The Washington State Joint Legislative Audit and Review Committee (JLARC) conducted a review of the state's efforts to conserve habitat and expand outdoor recreation. This work included a review of existing or potential objective outcome measures that could be used to evaluate the success of 13 land acquisition and regulatory programs intended to protect and conserve habitat and expand outdoor recreation. Based on the effective outcome measures found in the peer-reviewed and gray literature, communications with managers from similar programs in the U.S., and the project team's professional opinion, it was found that there is very little literature that focuses specifically on outcome measures as they relate to land acquisition intended to protect and conserve species, habitats or to expand outdoor recreation; however a number of states and regions have implemented outcome measures for acquisition, and guidance is available from the extensive literature on restoration program and project effectiveness.

Introduction

Developing strategies to effectively measure ecological outcomes linked to specific programs and projects is an essential, but not simple, task that remains generally elusive in practice (Dale and Beyeler, 2001; Sawhill and Williamson, 2003; Niemi and McDonald, 2004; Doren et al., 2009; Margoluis et al., 2013). There are many examples of project-level effectiveness and projects that have laid out clear outcome measures linked to the project goals, such as Hartema et al. (2014). At the programmatic and regional levels, examples of these outcome measures are more difficult to find. For an example of a regional evaluation of the cumulative effectiveness of multiple projects see Diefenderfer et al. (2016). For a model-based evaluation of restoration project impacts at a watershed scale see Roni et al. (2010).

Some researchers note that the increased demand for outcome measurement, particularly ecological outcomes, does not imply that they are useful for decision making or that they are frequently used (Turnhout et al., 2007). Others argue that aligning outcome measures (indicators and metrics) with the mission and goals of an organization, program, or project can change it profoundly.

Margoluis et al. (2013) argue that to measure success in conservation three questions must be answered: (1) are we achieving our desired impact?; (2) have we selected the best interventions to achieve our desired impact?; and (3) are we executing our interventions in the best possible manner? Another question to add to this list is (4) who is the audience and who will care about the effectiveness of our program and our actions?

Outcome measurement processes are based on the selection of indicators and metrics, and the choice of indicators and metrics will directly impact the results of the process (Behan et al., 2017). To understand which indicators and metrics have been shown to effectively measure the performance of land acquisition and regulatory actions, we focused our efforts on peer-reviewed literature, agency publications, and on programs that would help provide information about 'best practices' for outcome measures that were not found in peer-reviewed or agency publications. By best practices we were looking for *outcome measures* (i.e., indicators and metrics) and programs that were effective, innovative, or promising.

Due to the complexity and nuances related to the links between the protection of species, habitats, and water quality with growth management regulatory programs, this section is not a comprehensive compendium of the indicators and metrics used to create effective outcome measures. Rather it is a compilation of effective outcome measures and practices based on our literature search, conversations with program managers, and the opinions of the project team within the timeframe of the project. The complete report (Behan et al., 2017) provides many more details concerning the development of outcome-based indicators from the literature, along with information on all of the other related programs and subject areas evaluated in the JLARC study.

Background

Washington's Growth Management Act (GMA) is the state law aimed at comprehensively planning for and coordinating land use among jurisdictions in ways that encourage compact urban development in designated urban growth areas, reduce sprawl, and conserve resource lands and critical areas (State of Washington Department of Commerce, 2017). Under the GMA, growth is to be managed in ways that protect "critical areas" from threats posed by uncoordinated and unplanned growth. The mechanism for achieving this protection is the adoption and implementation of local government comprehensive plans and development regulations and that must be guided by 14 "goals":

1. *Urban growth*: encourage development in urban areas where facilities/services exist or can be provided efficiently
2. *Reduce sprawl*: reduce the conversion of undeveloped land into low-density, sprawling development
3. *Transportation*: encourage efficient, multimodal transportation aligned with regional priorities and local plans
4. *Housing*: encourage affordable housing and preserve existing housing stock
5. *Economic development*: encourage economic development consistent with comprehensive plans, promote economic opportunities,
6. *Property rights*: respect right of private property owners
7. *Permits*: process state/local government permit applications efficiently and fairly
8. *Natural resource industries*: maintain and enhance natural resource industries (timber, agriculture, fisheries)
9. *Open space and recreation*: retain open space, enhance recreation, conserve habitat, increase access to natural lands, develop recreation facilities
10. *Environment:* protect the environment and enhance quality of life, air/water quality, and water availability
11. *Citizen participation and coordination:* encourage citizen involvement in planning process
12. *Public facilities and services:* ensure public facilities/services serve development
13. *Historic preservation:* encourage preservation of places with historical/archaeological significance
14. *Shorelines of the state:* goals and policies of the shoreline management act as set forth in the Shoreline Management Act (RCW 90.58.020)

The designation and protection of "critical areas" is essential to preserve the natural environment and protect public health and safety. Critical areas include the following areas and ecosystems:

- Wetlands
- Areas with a critical recharging effect on aquifers used for potable water
- Frequently flooded areas
- Geologically hazardous areas
- Fish and wildlife habitat conservation areas

Natural resource production lands such as farmland or timberlands must also be identified, designated, and jurisdictions must adopt regulations to conserve them. However, this analysis will focus exclusively on the "critical areas" protection requirement of the law.

