

Developing Indicators for Balanced Growth:

Measuring the effects of land use on watershed health

As the Great Lakes region continues to experience rapid urbanization, whereby land is being consumed at a rate that far outpaces that of population growth, it is becoming increasingly evident that watershed health is being compromised. In response, several Great Lakes states have initiatives underway to guide development into areas that already have public infrastructure and services, and protect rural and natural resource areas for agricultural production, flood prevention, water quality, recreation and other ecological services.



New residential development on the rural-urban fringe

Watershed health includes the integrated network of biological, chemical, physical, social and economic considerations within a community or watershed. Land use and development decisions in the Great Lakes region are made by the smallest units of government (villages, towns, cities), but the impact of those decisions – economic, social and environmental – often go well beyond the local jurisdiction and indeed across the local watershed.

Watershed health is influenced by interrelated biological, chemical, physical, social and economic components.

Many states have recognized this with watershed planning initiatives throughout the Great Lakes, including Ohio, which established its Balanced Growth Program in 2004. Like other state and local “smart growth” programs, Ohio’s Balanced Growth Program aims to address the issues of land use and development in ways that are fiscally responsible, socially beneficial and environmentally protective. It does this by calling

for the voluntary local government designation of Priority Conservation Areas (PCAs) and Priority Development Areas (PDAs). While other smart growth programs set up a call for similar action requiring coordination among multiple municipalities, Ohio’s program is unique in that the approach is based on watersheds, not political boundaries. The Balanced Growth Program calls for the establishment of local watershed planning partnerships comprised of local governments, planning agencies, nonprofit organizations, and other parties.

Another forward-looking aspect of Ohio’s Balanced Growth Program is the recognition upfront of the need to be able to measure whether the program is having its intended effect. Accordingly, the program calls for the establishment of a series of indicators to measure progress and effectiveness related to programmatic accomplishments, land use changes and natural resource improvements.

More information on the full set of task force recommendations is available on the Ohio Lake Erie Commission website at: www.epa.state.oh.us/oleo/openhouse.htm.

Developing indicators for balanced growth

In 2004, the Great Lakes Commission approached the Ohio Lake Erie Commission (OLEC) to conduct a land-use roundtable as part of its land-use roundtable series. The round-



table series builds on previous work conducted by the Commission to identify state-specific strategies for balanced growth, which are presented in a report called Linking Brownfields Redevelopment and Greenfields Protection for Sustainable Development (available at: www.glc.org/bridges/finalreport.pdf.) Accordingly, the Commission’s round-

table series enables staff to engage individual states and key stakeholders to promote the recommended strategies through the design and conduct of a land-use policy roundtable that addresses brownfields-greenfield linkages. Each roundtable

Next steps

The process of developing indicators to measure and evaluate the results of future pilot projects and the larger Balanced Growth Program was an important first step toward implementation of the program. The roundtable proved to be an excellent process for engaging stakeholders at various levels in the development of a first suite of indicators for the program. Indeed, the Ohio experience could be used as a model to develop indicators for other state programs addressing land-use issues. With indicators in place, policy makers, scientists, managers and the general public can better determine whether such programs are having the desired affect on land use, development trends and the expected socioeconomic and environmental outcomes (e.g., improved watershed health).



The declining health of a forested open-water wetland can indicate environmental concerns potentially caused by human influence.

The revised indicators, as presented in the preceding table, have been presented to the Ohio Lake Erie Commission with the recommendation that Tier One indicators be implemented immediately by Ohio agencies and organizations to track progress toward achieving balanced growth. Tier Two indicators were recommended with the need for minor modifications before implementation, and Tier Three indicators were acknowledged to need significant review and revision.

Since the January 2005 roundtable, the Ohio Lake Erie Commission has been using guidance provided in the roundtable outcomes to help launch implementation of the Balanced Growth Program. With funding from the Ohio Water Development Authority, pilot project grants have been awarded to three local watershed partnerships representing urban, suburban, and rural watersheds in Ohio’s Lake Erie basin to demonstrate multijurisdictional and multistakeholder participation in the development of a Watershed Balanced Growth Plan.

