

The Second State of Natural Resources Report (SoNaRR2020)

SoNaRR2020 Register freshwater key pressures and opportunities

Natural Resources Wales

Final Report

About Natural Resources Wales

Natural Resources Wales's purpose is to pursue sustainable management of natural resources. This means looking after air, land, water, wildlife, plants and soil to improve Wales's well-being, and provide a better future for everyone.

Evidence at Natural Resources Wales

Natural Resources Wales is an evidence-informed organisation. We seek to ensure that our strategy, decisions, operations and advice to Welsh Government and others are underpinned by sound and quality-assured evidence. We recognise that it is critically important to have a good understanding of our changing environment.

We will realise this vision by:

- Maintaining and developing the technical specialist skills of our staff;
- Securing our data and information;
- Having a well resourced proactive programme of evidence work;
- Continuing to review and add to our evidence to ensure it is fit for the challenges facing us; and
- Communicating our evidence in an open and transparent way.

Title: **SoNaRR2020 Register freshwater key pressures and opportunities**

Peer Reviews: Internal and external peer review

Restrictions: None

The Second State of Natural Resources Report (SoNaRR2020) contents

This document is one of a group of products that make up the second State of Natural Resources Report (SoNaRR2020). The full suite of products are:

Executive Summary. Foreword, Introduction, Summary and Conclusions. Published as a series of webpages in December 2020

The Natural Resource Registers. Drivers, Pressures, Impacts and Opportunities for Action for eight Broad Ecosystems. Published as a series of PDF documents and as an interactive infographic in December 2020

Assessments against the four Aims of SMNR. Published as a series of PDF documents in December 2020:

SoNaRR2020 Aim 1. Stocks of Natural Resources are Safeguarded and Enhanced

SoNaRR2020 Aim 2. Ecosystems are Resilient to Expected and Unforeseen Change

SoNaRR2020 Aim 3. Wales has Healthy Places for People, Protected from Environmental Risks

SoNaRR2020 Aim 4. Contributing to a Regenerative Economy, Achieving Sustainable Levels of Production and Consumption

The SoNaRR2020 Assessment of Biodiversity. Published in March 2021

Assessments by Broad Ecosystem.. Published as a series of PDF documents in March 2021:

Assessment of the Achievement of SMNR: Coastal Margins

Assessment of the Achievement of SMNR: Enclosed Farmland

Assessment of the Achievement of SMNR: Freshwater

Assessment of the Achievement of SMNR: Marine

Assessment of the Achievement of SMNR: Mountains, Moorlands and Heaths

Assessment of the Achievement of SMNR: Woodlands

Assessment of the Achievement of SMNR: Urban

Assessment of the Achievement of SMNR: Semi-Natural Grassland

Assessments by Cross-cutting theme. Published as a series of PDF documents in March 2021:

Assessment of the Achievement of SMNR: Air Quality

Assessment of the Achievement of SMNR: Climate Change

Assessment of the Achievement of SMNR: Energy Efficiency

Assessment of the Achievement of SMNR: Invasive Non-native Species

Assessment of the Achievement of SMNR: Land use and Soils

Assessment of the Achievement of SMNR: Waste

Assessment of the Achievement of SMNR: Water Efficiency

Updated SoNaRR evidence needs. Published in March 2021

Acronyms and Glossary of terms. Published in December 2020 and updated in March 2021

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Freshwater Natural Resource Register

SoNaRR2020

The Natural Resource Registers are an important output of SoNaRR2020. Their purpose is to distil the key pressures and opportunities identified within the chapters and to provide an accessible assessment of SMNR.

The Freshwater Natural Resource Register is made up of two additional documents:

1. SoNaRR2020 Register freshwater assessment of SMNR
2. SoNaRR2020 Register freshwater evidence

Table 1 Key Drivers, Pressures and Impacts on the Freshwater Ecosystem

Drivers	Pressures	Impacts
Climate Change	1. Changing Weather Patterns	<p>1.1. Interference with life cycles, including direct mortality of aquatic organisms. Confidence Assessment: HIGH SMNR Aim 1</p> <p>1.2. Inadequate flows/water levels to maintain water quality, aquatic biodiversity and river health. Confidence Assessment: HIGH SMNR Aim 1 and 2</p> <p>1.3. Increased river channel erosion and instability as a result of more frequent and extreme high flow events. Scouring of habitats and wash-out of species. Reduction of water quality due to increased sediment load. Confidence Assessment: MEDIUM SMNR Aim 2 and 3</p>
Climate Change	2. Increased Water Temperature	<p>2.1. Change in population dynamics of species as a result of increased water temperature. Confidence Assessment: HIGH SMNR Aim 1</p> <p>2.2. Increased susceptibility to INNS and increased likelihood of</p>

