

Development Threat Analysis



PENNSYLVANIA
LAND TRUST
ASSOCIATION

A development threat analysis identifies undeveloped lands that are most likely to be developed within a specific time frame. Information is presented in map form.

Introduction 1

Applications 1

Conducting an Analysis 1

- GIS Recommended 1
- Accuracy and Scale 2
- Contracting 2
- Cost 2
- Getting Started 2

Examples in the Mid-Atlantic Region 2

- Resource Land Assessment 2
- Threat Assessment for Smart Conservation 2
- Schuylkill Watershed Priority Lands Strategy 3
- Virginia Development Vulnerability Model 3

Resources at ConservationTools.org 3

Introduction

Governments and conservation organizations use development threat analyses to identify unprotected land that is vulnerable to development over a given timeframe (usually 10 to 20 years). Development projections are primarily based on forecasts of population and employment, as well as features that attract development such as transportation access and public sewer and water service. Some analyses consider land's proximity to employment centers or the strength of a municipality's resource protection ordinances. More sophisticated techniques can include land value projections.

Data selection, collection, and processing methods depend on the intended scope of the analysis and the resources of the government or organization conducting it. (See the "Case Studies" section below for examples of different strategies and techniques.) The data inputs produce a map, usually using geographic information system (GIS) software. A typical map includes a base layer, a layer depicting areas likely to face development pressure, and a layer depicting important natural resource areas. Other layers may map different habitats, proposed infrastructure, floodplains, drinking water sources, current and projected population densities, and sites of historic or archaeological value. There are many options; an analysis is a

flexible tool that can be adapted to a variety of areas and circumstances.

Applications

Development threat analyses enable governments and organizations to use their limited resources effectively by focusing conservation efforts on areas that are both valuable and vulnerable. They encourage proactive conservation: instead of scrambling to react to undesirable development as it occurs, communities informed by an analysis can anticipate and prepare for the future. A large-scale analysis, or the combination of analyses from neighboring areas, can facilitate regional and interstate conservation work.

By showing how development is likely to impact open space, farmland, waterways, and other priority conservation areas, analyses can also guide governments as they develop comprehensive plans, land development ordinances, and open space protections. The findings of an analysis can alert a community to potentially undesirable land use consequences, and inspire the political will necessary to modify existing development regulations or create open space protections. However, if the analysis process does not engage key stakeholders—elected officials, planners, conservationists, community members, and others—it is less likely that the results will ultimately translate into conservation action.

Additionally, an analysis can influence decisions about resource-based industries, like forestry and agriculture. Knowing where development pressure is likely to impact hardwood forests and other resources can help ensure the long-term sustainability of these industries.

Conducting an Analysis

GIS Recommended

The vast majority of analyses use GIS because it allows data from multiple sources to be easily combined

and manipulated. Depending on the GIS software, maps can be shared in a format that allows anyone (even those without GIS software) to view them online. Communicating the implications of an analysis to leaders and community members is easier when anyone with internet access can explore the results themselves.

Accuracy and Scale

The quality of data inputs determines the accuracy and detail of the analysis. Regional-scale datasets are almost always less accurate than local data: since regional data inputs must be consistent across large areas, they use the lowest common denominator for data available. Older, less precise data produces less accurate results. Analysis based on localized data is more reliable because it is more current and specific; however, a lack of available data in a usable GIS format and the relatively higher costs of developing models for smaller areas often makes local analysis difficult. Therefore, economies of scale force most development threat analyses to study a larger geographic area.

Contracting

Development threat analyses require the purchase of GIS software as well as a familiarity with GIS, which takes a substantial investment of time to develop. If your organization or local government lacks GIS capability, you are probably best served by contracting for the analysis. In most cases, organizations and local governments seek the guidance of a planning specialist to advise or conduct the analysis. The Pennsylvania Department of Community and Economic Development offers a [general guide](#) to help municipalities work effectively with consultants.

