

2007 In Review

Our trees in Winter, Spring, Summer, and Fall. In 2007 many cities—including Baltimore—commit to planting trees to increase urban canopies.



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BES Funding and Research Partners

Federal funding and research partners:

National Science Foundation
USDA Forest Service

Charter principal institutions:

Gund Institute for Ecological Economics
Institute of Ecosystem Studies
Parks and People Foundation
The Johns Hopkins University
University of Maryland, Baltimore County
University of North Carolina
USDA Forest Service
US Geological Survey
Yale University

Co-Principal investigators from the following public and private institutions:

Arizona State University
Center for Watershed Protection
Columbia University
Fordham University, Louis Calder Center-Biological Station
Gund Institute for Ecological Economics
Institute of Ecosystem Studies
The Johns Hopkins University
King's College, London
Maryland Department of Natural Resources, Forest Service
Ohio University
Parks and People Foundation
San Diego State University
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University of Missouri, Columbia
University of New Brunswick
University of North Carolina, Chapel Hill
University of Pittsburgh
University of Vermont
USDA Forest Service
US Geological Survey
Urban Ecology Institute
Urban Interface

Director's Note:

I want to thank the BES researchers and staff who contributed to much of the success of our Mid-term Review. This truly was a successful group effort. Now we turn our attention toward using the suggestions from the review, as well as those generated at the Steering Committee Meeting, to help guide our planning for the renewal proposal. I encourage all BES Co-Principal Investigators to participate actively in the Quarterly Research Meetings that will be such a key part of our planning process. In addition, we will be planning specialized meetings to identify new or synthetic research questions and methods because of the breadth of topics we must address. An important guiding question as you attend or prepare for research meetings is, "How does my research conceptually and methodologically link with research in other areas of BES?" This question is especially important when it crosses major disciplinary boundaries, such as social-biophysical. Watch for details of these meetings and other opportunities to plan for the BES renewal.

Steward J.A. Pickett

Information Manager's Note:

The importance of LTER Information Science Meetings

In ecological information management opportunities to learn do exist but they're not the "run of the mill."

Computer science degrees have been offered at universities for some time now but not until very recently have information science curriculums been offered. Training venues, such as those that are available for let's say, PhotoShop, do not exist for information science. Additionally, there are tons of great books on the very latest programming languages and platforms, but little in the way of information science.

So how do we learn? I'd say the bulk of my learning comes from collaborating with other information scientists at conferences and meetings. These functions allow us to gather knowledge by meeting and collectively discussing our work and shared experiences. As we share common goals we overcome common hurdles. This is why the Information Management Committee, its sub-committees, working groups, and annual meeting are crucial to Long Term Ecological Research. The typical LTER IMC meeting

consists of presentations, posters, and breakout groups focused on planning and coordinating Network data management activities.

In a recent article in "Databits," the publication for LTER information managers, Karen Baker of the Palmer (Antarctica) and California Current Ecosystem Long Term Ecological Research sites points out the importance of these venues and identifies three that are of considerable interest for Long Term Ecological information management in particular.

American Society for Information Science and Technology (ASIST): At 60 years, this is the oldest of the three and I hope the LTER IMC forms a relationship with this organization. One of their goals is to promote the opportunity and atmosphere for professional exchange. They hold an annual conference and publish a bi-monthly bulletin. There are also a number of "special interest groups" exploring topics such as knowledge management, classification research, human-computer interaction, social informatics, information architecture, digital libraries, and history and foundations of information science.

They are online at <http://www.asis.org>

Hawaii International Conference for System Sciences (HICSS): The conference objective is to provide an environment for researchers and computer science professionals to discuss their ideas, techniques and applications. Instead of fostering specialized sub-groups though, HICSS takes a more generalized approach, addressing areas such as computer science, information systems, and computer engineering. (It should be noted that the annual HICSS conference takes place in Hawaii and that resulting expense reports could raise some eyebrows.)

Online at: <http://www.hicss.org>

The Digital Curation Conference (DCC), formed in 2005, is the youngest of the three groups. This group promotes the curation and preservation of information. They focus on the development of tools and methods to make information generated by research projects available to the community.

