

WATER AND WASTEWATER MONITORING

Introduction of Water and Wastewater monitoring

by

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<http://ocw.ump.edu.my/course/view.php?id=635#section-10>

Chapter Description

- Aims
 - Student understands the elements of water and wastewater monitoring
 - Student differentiates monitoring for management and assessment
 - Student explains the water quality (surface and groundwater) characteristic
- Expected Outcomes
 - Student should be able to understand the elements of water and wastewater monitoring
 - Student should be able to differentiates monitoring for management and assessment
 - Student should be able to explains the water quality (surface and groundwater) characteristic
- Other related Information
 - Environmental Protection Agency
 - Natural Resources Conservation Service
- References
 - Burden, Foerstner, McKelvie, and Guenther (2002) **Environmental Monitoring Handbook**, The McGraw-Hill Companies, Inc.
 - Jamie Bartram and Richard Balance (1996) **Water Quality Monitoring: A Practical Guide to Design and Implementation of Freshwater Quality Studies and Monitoring Programmes**, CRC Press.



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Water Quality

- ❑ Water quality is a term used to describe the chemical, physical and biological characteristics of water
 - ✓ Chemical : gases (e.g. O₂ and CO₂), metals (e.g. Zn, Pb), pesticides and other organic compounds (PCB)
 - ✓ Physics : color, odor, temperature, taste, and turbidity
 - ✓ Biological : living organisms including bacteria, viruses protozoans, phytoplankton, zooplankton, insects, plants, and fish



WHY WATER QUALITY IS IMPORTANT?

- Water quality factors influence and interact with each other
- What may cause problems in one situation may be harmless in another
- Influences effectiveness/toxicity of treatments
- Most disease problems can be avoided with proper management of water quality
- This includes maintaining water quality at a level that provides an environment conducive to fish health and growth



WATER QUALITY MONITORING

- Water quality monitoring is the practice of assessing the chemical, physical, and biological characteristics of water in streams, lakes, estuaries and coastal waters and groundwater relative to set standards and providing information on whether these waters are adequate for specific uses such as drinking, swimming, irrigation and ecosystem service



OBJECTIVES OF WATER QUALITY MONITORING

1. Identifying specific water quality problems that affect the health of humans and ecosystems.
2. Determining long-term trends in water quality
3. Documenting effects of pollution prevention or remediation
4. Providing evidence for regulation compliance and legal disputes

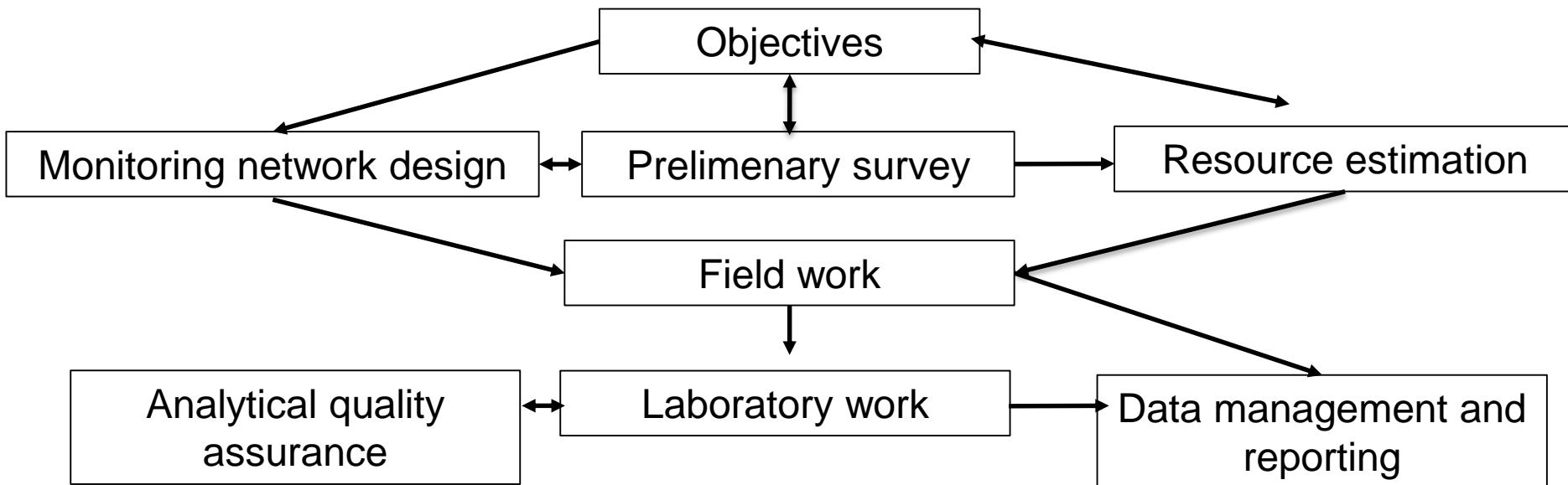


WATER QUALITY STANDARDS

- Established by states (with Environmental Protection Agency [EPA] approval)
- Water quality must conform to designated use
- Clean Water Act goal: fishable/swimmable
- Antidegradation Policy
- Typical Uses
 - ✓ Public water supplies
 - ✓ Propagation of fish and wildlife
 - ✓ Recreational
 - ✓ Agricultural
 - ✓ Industrial
- Numerical Pollutant Concentrations
 - ✓ Milligrams/liter H₂O
 - ✓ EPA 'Goldbook'



WATER QUALITY MONITORING PROGRAMME FRAMEWORK



MONITORING AS MANAGEMENT TOOL

Management's continuous examination of progress achieved during the implementation of an undertaking to track compliance with the plan and to take necessary decisions to improve performance.

Key elements:

- continuous examination of implementation progress
- tracking compliance against planned objectives
- generating data and information on performance to enable corrective measures to be taken



KEY MONITORING QUESTIONS

- What are the current condition of Water?
- Where are the conditions improving or declining?
- What stresses are associated with declines?
- Are management programs and policies working?



SURFACE AND GROUNDWATER CHARACTERISTICS

- The composition of surface and underground water is dependent on natural factors in the drainage basin :
 - ✓ Geological
 - ✓ Topographical
 - ✓ Meteorological
 - ✓ Hydrological
 - ✓ Biological
 - ✓ Human intervention (DAM, draining of wetlands, diversion of flow, pollution activities)

- It varies with seasonal differences in runoff volumes, weather conditions and water levels



Conclusion of The Chapter

- Monitoring provides the essential information which is required for an assessment of water quality
- There are 14 elements of water quality monitoring programme
- The water quality is the foundation on which water quality management is based



Reference

Jamie Bartram and Richard Balance. 1996. **Water Quality Monitoring: A Practical Guide to Design and Implementation of Freshwater Quality Studies and Monitoring Programmes**, CRC Press.



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