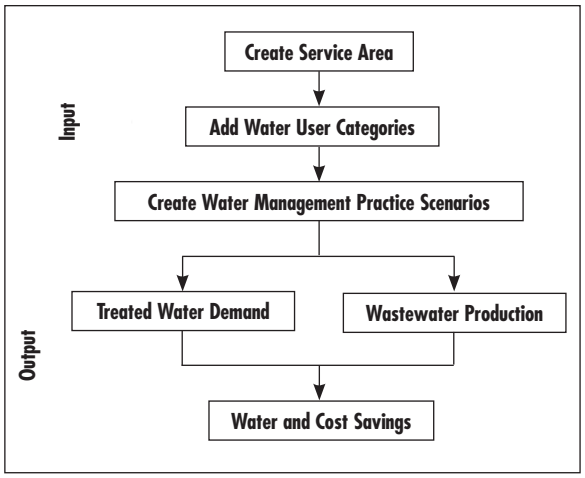
Development of the Integrated Urban Water Management Tool

The Integrated Urban Water Model (IUWM) is a mass balance model that provides a tool for water managers to forecast water demand, waste, and associated costs for different water management scenarios. Here, integrated urban water management is defined as a holistic approach to urban water management whereby water, wastewater, and stormwater management are considered together rather than optimizing each separately. The goal of the model is to help the user make informed decisions about the application and tradeoffs of available water management practices in terms of reduction in potable water demand and cost. The users of IUWM include urban managers and utilities. Through use of IUWM, the potential for positive impact of sustainable water management practices can be easily compared to conventional practices. The practices included in IUWM are:



IUWM Process Flow Chart.

- Indoor conservation
- Irrigation conservation
- Graywater reuse for flushing and irrigation
- Wastewater treatment plant (WWTP) effluent reuse for irrigation
- Stormwater capture and reuse for irrigation

Each practice can be modified and applied to different water user groups created by the user. Scenarios that include combinations of the practices are simulated in the model and the user is presented with the results for review, analysis, and export to spreadsheet file formats.

About IUWM

IUWM was developed in the Visual Basic.NET programming language and serves as a front-end interface for a collection of database files. The graphical user interface allows the user to easily organize, review, and apply changes to a project. The application can be installed on any Windows operating system that has the .NET framework installed.

The user starts by selecting a water user area and water user group (i.e., single-family residential, multi-family residential, commercial/institutional, or industrial) and inputting data on the water user area (Figure 1). The user then selects water management practices they would like to explore and is then provided with information on potable water use, wastewater generated, and potential cost savings associated with these management practices.

BENEFITS

- Reviews available water management practices for conservation, reuse, and wastewater production.
- Introduces the Integrated Urban Water Model (IUWM) and provides instruction for its use.
- Demonstrates the application of IUWM to five cities in different hydrologic regions.

RELATED PRODUCTS

Compendium of Best Practices in Water Infrastructure Asset Management (SAM7C07)

Development and Integration of LID and Green Infrastructure Technologies into Community Water Resource Management and Regulatory Programs (INFR5SG09)

Sustainable Water Resources Management, Volume 3: Case Studies on New Water Paradigm (DEC6SG06a)

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This project includes a User's Manual for the IUWM desktop application model. It includes details of the how the model carries out computations and also includes both a short tutorial and more detailed instructions for use of the model. The short tutorial mirrors the Quickstart walkthrough utility which is included in the application and acts as a guide to help a new user to become acquainted with the process of creating a project, making adjustments, and running simulations. The detailed portion of the manual explores more advanced features of the model.

Case Study Application

Case study applications of the model were conducted for five cities in various climatological regions the United States. These cities are: Fort Collins, CO, Orlando, FL, Philadelphia, PA, San Diego, CA, and Seattle, WA. The results of the case study applications confirm that hydrologic conditions impact the effectiveness of selected water management practices. The impact of rainfall and irrigation demand on water savings achieved through application of water conservation practices was demonstrated. Insights were also provided as to which conditions and parameters allow the practices to realize their full potential.

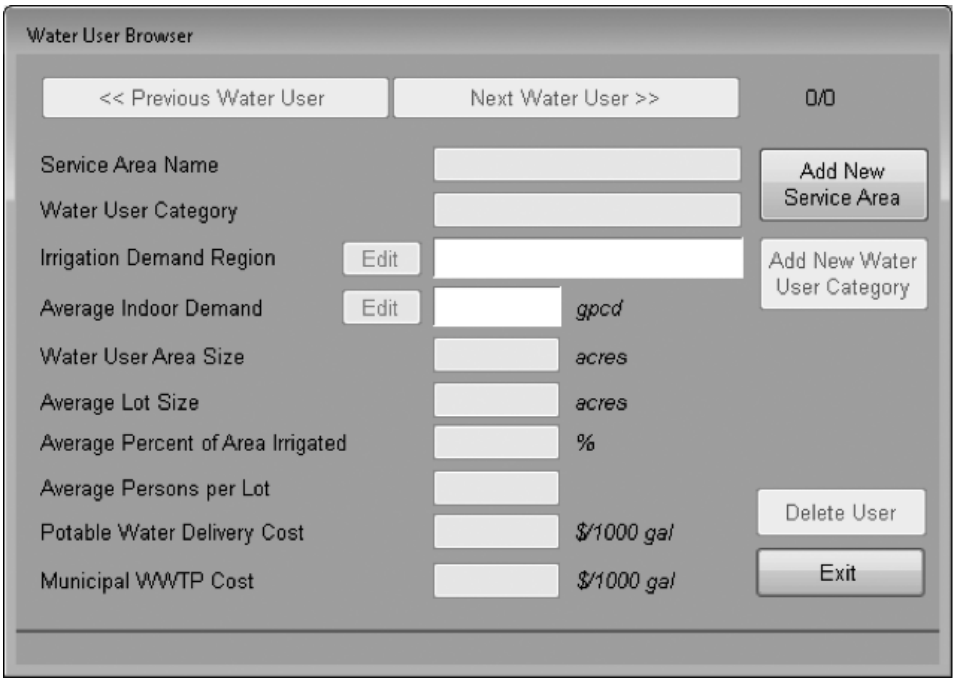

Figure 1. Water User Browser Window Where Data on Municipal Water Use is Input.

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