

L-THIA: Long-Term Hydrological Impact Assessment

WHAT IT IS: L-THIA is a universal Urban Sprawl analysis tool that is available to all at no charge through the Internet. It estimates impacts upon runoff, recharge and nonpoint source pollution resulting from past or proposed land use changes. It gives long-term average annual runoff for a land use configuration, based upon actual long-term climate data for that area. By using many years of actual climate data in the analysis, L-THIA focuses on the average long-term impact, rather than an extreme year or storm.

L-THIA results approximate the relative hydrologic and water quality impacts of different land use scenarios. This information can raise community awareness of potential long-term problems and support physical planning to minimizing disturbance of critical areas. It is a convenient tool for screening potential effects of land use change, and to optimize location of a particular land use while minimizing impact on the natural environment

Recent urban sprawl concerns center on several land use change issues. Failure to plan for hydrologic aspects of land use change can result in flooding, stream degradation, erosion, and loss of groundwater supply. L-THIA offers a quick, accessible tool to assess the long-term impacts of land use change.

FORMATS Three versions of L-THIA are currently available or under development. There is a WWW form ("spreadsheet") version, in which the user provides inputs through a simple WWW form. Results in the form of tables, bar charts, and pie charts are produced. There is a WWW GIS version, in which the user has direct GIS functionality in their own WWW browser. This allows them to zoom to the location of interest, create land use maps and obtain mapped LTHIA results within the WWW browser. It is accessible from Purdue's Watershed Site (http://pasture.ecn.purdue.edu/~jychoi/wd_home/) or the Michigan State Digital Watershed site (<http://www.iwr.msu.edu/dw/>) There is also a GIS version (requiring ArcView) in which the user provides a land use and soil map for the area of interest, so that L-THIA can create a series of output maps.

WHAT IT DOES LTHIA assesses the long-term Hydrologic impacts of land use change. These includes surface runoff vs. groundwater infiltration, along with quality changes for 14 non-point sources. It does this based upon computations of daily runoff derived from long -term climate records, soil data, current land use and curve number (CN). It requires no detailed data input, as the needed data is directly accessible for most U.S. planning scenarios.

LTHIA assess impacts upon water quality, watersheds, wetlands. It allows automatic optimum siting of commercial, industrial or residential facilities. At its intermediate and advanced levels it can evaluate dozens of different land uses and per cent impermeability – or be customized to express other land uses and Best Management Practices (BMP's). It evaluates areas from a few acres up to hundreds of square miles, or automatically defined watersheds. The SEDSPEC plugin (<http://www.ecn.purdue.edu/runoff/sedspec/>) allows calculation of peak flood rates for a land use change, along with selection and automatic sizing and design of mitigative measures like retention basins .

In addition, the basic LTHIA format allows virtually endless accretion of other geographical databases, including wetlands, floodplain mapping, and demographics (1990 and 2000 censuses). It thus can expand into an almost unlimited succession of planning and design tools covering wellhead protection, feedlot management, ambient air quality, stream hypoxia, and environmental justice.

WHERE TO FIND IT: The free web site includes a large amount of background information on running the model, technical descriptions, documentation, interpreting results, case studies and more at: <http://www.ecn.purdue.edu/runoff/lthianew/> For further information contact :

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