILTER's by-laws (Appendix B), the Coordinating Committee will continue to support the FMC and have ultimate responsibility for fundraising. The Executive Director will also have considerable fundraising responsibilities, and eventually, ILTER will hire a professional fundraising staff person. Examples of a diversified funding base for ILTER include:

  *Member Dues and In-Kind Contributions.* ILTER will consider whether members will be required to pay annual dues. Already, most ILTER members contribute through in-kind contributions by hosting global or regional meetings, paying for member representatives to attend international conferences and otherwise subsidizing ILTER's administrative costs. However, the majority of in-kind contributions have come from only a handful of member networks, and the organization will seek to spread this burden more evenly among members, developing a system of dues and/or in-kind contributions that recognizes the financial differences of ILTER-member countries.

  *Multi-lateral Funding Agencies.* ILTER will explore new financial relationships with multi-lateral funding agencies such as the United Nations (Environment Program, Development Program, UNESCO, etc.), the Global Environment Fund (GEF), and others.

  *U.S. Foundations.* Foundations in the United States may be an important source of funding for ILTER in the future.

  *International Foundations.* In addition to foundations in the U.S., national and international foundations based elsewhere will be pursued by members of the Fundraising and Marketing Committee, the Coordinating Committee, and ILTER's fundraising staff person.

  *Members' National Scientific Agencies.* ILTER has largely been dependent on U.S. National Science Foundation funding, and it is unclear whether NSF will continue to be an important source of support. ILTER members will reach out to their own countries' scientific and environmental agencies for support of ILTER's secretariat and joint projects, including research and CI development. In some cases, a bi-lateral arrangement could be developed between U.S. NSF and other countries' science agencies to better leverage support from all parties.

II.4.b *Science and Program Strategies.*

Developing these scientific strategies will be the primary focus of the Science and Program Committee—with input from other members of the Coordinating Committee—in the next one to three years, and the strategies will continue to be refined and evaluated on an ongoing basis.

- **Global Research Agendas.** The diversity of ILTER's members' research at the local, site-based scale (in scope, geography, and focus) is an extraordinary strength of the organization and part of what makes ILTER unique among its peers. However, in order to achieve ILTER's mission *to inform solutions to global environmental problems*, and its goal *to deliver non-biased ecosystems information to scientists, policymakers, and the public*, ILTER will need to focus a portion of its collaborative research on specific scientific research questions that are relevant to solving global environmental problems.

  This requires that ILTER members have a common research agenda in addition to the research they conduct based on their own site, local, national and regional priorities. ILTER members give mixed responses when asked whether ILTER should require members to conduct specific kinds of research (see Appendix D), and because ILTER *also* has a mission to improve general understanding of ecological systems, ILTER does not necessarily need to require *all* members or sites to engage in the same research.

  Potential areas of focus were described in section 1.4.b and include climate change, sustainable development, biodiversity loss and sustainable use of biodiversity, sustainable use of resources and ecosystem management, and environmental hazards and disasters.

- **Data Standardization and Sharing.** In order to achieve goal 1, *improve comparability of long-term ecosystem and socio-economic data from sites around the world*, ILTER will examine the most appropriate methods for standardizing and sharing data without compromising past measurement and data collection protocols. Standardizing and sharing data is the primary goal of developing globally-compatible cyber-infrastructures (see next section).

  Examples of the types of questions the Science and Program Committee, together with the Coordinating Committee, will examine include: Will phenomena which occur over long time scales be adequately sampled over appropriate spatial scales? What is the spatial and temporal range over which site data can be legitimately extrapolated, and what method(s) will be used? How much effort will be required for synthesis and inter-site comparisons, and has flexibility for subsequent adjustment of observations been incorporated into the design? Have the selected measurements been adequately tested, and have the required precision and frequency of observations been specified? Does the range of variables selected adequately reflect the full range of driving, state and response variables for the system under investigation?

- **Information Management and Cyberinfrastructure.** Information management through a globally-compatible cyberinfrastructure is a central component of ILTER's

ability to standardize data collection and sharing. This will be important for achieving goals 1, 2, and 4: *foster collaboration and coordination among researchers (goal 1), improve comparability of data from LTER sites around the world, and facilitate exchange and preservation of this data (goal 2), and facilitate education of the next generation of LTER scientists (goal 4).*

Preliminary efforts of the Information Management Committee (IMC) will include: determining the general connectivity status of LTER sites and scientists by country or region; organizing a clearinghouse system to facilitate technology and skills transfer among sites; creating an ILTER information server on the Internet to provide worldwide access to information and data relevant to long-term ecosystem research; and establishing an ILTER server access mechanism (or mechanisms) for researchers in regions presently without access to the international Internet.

Ultimately, IM systems throughout ILTER[8] should be compatible with others' systems both within ILTER and other organizations, such as GTOS, ICSU, ESSP, and TEAM[9].

