

Sustainability: Water

Water links all the UN SDG - it is essential for all living things, supports healthy ecosystems and drives economic growth. Despite this, 2.2 billion people lack access to safe drinking water and 4.2 billion people do not have clean, safe sanitation services. As global populations continue to grow and climate change yields rainfall variability across the world, water is becoming a resource that could risk "economic growth, poverty eradication and sustainable development", according to [The World Bank](#).



Task: Water Management for a Sustainable Future

Climate change, economic growth and sustainable development require careful management of water. Identify **five** water-management strategies outlined on this [webpage](#) that will support our sustainable development. These fantastic [infographics](#) from The World Bank will also help you with this task.

Curriculum: Sustainability KA3a - Definitions

Key terms

Wastewater

Water that has been used in the home, in a business, or as part of an industrial process.



Scottish Water
Trusted to serve Scotland

Task: Daily water usage

Watch this video from Scottish Water at the start of this key area. It makes you think, doesn't it? **How much** water do you use? How might this vary across the seasons? How much **wastewater** do you produce? How could you **reduce** water consumption in your own home?



Task: Scottish Water Carbon Capture

Scottish Water have set themselves a target to reach Net Zero Greenhouse Gas emissions by 2040. Watch this [video](#) and note down the ways they are **boosting carbon capture** across their 22,000 hectares of land. Other than reducing greenhouse gas emissions, are there any other **benefits** of these carbon capture activities? What is a **land management plan** and what does it aim to achieve?



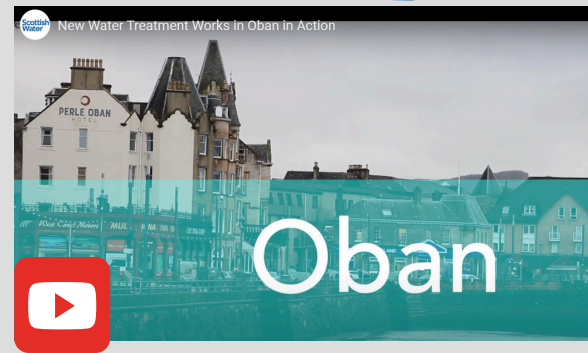
Image: Loch Katrine, from Scottish Water





Task: Clean water supplies in developed countries

Scottish Water explain how their new Tullich Water Treatment Works processes raw water from Loch Gleann A'Bhearraidh Reservoir into drinking water to meet the demands of the seasonal population changes across the county.



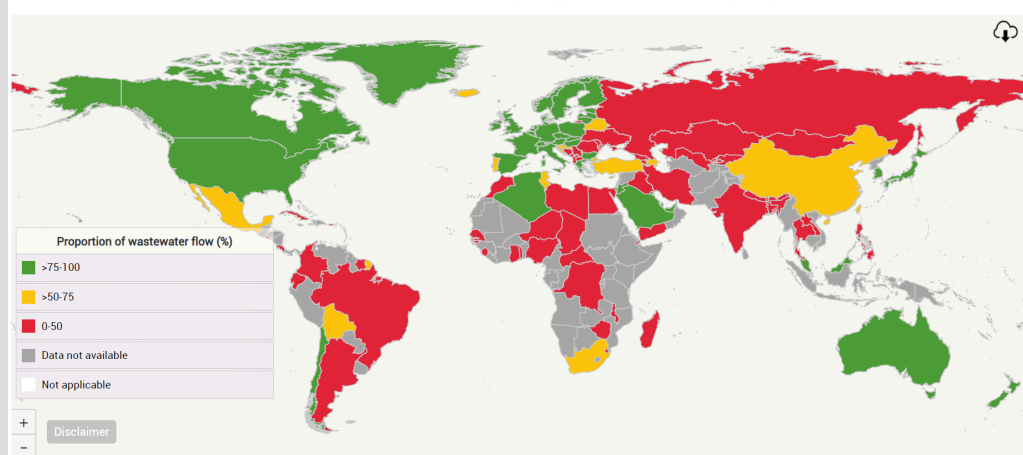
Task: Wastewater - what to do with it?

The UN SDG 6.3 target states: 'By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally'.

This infographic shows the global progress on target 6.3. Click on the map to access the larger image on the UN webpage.



