Tools for Watershed Management: Models and Monitoring

Building Capacity in Illinois Watersheds

October 10, 2008

Programs within Watersheds

Ambient Monitoring

NPDES Monitoring

MS4 programs/Stormwater

TMDL

Nonpoint Source Monitoring

Groundwater monitoring

Biological Monitoring

What is a model?

Most simply, it is a set of mathematical equations that utilize data to simulate some system. In our case, a water related environment.

What can models do for us? They can help us understand:

Sources of pollution

Stream dynamics

Loadings

Fate of pollutants

Simulate future scenarios

Where you should collect water quality data

Where to implement restoration projects and BMP's

QUAL2K	BATHTUB
EXAMS	OECD
HSPF	WASP
HEC-RAS	SWIMMS
EFCD	BASINS
MODFLOW	STREAMS
GAEST	QHEI
AQUATOX	DFLOW

Models occur in many sizes and shapes:

Simple	**Complex**
Minimal data	**Lots of data**
Few outputs	**Many outputs**
General	**Specific**
Spreadsheets	**Super computers**
Free	**Expensive**

Examples of types of data to be collected:

Physical/chemical water quality monitoring

- **Big 4, nutrients, turbidity, light, water depth**
- **Hazardous chemicals, heavy metals**
- **Alkalinity, hardness**

Habitat characteristics/geomorphology

Stream/River discharge

- **Water level, water velocity**

Biological monitoring

- **Bacteria, macroinvertebrates, fish, algae, plankton**

Typical equipment for physical/chemical monitoring:

Test Strips

Test Kits

Meters

Water Samplers

Water Bottles

Secchi disk/Transparency tubes

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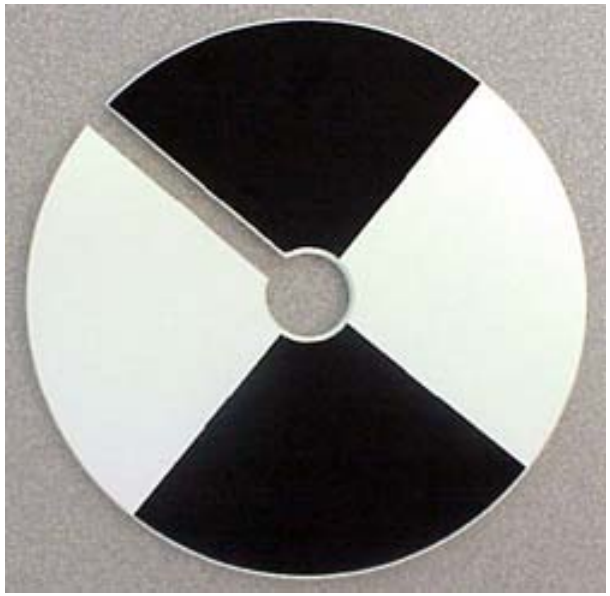
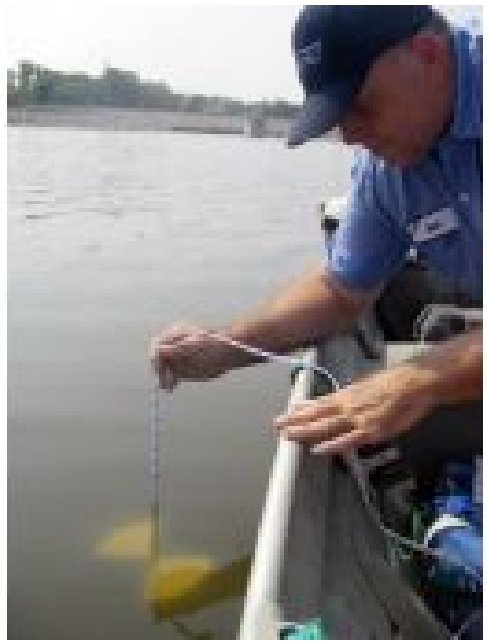




Dissolved Oxygen

Winkler titrations

Membrane based meters

Luminescent sensors

pH Measurements

Test Strips

Test Kits

Meters

Conductivity

Measurement method is by meter only.

Sensor types:

- Graphite
- Nickel
- Platinum

Nutrients

Nitrate

Ammonium

Phosphorus

Turbidity

Concerns:

- Pesticides
- Herbicides
- Nutrients
- Organic matter
- Covers Habitats
- Light Extinction

Stream Discharge Monitoring

Typical Equipment:

