



An Chomhairle Oidhreachta
The Heritage Council



Module 5: Water Protection

Unit 3: Our Drinking Water Sources





Objectives of this presentation

- To demonstrate the link between source water quality and treated water
- To look at the steps involved in the protection of our drinking water sources





From source water to drinking water

Source Water contains an assortment of contaminants

- Debris (weeds, leaves, etc.)
- Solids (grit, soil, insects, etc.)
- Colour, dissolved solids
- Natural contaminants
- **Human contaminants**



Drinking Water must be clean, safe and free from all contaminants





Considerations for water treatment

- Type and scale of contamination in raw water
- Variations including spikes in raw water quality
- Treatment processes to avoid Trihalomethane production

The additional cost of adapting treatment processes to deal with natural or human induced variations in source water quality may be significant.



Water treatment system

Water treatment plants vary in complexity, but generally include:

- Fine and coarse screens to remove gross solids/debris
- Settlement to remove solids
- Chemical treatment which deals with colour, fine solids and microorganisms through the process of flocculation (clumping particles together prior to removal)
- Settlement and filtration
- Disinfection (e.g. chlorination and/or UV)
- Monitoring

Tydavnet GWS
water treatment plant





Treatment doesn't provide all the answers

- Pollution incidents can overwhelm water treatment systems
- Some chemical contaminants are not removed by "normal" treatment systems
- Some pathogens, such as *Cryptosporidium* and certain viruses, are not inactivated by disinfection
- Blue-green algae (cyanobacteria) can produce toxins that are not removed by treatment systems



Water treatment costs

- Water treatment costs are an issue for group water schemes
- Deteriorating raw water quality will mean more chemicals, more energy and more operational costs in general
- In existing DBO contracts, for example:
 - Increased algae in a lake source resulted in one water scheme operator increasing the annual fixed cost by 8.5%, the cost per cubic meter by 25% and the annual replacement fund by 25%
 - A change in the colour of a lake source resulted in increased use of chemical usage and sludge disposal - incurring a 30% increase in annual costs



Protection of our drinking water sources

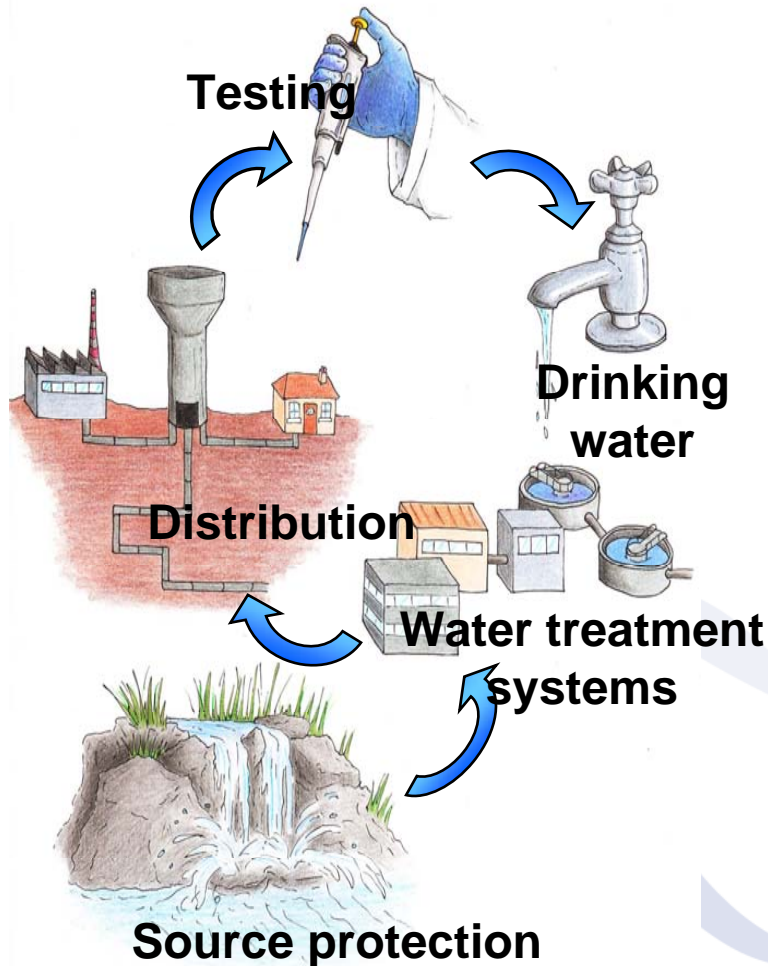
Driving Forces



- Water contamination is not just a third world problem - Ireland has serious issues to resolve:
 - In November 2002 the European Court of Justice found that Ireland had failed to comply with drinking water standards
 - EPA reports consistently highlight exceedances in the parametric values for drinking water
- EPA has increased enforcement powers
- Licensing of water supplies under the Water Services Act



The World Health Organisation recommends a catchment to consumer approach to safe drinking water



This approach includes:

1. **Source water protection and monitoring.**
2. **Effective water treatment systems.**
3. **Maintenance of distribution systems (reservoirs & pipes).**
4. **Training for water managers.**
5. **Careful and regular testing of our water supplies.**



What is Source Water Protection?