Online at: <http://www.dcc.ac.uk/events/#conferences>

Karen Baker's Databits article is online here:

<http://intranet.lternet.edu/archives/documents/Newsletters/DataBits/07fall/#fa1>

Jonathan M. Walsh

2007 In Review:

BES Mid-term Review by a team representing the National Science Foundation took place at the UMBC Campus on March 28-29. The six-person team reviewed the annual report, selected publications, BES website, as well as the comments on the renewal proposal from the panel review conducted in 2005. BES Co-PI's gave short presentations on representative research projects, information management, education and outreach as well as arranging a field trip to three of our research sites including: Glyndon Catchment, Watershed 263, and Carroll Park. Additional meetings and informal gathering with BES scientists, students, and staff, and with community leaders, and agency partners also took place during the site visit. In their report, the Review Team identified both strengths and areas for improvement: "The Team's overall assessment is that the BES LTER encompasses an impressive breadth and depth of research that cuts across physical, biological and social areas. At the same time, the Review Team has identified a number of areas of improvements to realize the LTER full potential. In discussing potential areas for improvement, we did so with an eye towards the second renewal proposal process that the BES LTER will soon undertake."

Information Management Highlights

BES Information Manager Jonathan Walsh wrote a program to convert the BES metadata to a form called Ecological Metadata Language (EML). EML is a structured form of metadata that can be read directly by other computers. Using EML, the metadata for all of the LTER sites are combined into one large database. This larger database can be searched and is structured in such a way that the results contain the web address of the actual dataset.

The BES website and home page was re-created and launched.

We created a WIKI—a web tool to provide access to and sharing of information. It can be accessed at www.beslter.org/perspective

The Education section of the website was completely remodeled.

The Education Team put a great deal of education content – for students and teachers – on the WIKI.

New soil temperature and stream chemistry data is on the ftp site. The ftp site is not publicly available, but those new datasets will soon be online and available for the general community.

"Developing and Evaluating Social Science Approaches for the Baltimore Ecosystem Study LTER: Local Focus, Global Thinking," was held in Baltimore January 17-18. There were approximately 23 researchers who took part from Baltimore as well as from across the country. The objectives of the workshop were to:

1. Improve social science and interdisciplinary approaches in the BES.

2. Explore different social science and interdisciplinary approaches to urban ecology in general, with particular attention to the needs for and opportunities to enhance existing and develop new social science theories, methods, and analyses.
3. Consider how existing biophysical science approaches can be modified to benefit from and contribute to social science urban ecological research.
4. Share the results of this “state of the science” workshop with a larger community of researchers and practitioners by publishing the results in a special issue of a social science journal.

SuperKidsGrow mentioned on National Public Radio July 9, 2007 – Research has shown that low-income school kids lose an average of two months of reading achievement over the summer. Programs like SuperKids Camp engage children in various activities including those that enhance their reading and math skills. Jackie Carrera of Parks and People is interviewed in this brief piece.

Education was well represented at the Ecological Society of America Annual Meeting in San Jose, CA. The ecology teaching study was presented in a session which included Richard Louv, well-known author of “Last Child in the Woods.” He is the spark behind the No Child Left Inside movement. It’s good to have our study data recognized at that level.

A teacher workshop, “**Teaching Urban Ecology in Baltimore**” was held over a four day period. Ten teachers attended from city/county public and private schools with one third of the teachers from Baltimore City schools. This was our most ambitious workshop to date.

The Summer **Branches** (Building Resources and Nurturing Community Health & Environmental Stewardship) group went very well. The closing ceremony included good PowerPoint presentations put together by the kids. They presented very well and took pride in their work. The students definitely flourished between the beginning of the program and the end. Parks and People is figuring ways to keep kids involved throughout the year.

The May/June issue of Zoogoer Magazine included an article by Christopher Mims entitled, “**A City's Living Secrets.**” The article describes the NSF LTER program and focuses on BES as well as CAP urban LTERs. Several of our Co-PI’s were interviewed for the article. Check it out at: http://nationalzoo.si.edu/Publications/ZooGoer/2007/3/citys_secrets.cfm

Trees

Baltimore is one of the cities mentioned in the Christian Science Monitor article, “How to bring shade to a city: Four East Coast cities are using satellite mapping to set environmental goals and plant more trees,” by Amy Brittain. www.csmonitor.com/2007/0801/p13s01-sten.htm In the article Morgan Grove describes the FOS (Forest Opportunity Spectrum) forest mapping technology—which fuses satellite images with a flexible model for classifying land parcels and analyzing cities’ environmental goals.