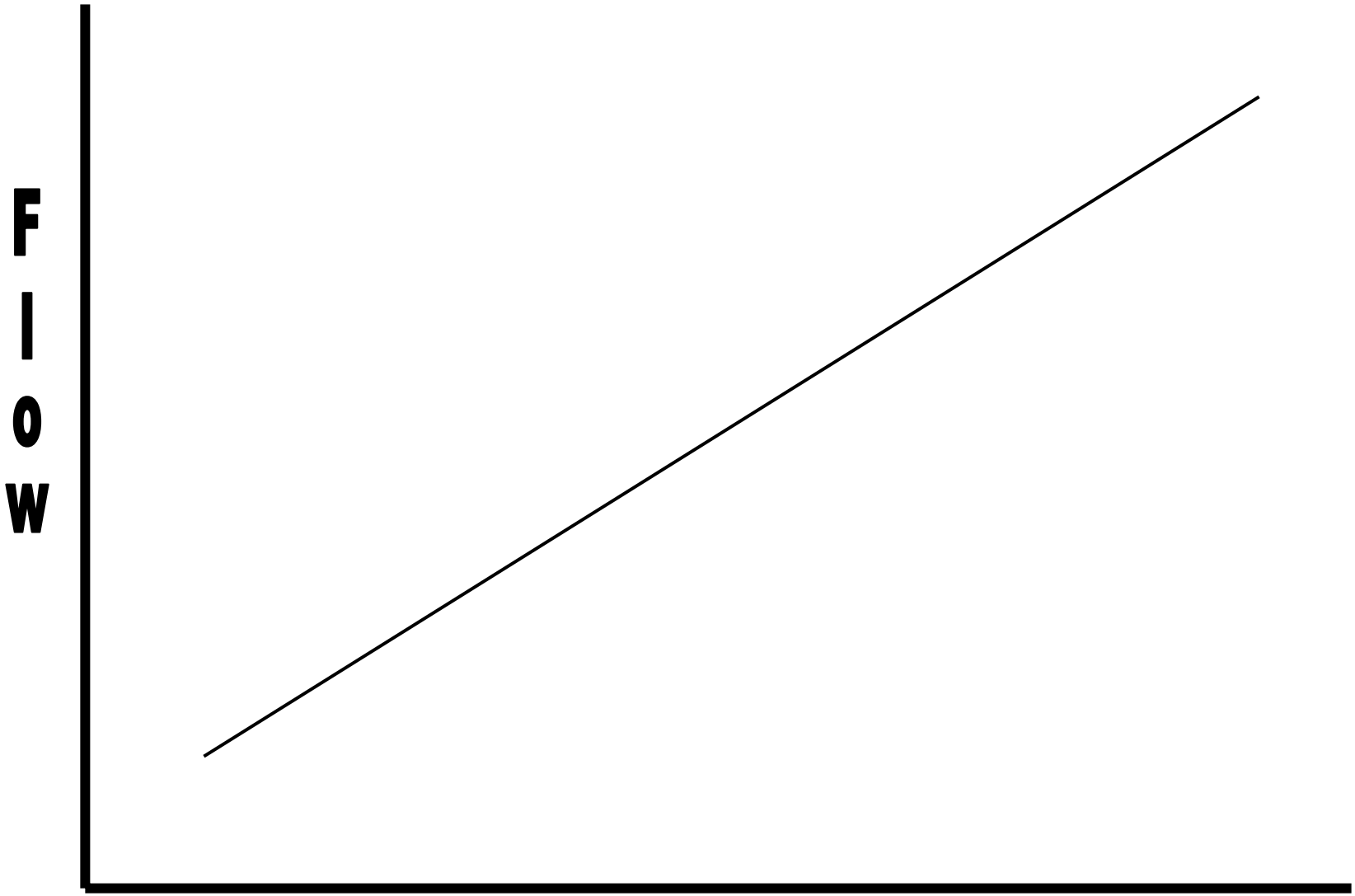
Water Level indicators/meters

Current Meters

Installed water velocity instruments


Status
CBS 30
Pump


SN: 234067
OTT
ADC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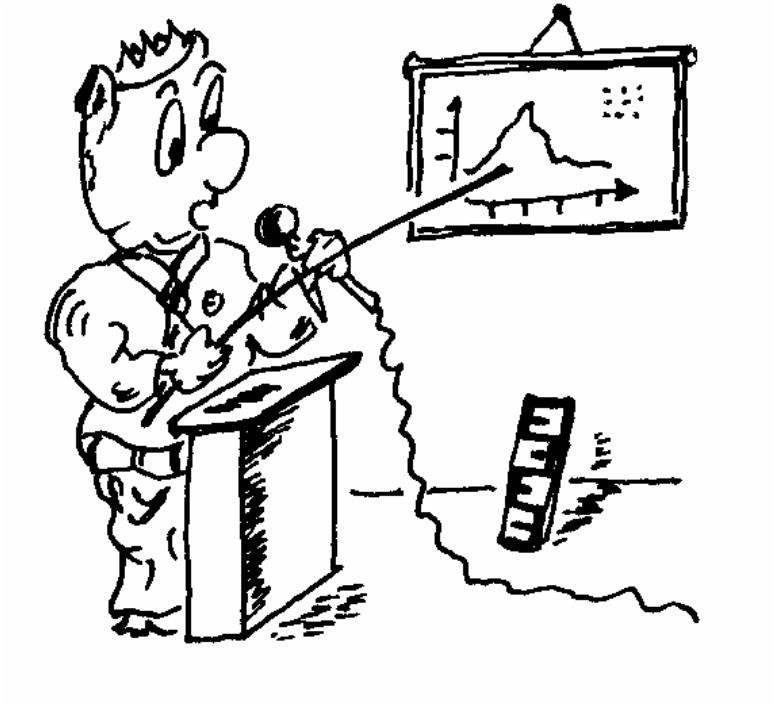
Water Level

Biological Monitoring

Typical equipment:

- Sterile containers for bacteria
- Various Nets
- Fish Shockers
- Benthic samplers
- Artificial substrates

Diane Zeman and Sean Kerwin seine for fish in the Mississippi River near Grand Tower, Ill.



Thank you very much for your attention.