Acknowledgments

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- Case Western Reserve University
- Cleveland State University’s Maxine Goodman Levin College of Urban Affairs
- Cuyahoga County Planning Commission
- EcoCity Cleveland
- Michigan State University
- Ohio Department of Development
- Ohio Department of Natural Resources
- Ohio Lake Erie Commission
- Ohio Sea Grant
- Ohio State University
- Ohio State University Extension
- Toledo Metropolitan Area Council of Government

For more information

For more information on Ohio’s Balanced Growth Program or the Ohio roundtable event, please contact the Ohio Lake Erie Commission at (419) 245-2514 or visit www.epa.state.oh.us/oleo/openhouse.htm.



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builds upon past accomplishments as well as current initiatives within the state. See www.glc.org/landuse.



Social and economic influences intersect with natural systems in waterfront settings such as this on Lake Erie.

OLEC and the Commission determined that developing a set of balanced growth indicators would serve the goals of both the Balanced Growth Program and the Commission's roundtable series. The match was further enhanced by Commission staff experience in the area of land-use indicators through the biennial State of the Lakes Ecosystem Conferences. Over the course of 6 months, Commission staff worked with a multistakeholder committee to develop a suite of 27 draft indicators, which included:

- Natural resource indicators (measuring changes in the condition of the resource or watershed health)
- Land-use and socioeconomic indicators (measuring land use and socioeconomic changes)
- Programmatic or performance measures (measuring actions carried out as part of the Balanced Growth Program)

The Steering Committee used the following criteria to develop an indicator suite that reflected short-term, intermediate and long-term outcomes:

- Data are available, dependable and collected at an appropriate scale
- Information is meaningful and relevant to key decision makers in diverse settings
- Information is attributable to the Balanced Growth Program or can be associated through applications of the Balanced Growth Program conceptual model

Fact sheets were developed for each indicator, which identified important details and criteria, such as the purpose and objec-

Suite of Proposed Indicators	
Natural Resource Indicators:	
Change in Water Chemistry Change in Water Clarity Change in Stream Morphology Characteristics Change in Volume of Water Withdrawn (Ground and Surface Waters) Change in Number of Combined Sewer Overflow and Sanitary Sewer Overflow Events Change in Aquatic Habitat and Biotic Quality Change in Extent and Condition of Riparian Corridors Change in Extent and Condition of Riparian and Coastal Wetlands Change in Percent of Watershed Dominated by Non-Cultivated Lands	
Land Use and Socioeconomic Indicators:	
Change in Impervious Surface Cover Change in Residential and Other Development Density (Dwelling Units per Acre, Building Square Footage per Acre) within Priority Development Areas (PDAs) vs. Outside PDAs Change in Percentage of New Commercial and Industrial Building Floor Area and New Housing Units Going Into PDAs vs. Rest of the Watershed Change in Property Values Change in Public Economic Development Investment in PDAs Change in Public Conservation Investment in Priority Conservation Areas (PCAs) Change in Population Density in PDAs Change in Average Commuting Distance to Work for People Living in PDAs Change in Level of Awareness of Balanced Growth Initiative (BGI) in Watershed	
Programmatic Indicators:	
Change in Number of Watersheds that have a Balanced Growth Watershed Planning Partnership Change in Number of Endorsed Watershed Plans Change in Number of Local Comprehensive Land Use Plans in Watershed that Identify PCAs and PDAs to Guide Local Land Use Decisions Change in Number of PCAs and PDAs and their Location Change in Number of Acres (within PDAs and PCAs) Converted From Green Area/Open Land to Urban Uses Change in Number of Acres of Land in Conservation/Protected Status in PCAs Change in Number of Best Management Practices in Watershed and their Locations Change in Percent of Agricultural Fields with Nutrient Management Plans Change in Number of New Home Sewage Treatment System Permits per Year	

tive under the Balanced Growth Program, scale, data location and availability, and potential limitations.