Researchers who became **BES Co-PI's** during 2007: Mike Koterba, US Geological Survey; Charlie Lord, Urban Ecology Institute; Dave Tenenbaum, University of Massachusetts-Boston; and Mary Washington, Parks and People Foundation.

US Geological Survey moved into their new building on the UMBC Campus. This move strengthens collaborative work with UMBC, the US Forest Service, and the Baltimore Ecosystem Study.

Graduate students Erin G. McCarty (advisor Geoff Buckley) and Benjamin Crawford (advisor Sue Grimmond) completed their **theses** in 2007. Erin earned an MA from Ohio University, Department of Geography for her thesis, "Green belt planning in Edinburgh and Baltimore: a cross-site comparison." Ben received an MS from Indiana University for his thesis, "Carbon dioxide fluxes suburban Baltimore, USA."

BES Visitors: We hosted international visitors from the Chinese Academy of Sciences, Zhiyun Ouang and Xiaoke Wang; and Eun-Shik Kim with a group of students from Kookmin University in Seoul, Korea. Other visitors included Stephanie Pincetl of Pacific SW Research Station of the USFS and William Miller from Baker University in Baldwin City, KS. A number of BES folks met with them to discuss the BES and our ongoing research. Dan Dillon was kind enough to take them along to see our stream sampling operations.

Summer Research: BES research activity increases by leaps and bounds. Each summer we have a number of students who are busily at work on various research projects guided by their advisors. Some are REU (Research for Undergraduate) students and others are working toward their theses. Through Claire Welty at the Center for Urban Environmental Research and Education (CUERE) at the University of Maryland, Baltimore County, office space is made available for students and summer researchers. Space at CUERE is always at a premium and BES Co-PI's and researchers are reminded that if they need office accommodations they must notify Claire weltyc@umbc.edu well before summer to assure space for their students.

Humans are now overwhelmingly urban!

According to the United Nations on May 23, 2007, for the first time in history, human population became predominantly urban, not rural. (NY Times article by Richard Conniff, "The Greening of the Urban Animal," 6/11/07) The article also mentions Parks & People in Baltimore.

Graduate Students 2007

The BES welcomes the following incoming graduate students. We look forward to working with you and to your many contributions to the project. Welcome!

Steve Brown

Ohio University
Advisor: Dr. Geoffrey Buckley

Michelle Chevalier

Ohio University
Advisor: Dr. Geoffrey Buckley

Katie Delaney

University of Maryland, Center for Environmental Science
Advisor: Dr. Sujay Kaushal

Jon Duncan

University of North Carolina, Chapel Hill
Advisor: Dr. Larry Band

Andrew Giguere

Ohio University
Advisor: Dr. Geoffrey Buckley

Tracy Kerchkof

University of Maryland, Baltimore County
Advisor: Dr. Claire Welty

Matthew MacLeod

Cornell University
Advisor: Dr. Tom Whitlow

James McConaghie

University of California, Davis
Advisor: Dr. Mary Cadenasso

Katie Middlecamp

University of Pittsburgh
Advisor: Dr. Emily Elliott

Tamara Newcomer

University of Maryland, Center for Environmental Science
Advisor: Dr. Sujay Kaushal

Gwen Stanko

University of Maryland, College Park
Advisor: Dr. Sujay Kaushal

Olyssa Starry

University of Maryland, Baltimore County
Advisor: Dr. Richard Pouyat

Meetings and Events for 2008

2008 Quarterly Research Meetings

Wednesday, 23 January – Topic: Altered Community Structure and Trophic Interactions in Urban Ecosystems. Organizer: Chris Swan

Wednesday, 9 April – Topic: Organic Matter Dynamics. Organizers: Peter Groffman, Sujay Kaushal & Ken Belt

Tuesday, 24 June – Topic: Education. Organizers: Alan Berkowitz, Janet Coffey & Janie Gordon

2008 BES Annual Meeting

Wednesday & Thursday, 15 & 16 October

2008 BES & Parks and People Open House and Greening Celebration

Wednesday, 15 October

2008 BES Steering Committee Meeting

Tuesday, 14 October

ILTER Events

2008 Science Council Meeting in Baltimore

Wednesday-Friday, 7-9 May

LTET Planning Process

LTET Network Decadal Planning Process Comes to a Close

by Mary L. Cadenasso

The Baltimore Ecosystem Study (BES) is a member of the National Science Foundation's Long Term Ecological Research (LTER) network. There are 26 sites in the network, each representing a biome in the United States plus two in Antarctica and one in the Pacific islands. BES represents the urban biome as does our sibling site – Central Arizona Phoenix (CAP). One purpose of the network is to foster cross site collaborations and syntheses of ecological understanding. To help do this, each site is mandated to conduct research in five core areas: 1) primary production, 2) population studies, 3) movement of organic matter, 4) movement of inorganic matter and 5) disturbance patterns.