- **Collaborative Research.** ILTER's Science and Program Committee will design new collaborative research projects. These will be critical to meeting ILTER's first goal (to *foster collaboration and coordination among researchers and improving comparability of data)* in a well-coordinated, deliberate fashion. This will include: encouraging the networking of established and developing sites which share similar ecological settings, and encouraging cooperation among groups of established sites within or between countries; assisting in the creation of research projects that are interdisciplinary, global, and focused on ILTER's research agendas; producing an inventory of sources of financial support for ILTER activities and infrastructure at participating sites.

- **Public Policy.** A central part of ILTER's mission and goals is to inform decisions and solutions pertaining to environmental problems. ILTER's Public Policy Committee will work in collaboration with the Science and Program Committee to explore the most appropriate mechanisms for ILTER to provide peer-reviewed research to decision-makers.

  With regard to public policy decisions, ILTER's activities may include: determining policymaking bodies will be the most relevant audience for ILTER's work; developing policy-relevant research foci; delivering scientific data to decision-makers, while not advocating for or against specific policies; providing insight into solutions to problems, and potentially helping forecast policy outcomes.

[8] Examples of current efforts on IM by ILTER members include: *ILTER's East Asia-Pacific Region* has already begun a series of workshops to identify IMS requirements of the region, to build member networks' capacities, and to initiate a regional science project to test the developed IMS's. *South Africa* is developing a geoportal based on open source software to enable interoperability among diverse data holdings. Solutions to overcome bandwith limitations have been developed and incorporated. The National Center For Ecological Analysis and Synthesis (NCEAS) in the USA has developed open source software specifically for ecological applications. These are being adopted by some of the regions. *Brazil* has developed an open archive system based on a Virginia Tech initiative that may be a useful model for ILTER's future system.
[9] Global Terrestrial Observing System (GTOS), International Council for Science (ICSU), Earth System Science Partnership (ESSP).

II.4.c *Communication, Education, and Public Awareness (CEPA) Strategies.*

ILTER's communication, education, and public awareness strategies will include: convening scientific meetings, providing educational and collaborative research opportunities for junior scientists and graduate students, improving member communications, revamping ILTER's marketing and branding efforts, and public outreach.

- **Scientific Meetings.** In-person meetings are crucial for ILTER to build a collaborative science program. Meetings allow for *collaboration and coordination among researchers* (goal 1) and for the *education of the next generation of LTER scientists* (goal 4). Meetings are also useful for *facilitating exchange and integration of data* (goal 2).

  *Annual Meetings.* ILTER will continue to host annual meetings through which members will develop collaborative scientific efforts, share research findings from the local to the international level, and conduct ILTER administrative business, including monitoring and evaluation of ILTER's progress toward its goals and objectives as laid out in this document and the accompanying operations plan, and revising by-laws and updating the strategic and operations plans as necessary.

  Over time, with the addition of ILTER staff members, future meetings will have more consistency (i.e. be less restricted by the limitations of a particular country network), and will be increasingly focused on research collaboration and less on administration.

  *Regional Meetings.* Regional meetings will continue to be managed at the regional level, but may also include increased coordination through the ILTER structure to ensure consistency. ILTER will examine whether regional meetings should follow and agenda discussed and approved by the Coordinating Committee at each annual meeting.

  *Topic / Discipline Meetings.* ILTER may also conduct meetings on the topics of common research that the organization chooses to undertake.

- **Education.** In order to reach goal 4, *facilitate education of the next generation of LTER scientists*, ILTER will facilitate the inclusion of junior scientists and graduate students in collaborative research projects, ILTER meetings and ILTER publications. Whenever possible, ILTER will coordinate exchange opportunities for graduate students and junior scientists. Additionally, ILTER members may offer their research sites educational resources for elementary and secondary curricula and schools, and for higher education institutions.

- **Member Communications.** Through email, list-serves, and newsletters, the international community of long-term researchers will be able to stay in communication with one another.

External communications include:

- **Marketing and Branding.** It was clear in both the internal and external interviews that ILTER's brand recognition is very poor. In upcoming years, ILTER will: conduct a strategic analysis of marketing opportunities; examine whether ILTER is the most effective name for the organization; develop a new logo, brochures, and website; explore other marketing opportunities. The Fundraising and Marketing Committee will lead this effort.

- **Outreach.** In addition to general marketing, ILTER will develop relationships or formal partnerships with like-minded organizations to build mutually-beneficial alliances. Groups might include some of those listed in Table 1. ILTER's Executive Director, in close consultation with the Coordinating Committee, will examine what ILTER would offer in such partnerships, the goals for new partnerships, and how such arrangements would be carried out.

## II.5 NEXT STEPS

To achieve its ambitious mission and goals, this strategic plan is accompanied by a five-year operations plan that provides more specific objectives and action items for the organization's upcoming years. ILTER's Coordinating and Executive Committees will revisit the strategic and operations plans annually to monitor the organization's success and identify challenges. The operations plan will be modified on an annual basis to ensure it remains relevant and current.