Environmental Quality Labs in the District of Columbia

Real Environment   Virtual Environment   Prediction or Results

# Environmental Simulation and Modeling Lab

ArcGIS/ArcInfo, City Green, ArcHydro, SWAT

ArcGIS with CITYgreen software conducts complex analyses of ecosystem services and creates easy-to-understand reports. The software calculates dollar benefits for the services provided by the trees and other green space. ArcHydro applies watershed hydrological analysis and visualization.
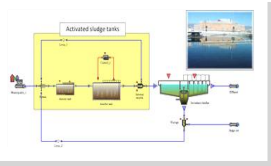
WEST (Wastewater Simulation and Modeling)

WEST is the most powerful and flexible dynamic wastewater modeling simulation software available on the market that applies for integrated urban wastewater system modeling and optimization.
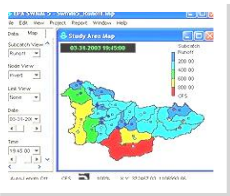
SWMM (Stormwater Management Model)

StormWater Management Model (SWMM) is a dynamic rainfall-runoff simulation model used for single event or long-term (continuous) simulation of runoff quantity and quality from primarily urban areas.
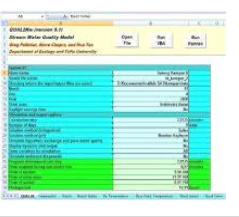
QUAL2K

QUAL2K (or Q2K) is a river and stream water quality model applies to predict conventional pollutants: nutrient, algae bloom and pathogens. It is the most widely applied eutrophication model in
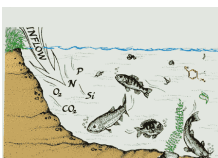
AQUATOX

AQUATOX is the only general ecological risk model that represents the combined environmental fate and effects of conventional pollutants, such as nutrients and sediments, and toxic chemicals in aquatic ecosystems.

Our Modeling Capacities

- **GIS Based Modeling:**
  - *Green Infrastructure benefit analysis*
  - *Ecosystem service analysis*
  - *Watershed delineation*
  - *Digital elevation model*
- **Hydrologic models**
  - *Rainfall runoff*
  - *Hydrodynamic models*
  - *Conceptual models*
- **Convectional Water Quality Modeling**:
  - *Nutrient dynamics*
  - *Eutrophication*
  - *Fate and transport of conventional pollutants*
  - *Dissolved Oxygen Curve*
  - *Eutrophication models*
  - *Wastewater treatment processes*
  - *Rivers and lakes*
- **Toxic compounds**
  - *Fate and transport of organic contaminants*
  - *Toxicokinetic models*
  - *Bioaccumulation model*
- ***Advanced Comprehensive Modeling:***
  - *Ecological toxicity model*
  - *Urban wastewater system*

UNIVERSITY OF THE DISTRICT OF COLUMBIA
COLLEGE OF AGRICULTURE, URBAN SUSTAINABILITY AND ENVIRONMENTAL SCIENCES

CAUSES/WRRI, 4200 Connecticut Ave, Washington, 20008, Phone: 202.274.5273, tdeksissa@udc.edu

Environmental Quality Labs in the District of Columbia


Grand opening, May 3, 2012

The College of Agriculture, Urban Sustainability and Environmental Sciences (CAUSES) has established the new Environmental Quality Testing Lab and the Environmental Simulation and Modeling Lab. Integrating monitoring and modeling, these labs will provide the capacity to measure the existing environmental conditions and identify alternative solutions to address environmental problems. Equipped with high-end analytical technologies with water quality models, UDC's new environmental labs are essential for research and training needs of our faculty and students to benefit our communities by providing research based solutions and support science based policies that impact the residents of the District of Columbia.

Environmental Quality Testing Laboratory

Clarus 600/560 D GC-MS

Gas chromatography-mass spectrometer (GC-MS) measures organic compounds: pesticides, pharmaceutical products and other organic pollutants (e.g. PAHs, PCBs etc) in air, water, plants and soils at very low detection limits possible in the latest available technologies.
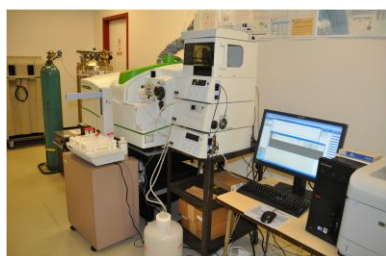

NexION 300 D ICP-MS

Inductively Coupled-Plasma – Mass Spectrophotometer measures trace metals in the part-per trillion range. It applies to analysis of Nano materials in food and environment.
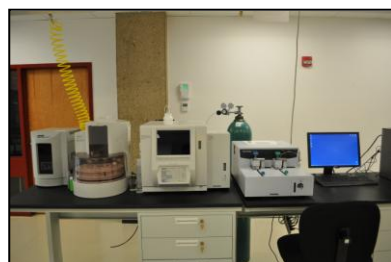
TOC-TON SSM-5000A

Total organic carbon analyzer is excellent for studying and monitoring of organic contamination of surface and ground water quality, industrial and sewage plants effluent. Incorporating the SSM-5000A permits analysis of many solid samples in addition to aqueous samples, including soil, sludge, and sediments.
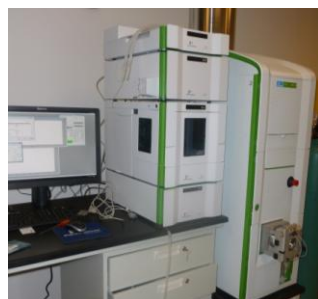
TOF-MS-DSA

Time of flight mass spectrometry with direct sample analysis can identify trace organic substances in a few seconds.

Our Analytical Capacities in Water, Food, Air and Soil:

- **Organic Contaminants:**
  - *Pesticides, herbicide and fungicides and insecticides*
  - *Pharmaceutical and Personal Care products*
  - *Endocrine disruptors: Hormones*
  - *Poly chlorinate biphenyl's*
  - *Total Organic Carbon*
  - *Total Organic Nitrogen*
  - *Nano materials in foods: PBPs, PFCs*
  - *Poly toxins*

- **Inorganic contaminants**:
  - *Micro and Macronutrients*
  - *Nitrate and Nitrite*
  - *Ammonium and Ammonia*
  - *Phosphate*
  - *Carbonate and bicarbonates*
  - *Trace metals: Lead, Arsenic, Mercury, Cadmium, Selenium,*
  - *Chlorine residue s*

- **Other parameters**
  - *pH*
  - *Alkalinity*
  - *E. Coli and Total Coliform*
  - *Specific conductivity*

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