The LTER network underwent a review 10 years after its establishment. The resulting recommendation was for more cross site integration and syntheses. Now, at 20 years, the recommendation is unchanged. This motivated the initiation of a planning process by the network that has extended almost 3 years. During this time hundreds of LTER scientists have contributed to the process through participation in workshops, symposia, and meetings including the 2006 LTER All Scientists Meeting in Estes Park, Colorado. I served as the BES representative at some of these workshops and other BES participants including Morgan Grove, Peter Groffman, Chris Boone, Jonathan Walsh, Alan Berkowitz, and Steward Pickett were involved throughout.

The goal of the planning process was to develop a vision for how to use the Network to its maximum potential. The vision recognizes that site-based science is strong in the Network, but multi-site, collaborative, highly integrative research activities that explicitly incorporate synthesis should be implemented to take advantage of the unique situation of having a Network. Of course, changes to the science would require changes to the governance structure of the Network and the training and education activities undertaken to infuse Network science into K-12 science curricula and undergraduate and graduate training.

To guide this Network Science vision, a new conceptual framework was developed (Figure 1). The framework is a feedback loop linking the geophysical template and socio-cultural-economic template that underlay the structure and function of ecosystems. That link is mediated through disturbances and ecosystem services. Connections among elements in the conceptual loop are motivated by guiding questions. Because the framework is a loop, its description can begin anywhere. Press and pulse disturbances act on the geophysical template to alter system structure and function. Press disturbances are those that are long-term as opposed to pulse disturbances that are short and discrete in nature. System structure and function reciprocally influence each other on top of a geophysical template that consists of such features as topography, geology, and infrastructure. Functioning ecosystems provide services for humans which may be services to maintain system health or services of direct provisioning utility such as providing food and fiber. "How do altered ecosystem dynamics influence ecosystem services?" is the question linking system structure and function to ecosystem services. Changes in ecosystem services will feed back on the socio-cultural-economic template which includes both

human outcomes and human behaviors. Human behaviors, in turn, influence the press and pulse dynamics of disturbances that influence ecosystems, thereby completing the feedback loop. Finally, the entire feedback loop is influenced by external drivers, such as climate change, that are occurring at space and time scales coarser than those identified when the loop is specified for application to a particular set of questions (Figure 1).