The Department of Commerce is directed by the Legislature to provide technical assistance to counties and cities to develop and update their comprehensive plans and development regulations. This includes direct technical assistance, guidance documents, and grants. However, Commerce does not have the regulatory authority to set minimum standards for components of the plans created by

the counties and cities, and does not set quantitative targets to measure performance. Commerce encourages monitoring of critical areas protection in its administrative rules. However, a survey of counties and cities conducted by Commerce found that 62% of those that responded do not monitor critical areas regulations for efficiency or effectiveness. The most commonly cited reason for not monitoring outcomes was the lack of access to useful tools and data.

In 1995, the Shoreline Management Act (SMA, 1971) was adopted as a "fourteenth goal" within the GMA (RCW 36.70A.480). Both the GMA and SMA require local jurisdictions to develop land use plans to meet state goals. The land use plan under the SMA is called a Shoreline Master Program (SMP) and applies to shorelines (defined in statute), and the land within 200 feet of the waterline. Rather than require two separate plans for these areas near shorelines, an SMP updated after 2003 can be used to comply with the GMA for critical areas protection. Unlike GMA plans and regulations that are effective upon local adoption, SMPs must be approved by Ecology before they are effective. Ecology's review, and any subsequent review by Hearings Boards or courts, is limited to whether the proposed changes are consistent with the SMA and master program guidelines (WAC 173-26, Part III).

Policy goals and governing principles of the SMA are laid out in the Master Program Guidelines, sections WAC 173-26-176, WAC 173-26-181 and WAC 173-26-186. These guidelines provide a bit more information about expected outputs and outcomes, but they do not include targets for each element that is to be conserved. As a result, while the statutes and guidelines are fairly specific about which elements "must" be protected, no statewide targets are set for maintenance of natural conditions, and there is no requirement for targets in the SMPs that could be used to measure progress, or evaluate performance. In approving a comprehensive SMP update, Ecology formally concludes that the SMP will result in "no net loss of ecological functions necessary to sustain shoreline natural resources. WAC 173-26-185(8). So if ecological functions are defined in this process, a baseline for measurement could be available.

Literature

As mentioned above, the definition of "critical areas" includes wetlands, areas with a critical recharging effect on aquifers used for potable water, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. Thus, rather than repeat the details of state management programs for the specific types of critical areas, this summary will focus on approaches to monitoring outcomes related to overall land use patterns, and their impact on areas designated as "critical" under local critical areas regulations.

A key challenge to effective performance measurement in Washington stems from the State's role in growth management planning, which largely involves providing guidance and funding to local jurisdictions. It is those local jurisdictions that take the lead in planning – and in implementing the plans.

In a set of recommendations prepared for the National Fish and Wildlife Foundation, Sellner et al. (2011) conducted an extensive literature review of best management practices and metrics for assessment of projects funded within the

Outputs

A short list of outputs identified in agency materials, or provided by JLARC, about the programs relevant to growth management:

- # of cities and counties with shorelines that have an approved, updated Shoreline Master Program (SMP)
- # of counties and cities that have both designated (mapped or described) critical areas and adopted regulations that protect them
- # of counties and cities that have updated their critical areas regulations at least once
- Implementation of regulations that protect the functions and values of critical areas (including ecosystem components and public health or safety)
- # of local governments receiving technical and financial assistance for critical areas regulation updates
- # of approved permits, consistent with SMPs and critical areas regulations

Outcome statements

The primary outcomes the project team identified from the objectives in the enabling legislation of the program:

- Critical areas values defined by the GMA are protected from threats posed by uncoordinated and unplanned growth
- The State's shorelines are protected from uncoordinated and piecemeal development, consistent with state and local laws, preserving the natural character, resources and ecology of the shoreline
- Priority given to uses that require a shoreline location, consistent with control of pollution and prevention of damage to the natural environment, or are unique to or dependent upon use of the state's shoreline

Chesapeake Bay. Their proposed metric for the development of code and/or ordinance revisions is to "assess progress made in accomplishing planned milestones," with a list of suggested planning milestones. This approach aligns closely with Commerce's strategy of tracking the development and updating of local plans under the GMA and SMA. However, it leaves open the question of whether the plans are being implemented effectively, and achieving their intended outcomes.

To overcome the obstacle of having customized metrics that are tailored to each local plan, it should be possible to identify the list of "statewide values" that the cities and counties are required to address, and create a set of metrics to assess overall land use and growth trends across the state. Table 1 (below) lists the most commonly cited land use and growth indicators and metrics, drawn from a set of the most widely cited examples of good outcome measurement.

In practice

Best practices for "smart growth" call for mixed uses, compact development, revitalizing urban centers, preserving farms and working forests, and protecting open spaces. The scale at which indicators are measured is important because it can significantly influence the results. But the scale of analysis, in practice, is often dictated by availability of data.

