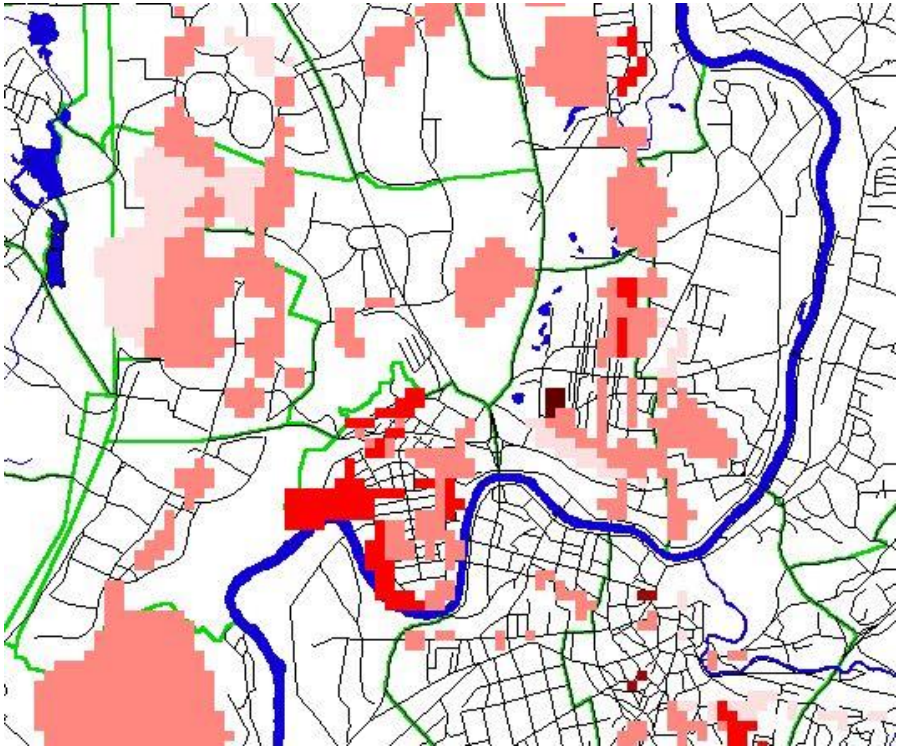
The Design of Geographic Information Systems for the Storage and Analysis of Public Health and Environmental Data

Waterscape International Group



Purpose of this Research

- Develop a system for the storage and analysis of public health and environmental data to guide decision-making using database and Geographic Information System (GIS) software
- Use this system to investigate the effects of air and water quality on public health
- Highlight the need for appropriate data storage, analysis, and exchange

