

Assessing water pollution

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环境治理项目 (贵州) — 推动贵州环境司法发展 维护贵州公众环境权益

中欧环境治理项目--地方合作伙伴项目

EGP Guizhou - Improving access to environmental justice to
protect people's rights in Guizhou province

A Partnership Project within the EU-China Environmental Governance
Programm



贵州省环境保护国际合作中心
Guizhou International Cooperation Centre
for Environmental Protection



Some important water quality parameters:

- pH –the acidity or basicity quality of water. Pure water at ~pH 6.8 (neutral).
- Salinity – the dissolved salt content. Proportional to conductivity.
- Alkalinity –acid neutralizing capacity.
- Turbidity –measure of suspended solids in water (analogues to smoke in air).
- Load of nutrients – total content of Nitrogen and Phosphorus compounds.
- CODMn –measure of organic material content.

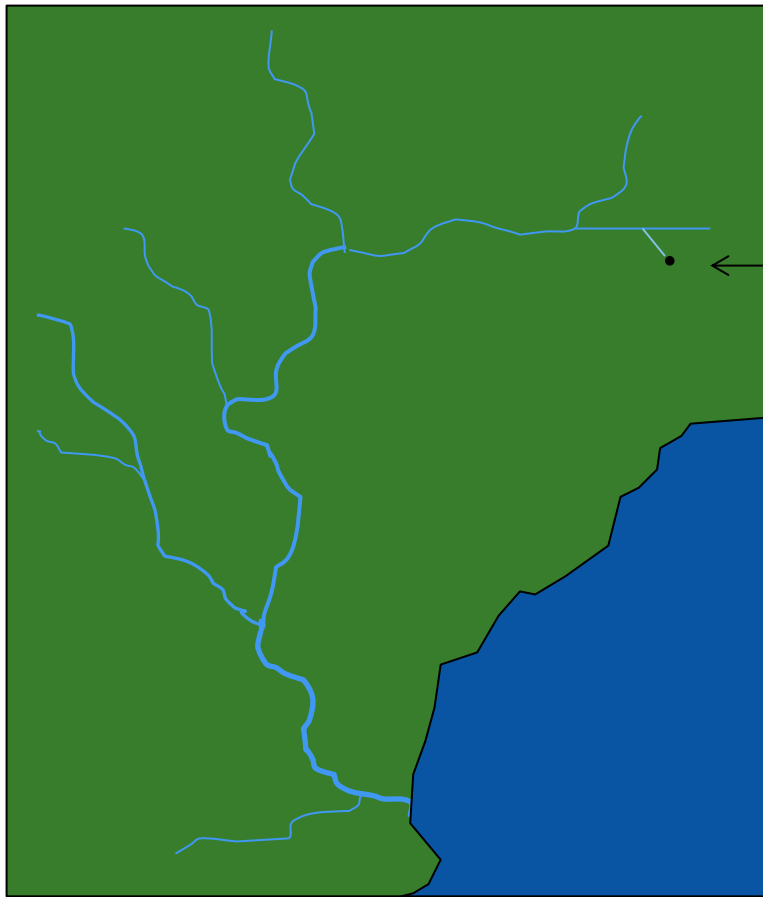


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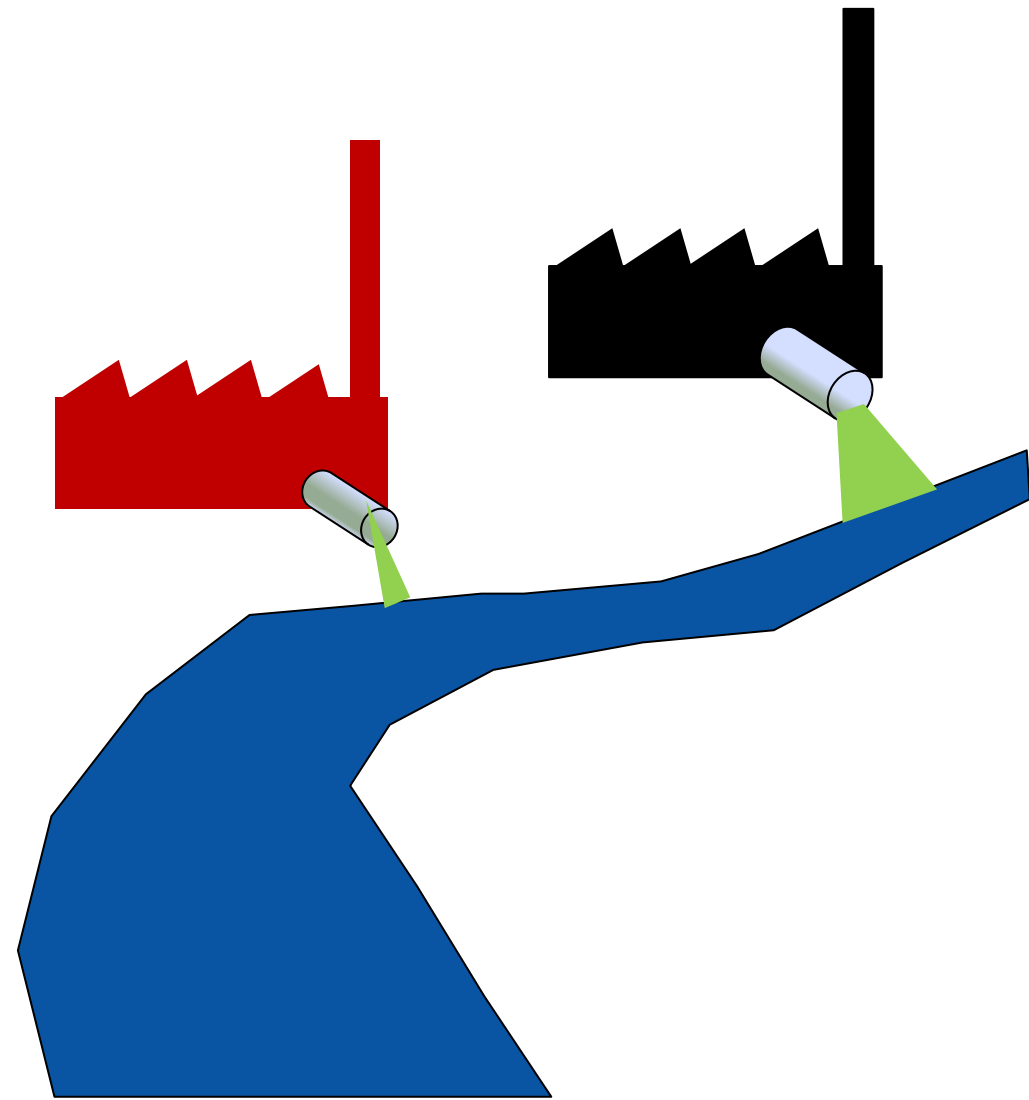