Cost

Conducting a development threat analysis could cost \$5,000, \$50,000, or any number in between; the cost depends on the research required to select and adapt a suitable technique, availability and quality of data, and processing and presentation of results. An organization with GIS expertise and plenty of accurate data may be able to conduct an analysis at no cost other than staff hours, while another organization might

spend thousands of dollars to hire a consultant and build an interactive website to showcase the map.

Getting Started

To explore the feasibility of conducting an analysis, contact a planner, GIS specialist, university (Earth Sciences or related department), or conservation organization in your area. ConservationTools.org provides a list of county/regional planning commissions and conservation organizations, searchable by location.

Examples in the Mid-Atlantic Region

Resource Land Assessment

Chesapeake Bay Program

The Chesapeake Bay Program's [Resource Land Assessment](#) developed six analytical approaches to assess the value of forests, farms, and wetlands within the Chesapeake Bay watershed using GIS and a variety of data from federal and state-specific sources. One is the [Vulnerability Model](#), which evaluates the relative potential risk of future land conversion to urban uses. Viewers can use the vulnerability layer by itself to evaluate development trends, or combine it with the other layers to help prioritize specific conservation efforts.

Threat Assessment for Smart Conservation

Natural Lands

The Delaware Valley Regional Planning Commission conducted the [Development Threat Assessment for Smart Conservation](#) for Natural Lands. The assessment covered the five-county Philadelphia region. Factors including population and job forecasts, land consumption trends, travel time to employment centers, developable land, availability of public sewer service, and municipal use of resource protection tools were weighed in the assessment. Use of partially or already completely available data allowed the completion of an analysis that would have otherwise been too costly and time-consuming. The results of the assessment are presented in a composite threat assessment map.

Schuylkill Watershed Priority Lands Strategy

Delaware Valley Regional Planning Commission

The Delaware Valley Regional Planning Commission developed the [Schuylkill Priority Lands Strategy](#). Maps showing future development are based on the Commission's regional growth model, the Berks County Comprehensive Plan, and the Schuylkill County Comprehensive Plan. On a county level, the model spatially assigns population and employment forecasts to acres consumed based on attractors (transportation access, public sewer and water, proximity to existing development), discouragements (congestion), and masks (developed land, protected land, wetlands). An *Areas of Friction* map merges the *Combined Priority Lands* map with the *Future Development* map to highlight the most critical areas for conservation.

Virginia Development Vulnerability Model

Virginia Department of Conservation and Recreation

The [Virginia Development Vulnerability Model](#) quantifies the predicted relative risk of development of natural, rural, and other open space lands across the state in a series of GIS maps. Development forecasts are based on travel times to development attractors (urban areas, metropolitan areas, and growth hotspots) and incorporate the legal protection status of conservation lands.

Resources at ConservationTools.org

To find experts and other resources, see the right column of the on-line edition at

<http://conservationtools.org/guides/38>.

Submit Comments

Help improve the next edition of this guide. Email your suggestions to the Pennsylvania Land Trust Association at aloza@conserveland.org. Thank you.

Acknowledgements

[Nate Lotze](#) authored the second edition (2017) and [Andrew M. Loza](#) edited it. [Patty Elkins](#), PP, AICP, of the Delaware Valley Regional Planning Commission served as a reviewer.

[Ms. Elkins](#) authored the first edition (2009) and Peter Claggett of USGS served as a reviewer.

The Pennsylvania Land Trust Association published this guide with support from the William Penn Foundation and the Community Conservation Partnerships Program, Environmental Stewardship Fund, under the administration of the Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation.

Nothing contained in this or any other document available at ConservationTools.org is intended to be relied upon as legal advice. The authors disclaim any attorney-client relationship with anyone to whom this document is furnished. Nothing contained in this document is intended to be used, and cannot be used, for the purpose of (i) avoiding penalties under the Internal Revenue Code or (ii) promoting, marketing or recommending to any person any transaction or matter addressed in this document.

© 2017, 2009 Pennsylvania Land Trust Association

Text may be excerpted and reproduced with acknowledgement of [ConservationTools.org](#) and the Pennsylvania Land Trust Association.