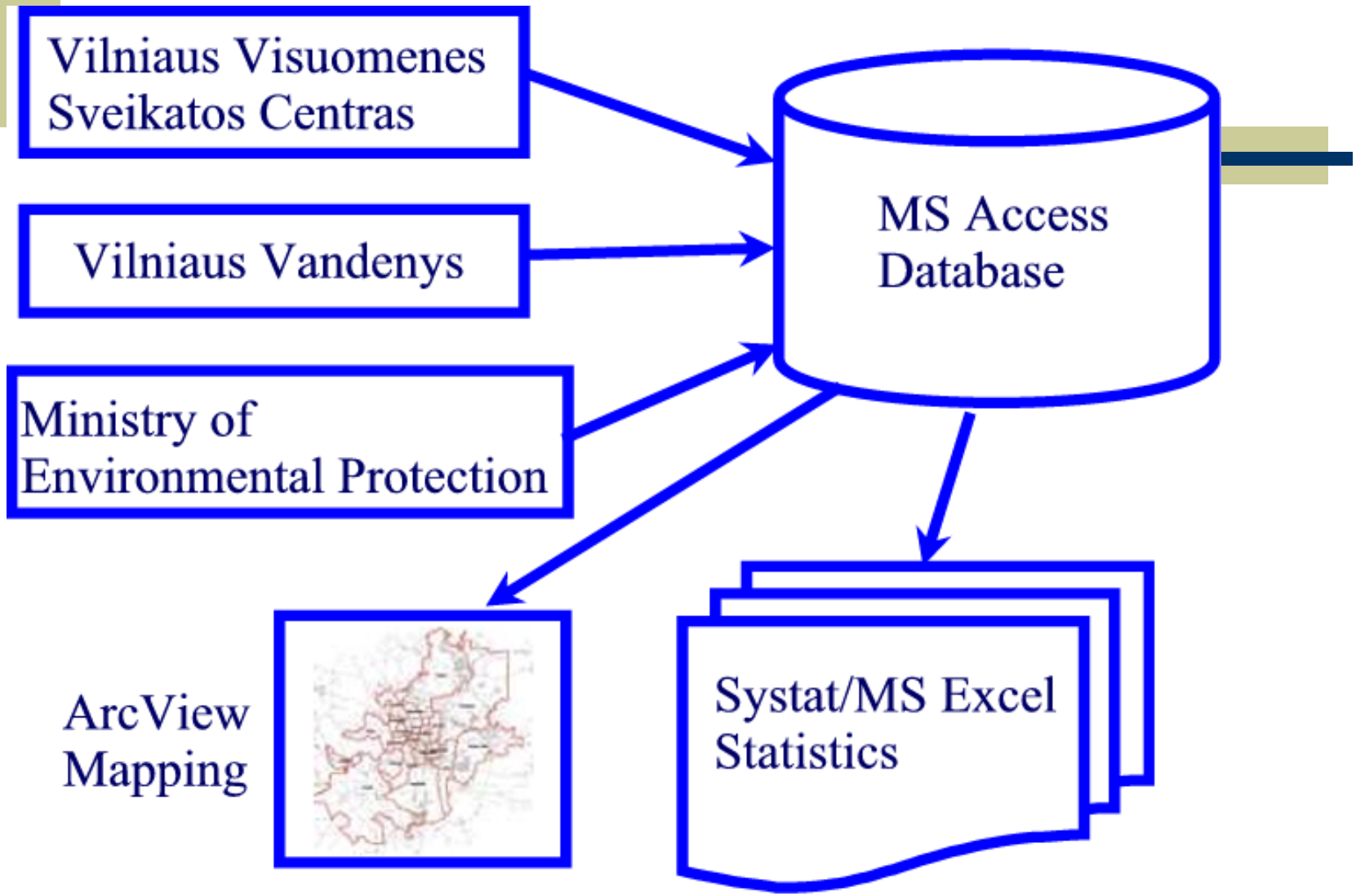
Background

- Vilnius, capital of Lithuania, population 580,000
- Maps of the city, 20 city districts, 9 distinct water supply networks in the city
- Design of the system and show an example of its application to air quality
- Extensive restructuring in the ministries involved in environmental and public health data collection, analysis, and dissemination

Overview of Steps Involved

- Obtain data on disease rates, water quality, air quality, and basic GIS layers (city features)
- Import this data and create meaningful relationships to query the database by city district or water supply district
- Export data sets to statistical or mapping packages for analysis
- Software used: MS Access, ESRI's ArcView, MS Excel, Systat.

Data Flow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Ministry of Environmental Protection
MS Access Database
ArcView Mapping
Systat/MS Excel Statistics

Data

- Age Groups: 1991 & 1992 all ages, 1991-1995 ages 0-100
- Air Quality Index, CO, NO2, SO2
- International Classification of Diseases
- Diseases studied

Methods

- Two fold aim: First to calculate disease rates and, second, to look for relationships between disease rates and environmental phenomenon
- Calculate morbidity rates at the street and district level
- Select respiratory diseases for analysis
- Simple regression analysis between air quality indicators (Air Pollution Index, CO, NO2, SO2)

Results

- General findings of disease rates
- Results of the regression analysis
- Maps of disease distribution

Discussion

- The examination of air quality is meant to be an example of potential applications and not a thorough analysis.
- Temperature, social, economic, and other factors may confound the analysis. Time-series analysis.
- Training is a very important part of implementing this sort of system.
- Some of the software and development can be costly.

Recommendations

- General data management: information exchange between government agencies, Internet, publicly available information. Seek ways to standardize information collection among agencies.
- In regards to air quality: seek methods of compliance with air quality standards, educate the public about disease prevention