Global status of indicator 6.3.1 Proportion of wastewater flow (safely) treated > Domestic (2020)



How can further progress be made? Use this [resource](#) to identify ways to use wastewater in:

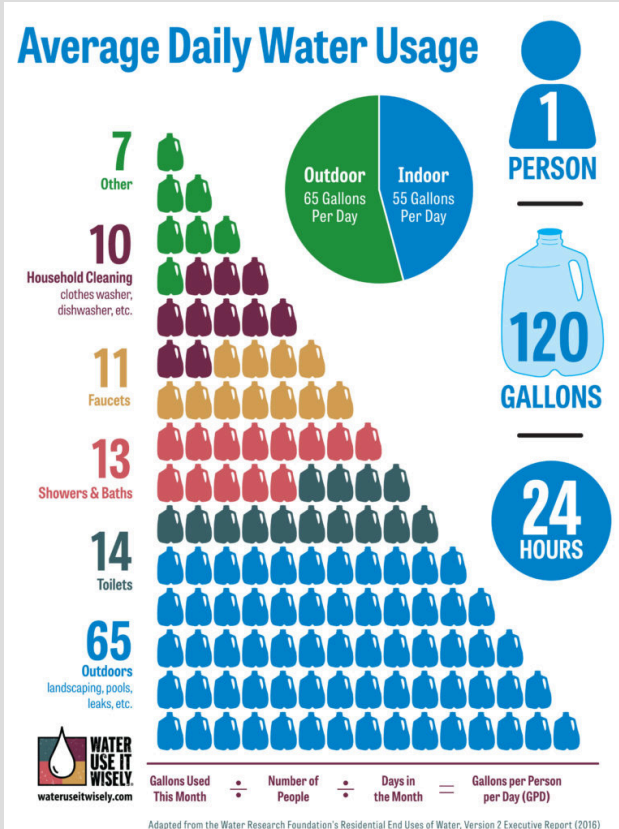
- urban, domestic areas
- industry
- agriculture





Task: Use it Wisely

Can we reduce our water consumption? The infographic below was produced using data from the 2016 Water Research Foundation report on residential uses of water in Arizona. While their daily 545L of water use per day is greatly in excess of Scotland's estimates for us (~150L/household/day), the website includes useful tips on how to reduce water consumption.



You may be a drop.
Your actions create a ripple.

Look at the water-saving tips. **Select** five that are achievable for:

- you
- your family
- your school

Compare your choices with your class mates.

Could you bring your ideas to the Pupil Council?

waterwise

Task: Water Sustainable Garden

Combine learning from KA2 and KA3 by designing and building a water sustainable garden. Based on the challenges of an increasing global population, climate change and increased demand for food and water, this resource will guide learners through sustainable water use in a garden to grow fruit and vegetables.



Learn about transpiration, soil types and what to grow in raised beds.



<1% of Earth's water is available for human consumption-use it wisely. Growing your own food is one way to reduce our water use.

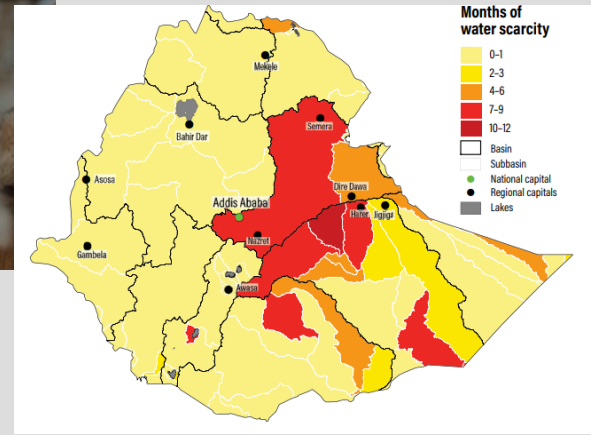
Task: Water for Sustainable Development in Ethiopia

The WRI website has lots of information about water sustainability projects around the world. Looking at sustainable water development in the developing world in the face of climate change requires careful management to ensure socioeconomic development and improve livelihoods. Read the information in this [document](#) to **summarise** the steps Ethiopia are taking, with the aim of becoming a low-middle income country by 2025.



Water for Sustainable Development in Ethiopia

WRI is working with partners in Ethiopia to better understand water risk, improve water-wise planning, and advance integrated water resources management toward a more sustainable and resilient development path.