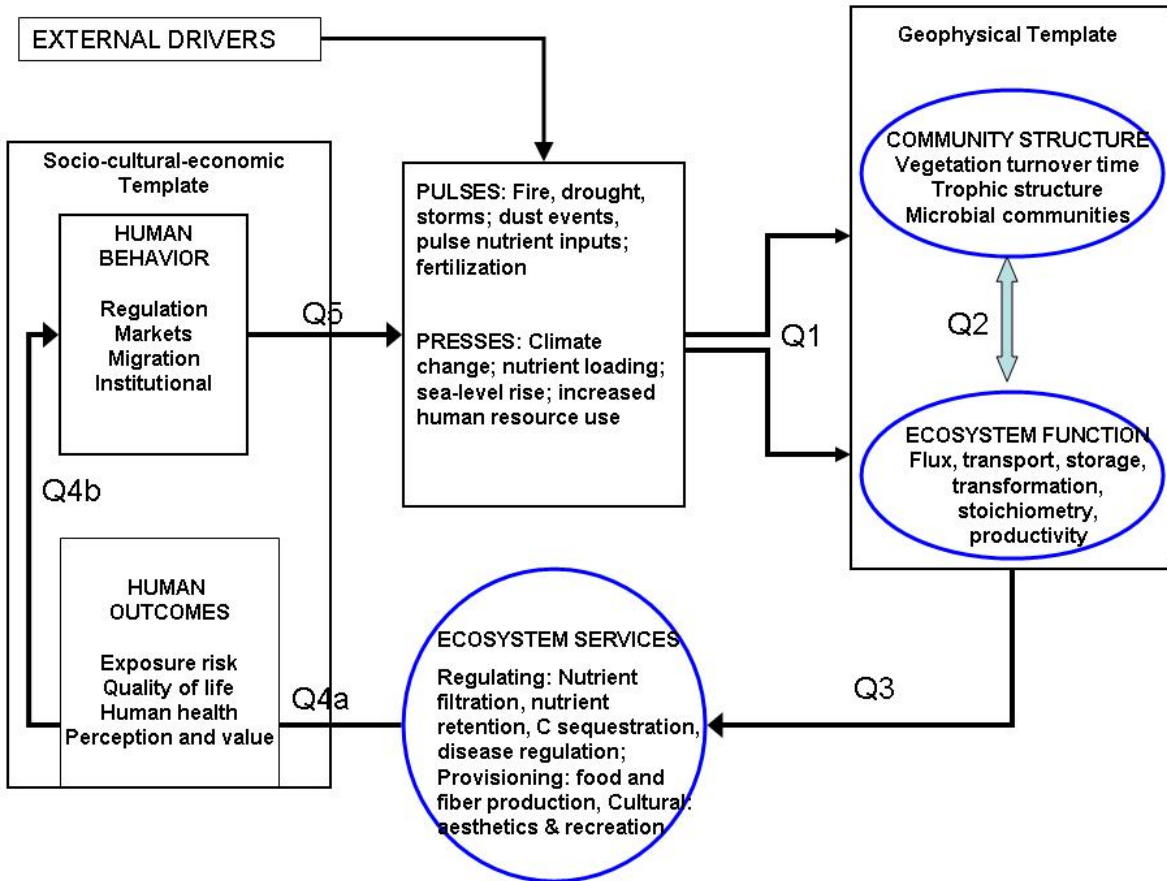


Figure 1. Framework for Network Science. Specific questions motivate each link in the framework.

It is not intended that each LTER site be able to address all of these questions or the complete feedback loop by itself or within every project the site undertakes. Rather, the strategy is to recognize that by exploiting the Network and collaborating across multiple sites, the entire loop can be addressed (Figure 2).

Three grand challenges were selected as themes to begin exploring specific research opportunities to work with this new integrative framework. The three themes are 1) altered biogeochemical and water cycles, 2) altered biotic structure, and 3) climate change and climate variability. All three of these themes resonate across all sites in the Network.

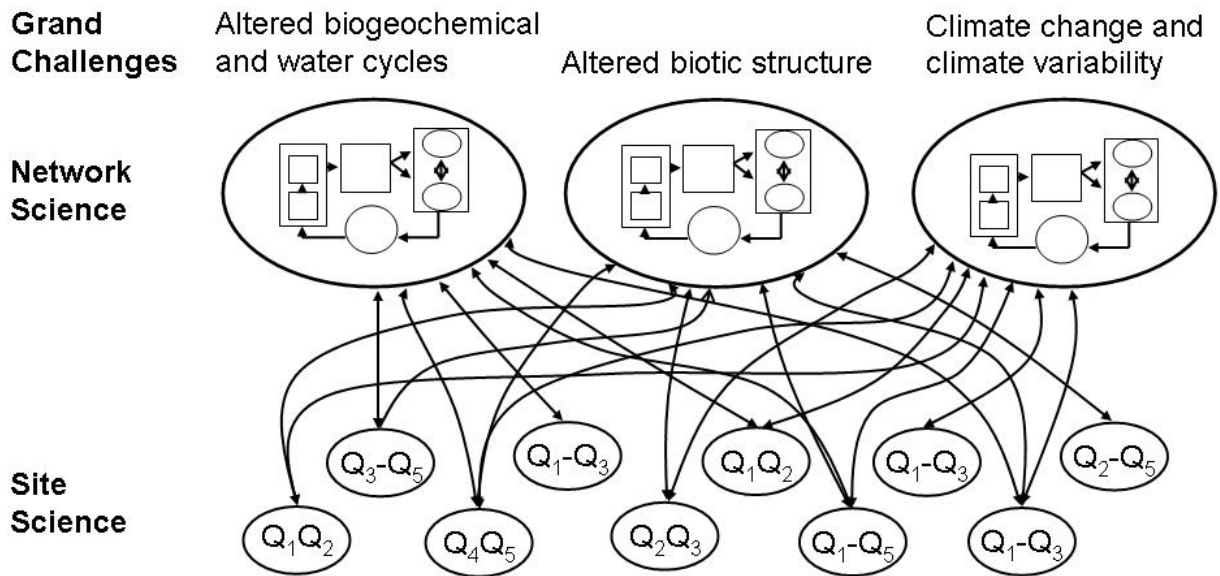


Figure 2. Diagram depicting the multi-site collaboration and synthesis required to do integrated, synthetic Network Science. At the site level, specific research projects may address only a subset of the questions in the framework as indicated by the small ovals. Integration across sites, however, enhances the ability to drive the research around the complete feedback loop. This is required to achieve "Network Science." Three grand challenges have been identified as initial themes around which to develop specific proposals.