Best practices in code and/or ordinance review. The report, *Metrics and protocols for progress assessment in Chesapeake Bay Stewardship Fund Grants* (Sellner et al., 2011) offers a succinct list of the best practices in planning, specifically as it relates to conducting a code and/or ordinance review in order to ensure consistency with GMA and SMA guidelines:

- Select a committee responsible for review.
- Identify existing development rules in the community.
- Identify guidelines to use for review.
- Develop timeline for completion of review.
- Compare existing rules with model development principles (e.g., state guidelines or STAR community certification requirements, see references).
- Identify rules for potential revision.
- Develop a local site planning roundtable to negotiate revisions
- Draft code and/or ordinance.
- Propose an overlay district for protection of a specific resource (e.g., critical areas).
- Develop a strategy for shepherding the "draft" through the adoption process.

Best practice: STAR Communities Program certification approach. Another approach that aims to reinforce best practices in smart growth at the municipal level is the STAR Communities program. This program uses a certification approach based on performance criteria that must be demonstrated by communities that wish to be certified. Key rating factors that relate to the GMA and SMA goals include:

Outcome 1: Natural Resource Areas

- A: Maintain natural resource acreage at 20 acres per 1,000 residents or greater.
- B: Maintain natural resource acreage at 11.5% or more of total jurisdictional land area.

Outcome 2: Wetlands, Streams, and Shoreline Buffers

- Achieve no net loss of wetlands, streams, and shoreline buffers.

Outcome 3: Connectivity

- Increase the amount of natural or restored areas directly connected to regional natural systems in order to improve ecosystem services.

Outcome 4: Restoration

- A: Reduce the difference between the actual acreage restored and targeted acreage established in the natural systems plan or land conservation plan.
- B: Restore degraded natural resource areas at a ratio greater than 1% of developed land area in the jurisdiction.

Washington State has four STAR Communities recognized under this certification system: King County (STAR certified), Tacoma (STAR certified), Seattle (STAR certified), and Bellevue (Reporting community).

For growth management outcomes, the most relevant indicators found in the literature or identified practices are included in the table below.

Conclusions

Methods for developing meaningful outcome-based indicators are clearly identified in the literature. They are being put into practice successfully in a few states, but generally very sparsely across the country, and rarely for species and habitat focused land acquisition programs, although a bit more widely for land use planning. The most effective programs for evaluating program success in land acquisition, water quality protection, and restoration had a few commonalities. First, the legislation that created these programs was relatively specific in describing the types of outcomes desired, so designing an outcome based set of indicators was more straightforward for agencies. Second, the legislation required that indicators of program success be developed and reported on some regular schedule, and funded the development of the indicators and their implementation, often requiring interagency cooperation, which is essential as many agencies and local or regional governments may be involved in program implementation. And lastly, they required statewide (or jurisdiction wide for regional governments such as Tahoe) evaluation of outcomes – which helps to assure the development and measurement of the indicators are not focused on plans or projects.

Growth management programs are particularly difficult to identify key outcomes because they have a diverse set of goals and outcomes that can be mutually exclusive. For these, identifying which goals or outcomes are most important would be the most efficient way to assure statewide outcome indicators were developed and implemented. The proposed outcome indicators from the literature and practice are relatively straightforward and simple to measure, unlike many of the other habitat, species and aquatic focused programs. Assuming key goals are identified, understanding the status and trends of the growth management outcomes is quite possible

Table 1. Indicators and metrics for coastal system outcomes identified in the literature or effective practices

Measure Categories	Indicators and Metrics (Units of Measurement)	Source(s)
Development Patterns	*Area and composition of the urban and suburban landscape* - % of plan area in urban/suburban land use types *Total impervious area* - % of urban/suburban landscape in the plan area with impervious land cover *Rural/urban balance* - % of population growth in urban areas vs. rural areas *Rural growth* - % of parcels developed outside of targeted urban growth areas *Conversion of ecologically important lands* - % change of critical areas to developed land *Climate resilience* - The spatial arrangement of buildings, transportation networks, other infrastructure, and interstitial open space can absorb the impacts of climate change with minimal disruption	Thom and O'Rourke, 2005; Heinz, 2008; Sartori et al., 2011; Hamel et al., 2015; Sustainable Jersey, 2016
Natural Lands	*Area and composition of natural lands in the urban/suburban landscape* - May include an analysis of patch sizes to gauge changes in fragmentation of natural habitats *Area and composition of natural lands overall* - % of lands classified as urban/suburban vs. farmland vs. natural lands *Protected natural lands* - % of natural lands in protected status *Road density* - Length of roads per planning area *Land cover change* - % change of forested land to developed land	Thom and O'Rourke, 2005; Sartori et al., 2011; Hamel et al., 2015
Demographics	*Population* - # of people *Population density* - people per unit area *Population growth* - % of growth over time *Population growth in Urban Growth Areas* - % of growth over time	Thom and O'Rourke, 2005; Sartori et al., 2011; Hamel et al., 2015
Housing	*Housing density in low-density suburban and rural areas* - % of plan area in various classes of housing density, with a sufficient number of classes to detect change	Heinz, 2008

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