Narrowing down sources of pollution

Important to measure the load from each point-source as close to the source as possible.



- Concentration = mass per unit of volume ($\mu\text{g}/\text{l}$).
- Flow = volume water per time unit (l/s).
- Load = $\text{Flow} \times \text{Concentration}$ ($\mu\text{g}/\text{s}$).
- Big variation in river flow.
- Impact of pollution biggest when flow is low.



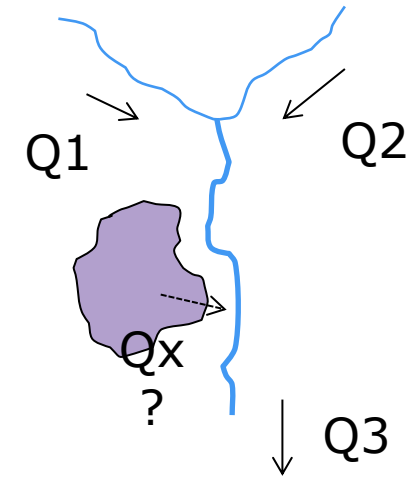
- Not all sources will be easily detected.

Basic equations to estimate load from diffuse source:

- $Q_x = Q_3 - (Q_1 + Q_2)$

- $C_x = \frac{C_3 Q_3 - (C_2 Q_2 + C_1 Q_1)}{Q_x}$

Q is the flow at certain part of the stream and C is the concentration of pollutant of interest.



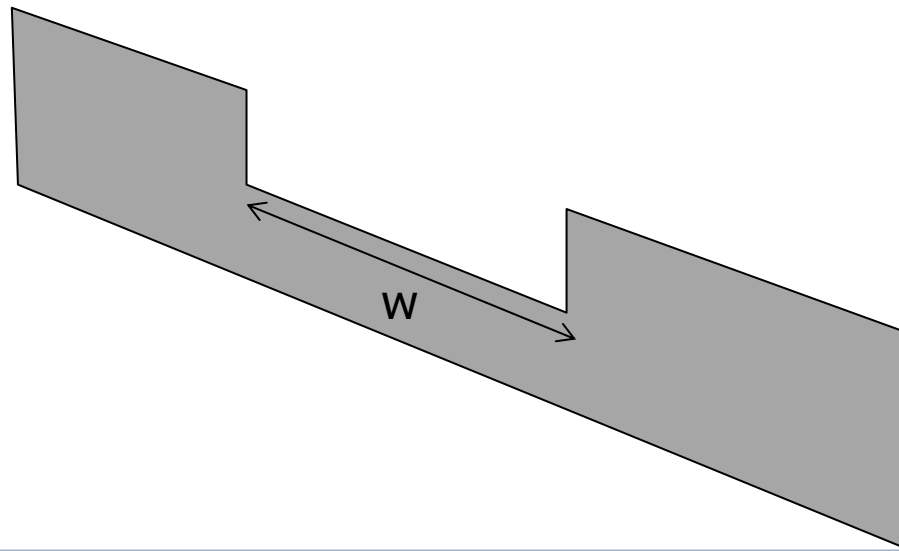
Flow measurement techniques

Weir construction

General formula flow $Q = Cwh$.

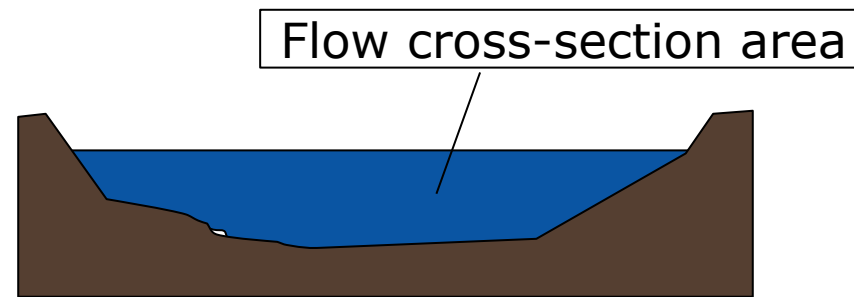
C is constant specific for each type of weir. w is the width of the opening in the weir and h is the height of the water level above the crest of the opening.

- Only need to measure water height over crest.
- Allows for continuous flow-measurements.



Area-velocity methods

- The basic principle is that the flow is calculated by multiplying the cross-section area of the stream with the average velocity of the water.



Since there are large variations in velocity in different parts of the cross-section, several velocity measurements have to be carried out. The cross-section is divided into smaller transects. Average water depth is measured in each transects approximating each to a rectangle for simplified area calculation. Velocity is measured on different depths in each transect and the average velocity is calculated.