Some research efforts within BES, however, do extend around the complete cycle. For example, the work in BES around riparian zone function can be used to demonstrate how the framework can be applied. The addition of impervious surfaces and infrastructure that accompany urbanization is a press disturbance on the landscape that has altered the structure and function of riparian zones in the Gwynns Falls watershed. Rainstorms and the fast removal of water through pipes can be considered a pulse disturbance that also acts on the riparian zones. Both the press and pulse disturbance of altered hydrology has resulted in the undercutting of stream channels, the lowering of the water table, and, consequently, the disassociation of riparian vegetation and soils with groundwater. The drying out of the riparian zone has resulted in an increase in upland species (structure) in these zones and a decrease in the denitrification rates (function). This alteration to system structure and function has led to a change in the ecosystem service riparian zones are expected to provide. Riparian zones are buffers between land and water and function to retain nutrients on the landscape and reduce nitrate, a water pollutant, from entering the stream. A decrease in the denitrification rates means that more nitrate is going into streams from the land and the riparian zone has been altered from serving as a sink of nitrate to serving as a source. This alteration of an important ecosystem service has important outcomes for humans. The

Chesapeake Bay, the ultimate downstream receiver of water input from the terrestrial system, is “impaired waters” according to the U.S. Environmental Protection Agency. And the jurisdictions in the Bay watershed have been mandated to decrease the amount of nitrate entering the Chesapeake by the year 2011 or face regulatory action. In order to restore the ecosystem service of retaining nitrate by increasing the capacity to store nitrogen on land, human behavior has been altered by changing management strategies. Now the entire watershed, not just the riparian zone, is included in opportunities to “green up and grey down” meaning increase vegetation and reduce impervious surfaces thereby slowing down water as it moves through the landscape allowing the land to retain more of it. This is just one example of how BES is knitting together research projects across the program to come full circle around the feedback loop.

Where does this process stand now? In the Spring of 2007 a writing team was established and given the Herculean task of synthesizing all of the input acquired over the previous two years into a proposal to the National Science Foundation. Chris Boone, Peter Groffman, and Morgan Grove served on this committee. The proposal was submitted to the NSF in September and is awaiting evaluation.

Book Review: **by Steward T.A. Pickett**

Review of Christopher G. Boone and Ali Modarres’ book, City and Environment, which was published in June 2007.

Cities: The Greatest Human Invention

This title is a provocative line from the new book by Chris Boone, a Co-PI in BES, and Ali Modarres, entitled *Cities and Environment*. I found this book to be informative and stimulating. I would like to bring this work to the attention of BES members, as a spur to discussion and synthesis. The book is aimed at understanding urban areas as integrated human-natural systems, capable of contributing to sustainability. I approached the book from the perspective of my desire for an articulation of the theory of urban ecological systems. There is much in this book that promotes that goal.

The book comprises six chapters, dealing with 1) urban morphology and the urban ideal, 2) urban demography and development, 3) farmland conversion and suburban development, 4) the role of infrastructure, and 5) green governance and planning. Some of these large topics are familiar and expected in urban textbooks, while others are novel. Even in the familiar subjects, Boone and Modarres almost always include new analyses and new combinations of ideas. This is done in a very easy to read style. The entire package is framed by a passionate vision of sustainable, equitable urban areas.

In discussing urban morphology and the urban ideal, the authors give the expected history of evolution of urban form. However, they do it quite differently than I have seen elsewhere. For instance, they include Islamic cities in the mix. In addition, they bring alternative theories about the origin of urban areas to the table. They also note the role of temporally shifting ideals of what the city is, physically and socially. They show how the roster and relationship of components of cities has changed and how they reflect the desires of certain social groups. A question that emerges: What is the implicit role of ecological knowledge in the

urban ideals of the past? How can ecological knowledge be incorporated into the urban ideals of the present and future? These are important concerns for these authors, though I may put them more in terms of ecological science than they would.