Source water protection is simply protecting both surface sources (such as lakes and rivers) and groundwater sources from contamination or overuse

Source water protection is recognised as the first of several barrier approaches for the protection of drinking water supplies



Muckno Mill Lough/Milltown Lake Co Monaghan- a water supply source



Key elements of source water protection

1. Identify and map source and catchment area
2. Identify vulnerability and safeguard zones around water supply sources
3. Secure community participation
4. Identify all potential risks to source water
5. Identify measures to address risks
6. Set achievable targets for improvement
7. Monitor and evaluate the measures



Appropriate measures to reduce and manage risks to drinking water sources

Plans will be source specific. However, the following may apply:

- Consultation and community involvement
- Education and awareness raising
- Enforcement of environmental legislation
- Implementing and monitoring remediation measures, including:
 - Development control
 - Establishing Safeguard Zones
 - Introduction of Bye Laws/additional regulations
 - Sector-specific best practice
 - Agreed financial incentives



The GWS Quality Assurance System



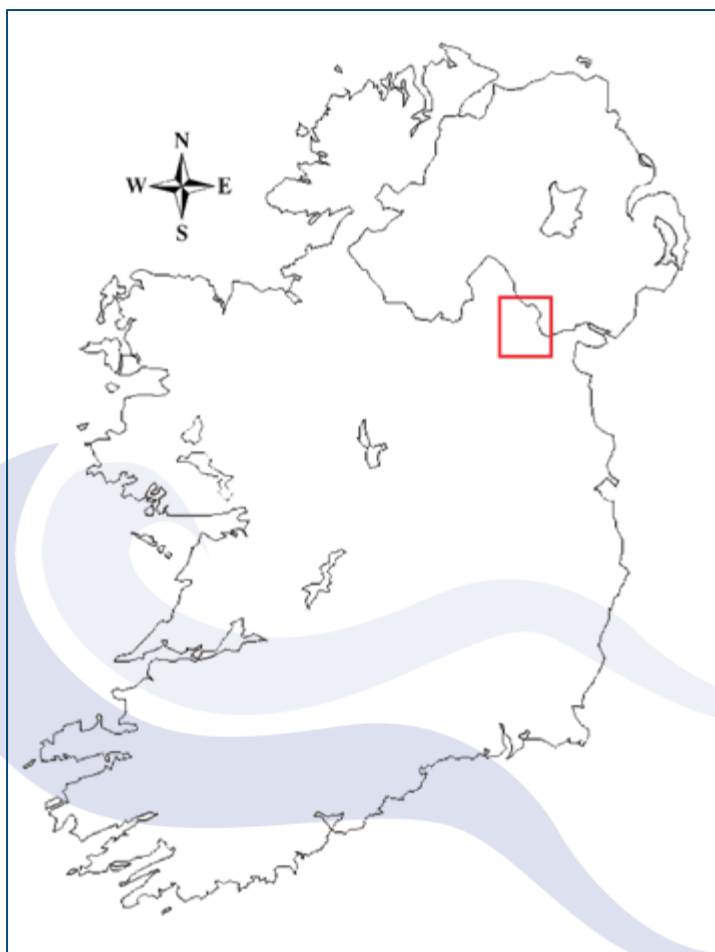
The National Water Services Authority recommends the HACCP preventative and recording approach to quality assurance being introduced to group schemes through their National Federation

Benefits of Quality Assurance:

- Helps ensure compliance with Drinking Water Regulations
- Provides a record of compliance to the Statutory Authority
- Minimises problems by providing control of the water supply from source to tap
- Increases confidence in water quality amongst group scheme members



The National Source Protection Pilot Project



Ireland's first source protection project - the National Source Protection Pilot Project, is located at Muckno Mill Lough (Milltown Lake) catchment in Churchill & Oram, Castleblayney, Co. Monaghan