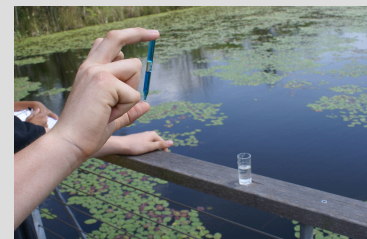
Task: UN SDG 6 - Clean water and sanitation

While completing the task above, listen to this [video](#) about Sustainable Development Goal 6.



SSERC has developed practical activities that support different aspects of this key area:

- Testing water for mineral content - a series of experiments to determine the level of chemicals in water (boron, calcium, carbonate, iron, magnesium, nitrate, nitrite and phosphorous). These experiments will introduce learners to titrations and colorimetry.
- Soil Science - would link well with the water sustainable garden project above.
- Ocean acidification - the buffering power of seawater.





Task: Agri-environmental climate scheme

The Agri-Environment Climate Scheme promotes practices to manage land that protect "Scotland's natural heritage, improve water quality, manage flood risk and mitigate and adapt to climate change". Use this resource to **outline the benefits** of agri-environment management strategies.

[CLICK HERE](#)



Read this [document](#), watch the videos & listen to the podcast about the management of wetlands for wildlife. How is a wetland defined and what are the benefits of protecting and managing these areas across Scotland?

Task: Marine Pollution

Human activities are inextricably linked to marine pollution: from the microfibres that transfer from our clothes to the oceans, to the chemicals we use in our homes that reach waterways and enter the ocean. Our linear economy is having a detrimental impact on the marine environment.

In this lesson, from the Marine Conservation Society, you will **design** a sustainable circular economy product, aiming to understand the social responsibility we all have to reduce the impact of our actions on the environment.



Find out more about the circular economy in Scotland [here](#). What can you do as an individual? What does a circular economy business look like?



Task: Causes of water pollution

Various issues arise from water use by industry, agriculture and domestic dwellings. These can have an impact on public health, contamination and pollution of water supplies, conservation and tourism. If wastewater is untreated, this can have an impact on aquatic ecosystems.

Click on the buttons below to explore **causes** of water pollution.

Eutrophication



Underground storage leaks



Global warming



Oil pollution



Atmospheric water pollution



Nuclear waste



Industrial waste



Image from [Water Pollution Guide](#)

What types of pollution do these sources cause?
What are the dangers and how can we prevent this from happening to protect Earth's water supply?

Curriculum: Sustainability KA3d - Sustainable approaches to water use

SEFARI 

 The James Hutton Institute

 CREW CENTRE OF EXPERTISE FOR WATERS

 2020 COASTS & WATERS

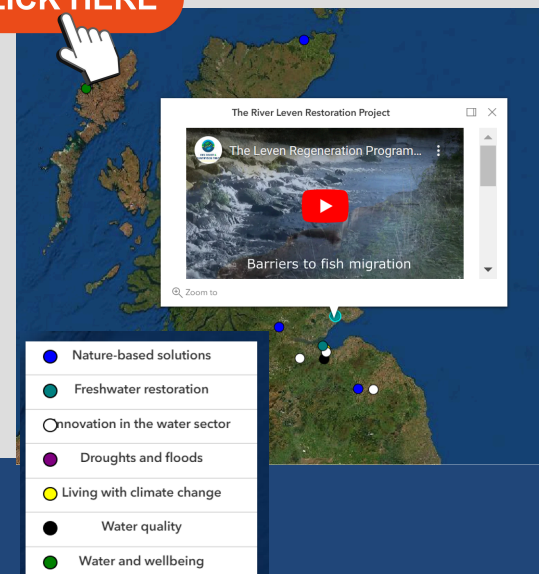
Task: Monitor, research, innovate, manage and conserve Scotland's water resources

Scotland is shaped by its water resources: from waterfalls and lochs, to fisheries and hydroelectric power. The "WaterWall in Motion" campaign sought to explore scientific solutions to climate and water-related challenges.