The second chapter deals with urban demography and urban development. Here, the familiar "demographic transition" comes in for major criticism and new analyses. They evaluate the process of consumption to indicate that the demographic transition may be less useful than sometimes assumed as a policy instrument for limiting human population and promoting a wealth driven shift toward environmental conservation. Here, too, they show how the correlates of urbanization that operated in the colonially and industrially supported West, are unlikely to hold in the currently urbanizing global East and South. New threats and crises emerge from the current explosion of urbanization compared to those familiar to us in the history of Baltimore. Importantly, they review new ways of assessing mortality and morbidity, and note that sustainability requires attention both to population and the status of the demographic transition, and to consumption. New couplings of consumption, population, social and spatial differentiation suggest new patterns within the ongoing global urbanization.

The issue of farmland conversion, urban food sustainability, and suburban sprawl are dealt with in chapter 3. The inefficiency of resource use embodied in farmland conversion is a key. And along with the large distances that cities now must draw their food and services from, the idea of a hinterland has become an abstraction, rather than a mappable unit. This leads to an analysis of the ecological footprint, which has become a widely utilized metaphor and aggregate calculation of human impact. Boone and Modarres review criticisms, including the fact that ecological footprints don't account for social processes, they don't measure ecological processes, and they are static, for instance.

Infrastructure is the topic of chapter 4. Here assumptions about the links between structure and behavior are questioned. They enumerate many of the risks and disamenities of current suburban driven infrastructural patterns. The gender segregation of employment, the role of automobiles in violent death, and the fact that cities "make their own floods," are among the topics covered here. The principle that development follows infrastructure is illustrated. A hopeful stance is taken in noting the opportunity to redesign older suburbs and cities to compensate for some of the infrastructural mistakes of the recent past. The neglect and destruction of wetlands as a potentially valuable part of urban infrastructure is rampant, and presents a significant opportunity for redesign.

In chapter 5, health and environmental justice are linked explicitly. Spatial segregation and economic and racial discrimination are themes that emerge through the various other discussions of the city, from evolution to development. This chapter makes the concern and importance of environmental justice patent. The range of dimensions along which spatial segregation, and the differential allocation of environmental risk and benefit can exist in cities and suburbs is large. Environmental injustice has tentacles that reach into many aspects of urban life and urban ecology. Especially as urbanization takes new forms, or combines new social and environmental factors in the global South and East, the differentials in health between city and countryside shift, and new health pressures emerge. The healthy cities movement, appearing in many places in the world, is a positive reaction to the existing and emerging environmental disamenities. This movement also emphasizes that equity in access to environmental goods is important.

The book closes with a chapter that considers the role of green space, green governance, and planning (which we in BES include in our efforts on urban design).

This chapter reviews how green spaces have been used and motivated in cities, and how social control or benefit are among the drivers for design of green and built spaces in cities. How design may fit within democratic or consultative governance to improve environment and health are discussed. Existing movements that aim to contribute to sustainability, such as New Urbanism, are appropriately critiqued. The neglect of older suburbs and brownfields by most new urbanist projects, and the distance between these design fixes and the political and economic drivers of sprawl is noted. The chapter closes with seven reasonable and indeed exciting recommendations for sustainable urban development. The practicality of these recommendations is attractive. But so is their potential to identify the major dimensions of a descriptive (as opposed to normative) integrated urban theory. Let's examine them for their theoretical implications:

Use the best ideas to create urban futures. From a theoretical perspective, this invites ecologists, hydrologists, sociologists, economists, etc., to answer the question, What are the generalizations, laws, models, concepts, or collections of facts each of us would like to see made available to urban designers and planners? We can take a clue from some of the chapters in the book to focus on the relationship between infrastructural networks and spatial heterogeneity as addressed by different disciplines, or the ecological implications of the shift from industrial production to consumption economic models for cities. However, the whole range of concerns and interdisciplinary connections in BES should be included in addressing the question, above. The theoretical implication of this recommendation is that understanding and shaping cities is a multidisciplinary and interdisciplinary pursuit.