The National Source Protection Pilot Project

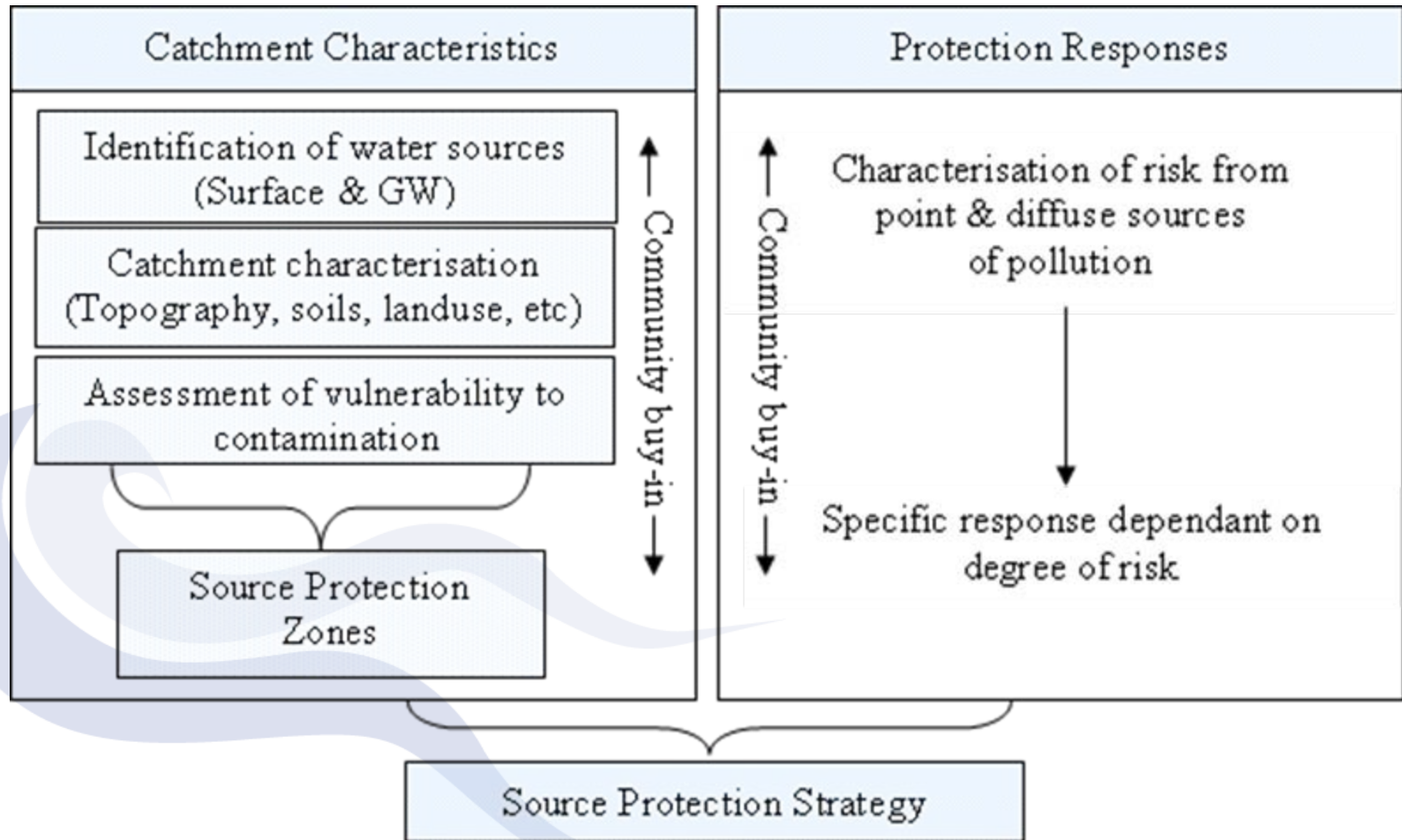


This project aims to devise solutions to source water pollution that are:

- Community-led
- Low-tech
- Low-cost
- Capable of replication



The National Source Protection Pilot Project





The National Source Protection Pilot Project



Measures adopted across the catchment to date include:

- Intensive monitoring and analysis
- Farmyard surveys
- Soil sampling
- OSWTS study
- Fencing-off of waterways and installation of drinkers
- Education initiatives





The National Source Protection Pilot Project

The model preliminary surface water protection plan relies on:

- The application of common sense
- The effective participation of governmental authorities, local authorities, **private stakeholders** and, most importantly, **local communities**

Discussion /Exercise

"Better source protection means preventing the kind of pollution that later must be removed or treated,... It means taking a prevention approach,... It means being more careful about land use and urban development, about where and how development occurs, and about agricultural uses, including livestock operations "(Rick Findlay, Director Water Programme, Pollution Probe, (2004))