An Ohio land-use roundtable

The Ohio roundtable event, entitled Measuring Change Toward Balanced Growth, took place at Cleveland State University's Maxine Goodman Levin College of Urban Affairs on January 21, 2005. With nearly 70 individuals representing local, state, regional, federal, and academic interests within the Ohio Lake Erie basin, the roundtable provided a unique forum to acquire feedback on the proposed suite of 27 indicators.

Roundtable participants evaluated and refined the suite of proposed indicators through several in-depth, issue-specific breakout sessions. These sessions provided an opportunity for the participants to employ their wide array of expertise by making suggestions, revisions, and clarifications for the proposed indicators. In several instances, participants recommended deleting or merging the existing indicators and, where necessary, developing new indicators.

Participants also identified other programs within the state that could benefit from the collection of data (e.g., statewide aerial photos and updated land use maps) through the indicator process. Needs for these data by other programs might add value to the Balanced Growth Program's indicator suite and aid in the collection of data that are not currently available and/or easily collected.

Following the morning breakout sessions, roundtable participants utilized an electronic interactive voting system to collectively prioritize the indicators. Participants assessed each indicator subset (natural resource, land use and socioeconomic, and programmatic) according to data availability, effectiveness and attributability to the Balanced Growth Program through a series of facilitated questions. Through the voting system, anonymous and instantaneous visual results from the exercise were then presented to stimulate further group discussion, such as effective ways that the indicators could be assembled and communicated to professional staff and decisionmakers within the state. Building on the outcomes from the morning sessions, this plenary session produced a prioritized list of the indicators as shown at right.



Ed Hammett, executive director of the Ohio Lake Erie Commission, introduces the Ohio Balanced Growth Program.

Tiered List of Revised Indicators	
Tier One Indicators (12): Ready to Implement	
Change in Water Chemistry (Nat. Res.) Change in Biotic Quality* (Nat. Res.) Change in Impervious Surface Cover (Land Use/Soc) Change in Residential and Other Development Intensity (Dwelling Units per Acre, Building Square Footage per Acre) in PDAs vs. Outside PDAs* (Land Use/Soc) Change in Percentage of New Commercial and Industrial Building Floor Area and New Housing Units Going Into PDAs vs. Rest of the Watershed (Land Use/Soc) Change in Public Economic Development Investment in PDAs (Land Use/Soc) Change in Public Conservation Investment in PCAs (Land Use/Soc) Change in Number of Watersheds that have a Balanced Growth Watershed Planning Partnership (Prog.) Change in Number of BGI Endorsed Watershed Plans* (Prog.) Change in Number of Local Comprehensive Land Use Plans in Watershed that Identify PCAs and PDAs to Guide Local Land Use Decisions (Prog.) Change in Number of PCAs and PDAs* (Prog.) Change in Number of Acres of Land in Conservation/Protected Status in PCAs (Prog.)	
Tier Two Indicators (6): Need Minor Adjustments	
Change in Water Clarity (Nat. Res.) Change in Stream Channel Stability* (Nat. Res.) Change in Extent and Condition of Riparian Corridors (Nat. Res.) Change in Extent and Condition of Wetlands* (Nat. Res.) Change in Population Density in PDAs and PCAs* (Land Use/Soc) Change in Rate of Acres (within PDAs and PCAs) Converted From Green Area/Open Land to Urban Uses* (Prog.)	
Tier Three Indicators (9): Need Major Reworking	
Change in Volume of Water Withdrawn (Ground and Surface Waters) (Nat. Res.) Change in Number of Combined Sewer Overflow and Sanitary Sewer Overflow Events (Nat. Res.) Change in Percent of Watershed Dominated by Non-Cultivated Lands (Nat. Res.) Change in Property Values (Land Use/Soc) Change in Average Commuting Distance to Work for People Living in PDAs (Land Use/Soc) Change in Level of Awareness of BGI in Watershed (Land Use/Soc) Change in Number of Best Management Practices in Watershed and their Locations (Prog.) Change in Percent of Agricultural Fields with Nutrient Management Plans (Prog.) Change in Number of New Home Sewage Treatment System Permits per Year (Prog.)	
* Indicator title was changed to reflect comments received during the Ohio roundtable.	