Explore the WaterWall and find out how Scotland's water has impacted these areas:

- Water and wellbeing
- Water inspired creativity
- Droughts and floods
- Water quality
- Living with climate change
- Freshwater restoration
- Innovation in the water sector
- Nature-based solutions

[CLICK HERE](#)

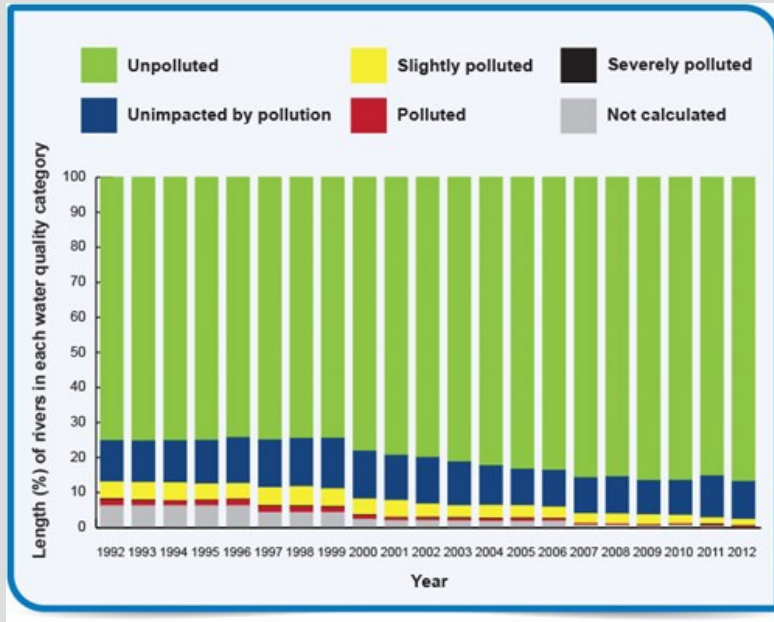




Scotland's environment

Task: SEPA in Scotland

Scotland's freshwaters and seas are in a good general condition, with pollution levels decreasing over the past 25 years (see graph below). Pollution resulting from excessive nutrients entering the waterways remains a problem that has an impact on habitat and wildlife health.



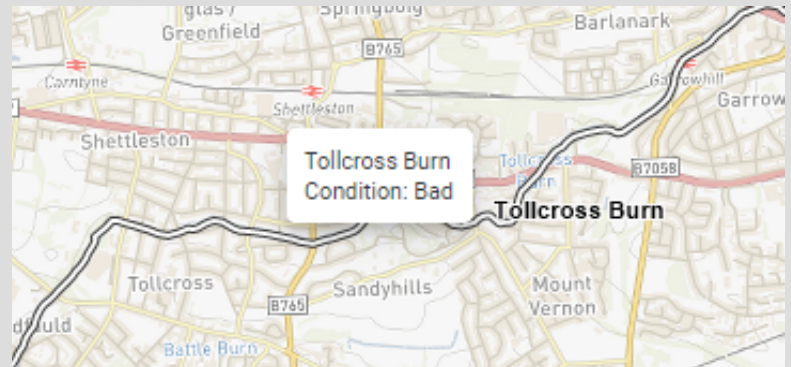
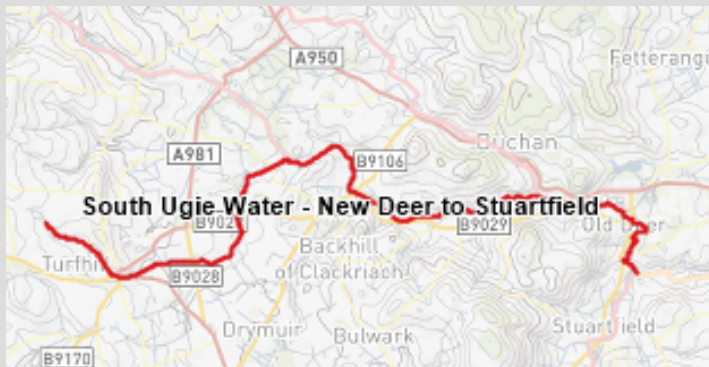
SEPA have an important role in monitoring the health of our waterways. Click [here](#) to reach the Water Environment Hub with an interactive map of Scotland. Find a waterway close to where you live by zooming in on the map (or use the search bar at the top).

Use the drop-down menus on the left-hand side to determine (for your chosen waterway):

- The overall condition of surface waters
- The water quality of surface waters
- The physical condition of the surface waters
- Access for fish migration
- Freedom from invasive species



Identify an area where the overall condition of surface water is rated "bad". Discuss in a small group the potential reasons for this.



Watch these videos on "Pond Dipping" (left) and "Water clarity". Learn how to identify indicator species for pollution and assess the overall health of an ecosystem.