Build the city around the person rather than the car. Is there scientific knowledge that each discipline can contribute to understanding the person—as an environmental and social agent, as a member of institutions, as an organism affected by environment—that can facilitate better understanding of the person in the city? What interdisciplinary connections can help better understand persons as an urban focus? Are there ecological processes that reinforce or parallel person-oriented design? How do the ecological effects of car-oriented versus person-oriented design differ? Here the key insight is the theoretical power of combining design and scientific knowledge.

Redesign existing cities and suburbs. This recommendation acknowledges that cities and their components have "life cycles." Where, in space and time, do the "frontiers" or disturbed sites that are ripe for redesign appear? How do the ecological functions of individual redesigned vs persistent parcels differ from the functions of patchworks that contain different kinds and configurations of redesigned parcels? This recommendation focuses on a functional role for spatial heterogeneity throughout the urban mosaic.

Internalize externalities. This recommendation is perhaps most familiar, especially when considering economics and markets. What risks and benefits are not accounted for by the real estate industry and market? What social and environmental inequities are hidden by the way markets are structured? This recommendation highlights the role of economics and globalization in urban dynamics.

Adopt a broad conception of health and the role of environment in health. This recommendation suggests that human health and community health be considered to deal with not only disease and mortality, but also with individual well being, healthy lifestyle, healthy diet, and community cohesion and vitality. Relating these kinds of factors, with their clear connotation of human values invites natural scientists to recognize the role of values and social identity in determining how

people relate to environment. In addition, the social and demographic differentiation in health and healthful behaviors across space, and therefore their potential for differential relationship to ecological structures and processes is open issue. Here, different ways to link ecological processes and structures to risk are themes.

Promote justice and equity. This goal recognizes that spatial differentiation in the allocation of environmental benefits and hazards exposes different social groups disproportionately to these goods and bads. There is great opportunity to measure such environmental differentiation, and to understand its historical roots and temporal trajectories. In addition, natural scientists have the opportunity, if individuals so desire, to become involved in helping communities understand complex data on environmental benefits and hazards. This recommendation acknowledges that research in the city impinges on socially and economically constructed inequities, that this feature of cities is important to understand, and that it is a great opportunity to engage in communication with urban residents and policy makers.

Look to the past and elsewhere for possible solutions. Theoretically, this dictum reminds us that cities are not repeatable molecules that all behave alike under similar conditions. Indeed, not only are individual cities historically and spatially contingent on the time of their founding, the locations they occupy, and the social histories they have experienced, but in fact the physical environment and geographic template condition how they have developed and might change in the future. How to generalize across such diversity is a crucial theoretical issue. This will require attempting to extract a framework from the accumulating cases of urban research. What gradients of contrast are there among cities? Are there useful breakpoints or categories of city type within which generalization is fruitful, and across which contrast or comparison are most appropriate? This recommendation helps keep our attention focused on broader scales and wider contrasts than the detailed, local and regional work that is so fundamental to building the body of knowledge needed to understand the greatest human invention.

This book is a useful guide for us in that pursuit. Thanks Chris!

Administrative & Web Information:

New Access Info Needed

To access to the BES internal website, please contact Jonathan Walsh

walshj@ecostudies.org or 845-677-7600 X 103

for the ID and Password to visit the following link:

<http://beslter.org/internal/frame8-stuff.html>

BES Bulletin contributions—**especially photos** are always welcome.
Contact: beyarh@ecostudies.org

BES Publications Online: BES publications are online in a searchable database. Go to: <http://www.beslter.org> and click on the Publications tab. Note: If your published or submitted work is not listed please send your citations to Holly Beyar beyarh@ecostudies.org

**REMINDER: BES PUBLICATIONS
Guidelines**

One of the goals of Co-PIs of the Baltimore Ecosystem Study is to publish papers specific to BES. Each BES-related publication must include the NSF acknowledgement below. Additionally, if you are the lead author or closest author who is part of BES, you must submit a .pdf or copy of the published paper or work. Please send them to: Holly Beyar, beyarh@ecostudies.org

BES Publication acknowledgement and disclaimer for the NSF:

Any publication, including World Wide Web pages developed under or based on NSF support of the Baltimore Ecosystem Study must include an acknowledgement of that support in the following terms:

***“This material is based upon work supported by
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In any publication, including World Wide Web pages which contain material based on or developed under this award, (other than a scientific article or paper appearing in a scientific, technical, or professional journal) this acknowledgement must be accompanied by the following disclaimer:

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Holly J. Beyar
beyarh@ecostudies.org