		<p>establishment of INNS due to temperature increases. Confidence Assessment: HIGH SMNR Aim 2</p>
Pollution	3. Air Pollution	<p>3.1. Acidification of rivers and lakes. Confidence Assessment: HIGH SMNR Aim 2 and 3</p>
Pollution	4. Water Pollution	<p>4.1. Excessive nutrient and sediment loadings in rivers and lakes which in turn disrupts ecological processes. Pollution of freshwaters by metals, plastics and anthropogenic compounds (e.g. PFAS and PBDEs) which can bioaccumulate in the food chain to toxic concentrations. Confidence Assessment: HIGH SMNR Aim 2 and 3</p>
Land Use Change	5. Physical Modifications	<p>5.1. Reduced freshwater ecosystem resilience due to interference with natural physical processes. Confidence Assessment: HIGH SMNR Aim 2</p> <p>5.2. Obstruction of species movement within river systems (e.g. barriers to fish migration) and interference with sediment movement and supply. Confidence Assessment: HIGH SMNR Aim 1 and 2</p> <p>5.3. Direct loss of habitat due to physical damage to freshwaters (e.g. dredging, channel straightening, bank/bed reinforcement, culverting). Confidence Assessment: HIGH SMNR Aim 1</p> <p>5.4. Loss of connectivity between rivers and flood plains, and between rivers and ponds/lakes, as a result of physical modifications Confidence Assessment: HIGH SMNR Aim 2</p>

<p>Land Use Change</p>	<p>6. Agricultural Intensification</p>	<p>6.1. Increased flood risk. Confidence Assessment: HIGH SMNR Aim 3</p> <p>6.2. Increased risk of pollution. Confidence Assessment: HIGH SMNR Aim 2 and 3</p> <p>6.3. Loss of riparian corridor habitat due to lack of buffer zones. Confidence Assessment: HIGH SMNR Aim 2</p>
<p>Land Use Change</p>	<p>7. Built Development and Infrastructure</p>	<p>7.1. Increased flood risk. Confidence Assessment: HIGH SMNR Aim 3</p> <p>7.2. Increased risk of pollution (such as, increased sewage load). Confidence Assessment: HIGH SMNR Aim 2 and 3</p> <p>7.3. Loss of habitats and species due to physical damage to freshwaters (e.g. loss of riparian corridor, cultivation and development up to water's edge, culverting, loss of floodplain habitats). (High Confidence)</p>
<p>INNS, Pests and Disease</p>	<p>8. INNS</p>	<p>8.1. INNS outcompete native biodiversity, introduce disease and predate on native species. Confidence Assessment: HIGH SMNR Aim 1 and 2</p> <p>8.2. INNS cause structural instability in river banks, can increase localised flood risk by blocking channels, interfere with navigation and water supply. Confidence Assessment: HIGH SMNR Aim 3</p>
<p>Over Exploitation</p>	<p>9. Water Demand</p>	<p>9.1. Potential for restricted availability of water resources if not managed sustainably. Confidence Assessment: HIGH SMNR Aim 1 and 4</p>

		<p>9.2. Inadequate flows to maintain water course biodiversity and river health. Confidence Assessment: HIGH SMNR Aim 1</p> <p>9.3. Increased demand for water transfer between catchments, and the resulting potential impacts this has on the relevant water bodies. Confidence Assessment: HIGH SMNR Aim 2</p>
Over-exploitation	10. Insufficient Management	<p>10.1. Non efficient use of water. Confidence Assessment: HIGH SMNR Aim 4</p> <p>10.2. Cost of treatment of potable water. Confidence Assessment: HIGH SMNR Aim 4</p>

Opportunities for Action

Aim 1: Stocks of Natural Resources are safeguarded and enhanced

Protect and restore freshwater ecosystems.

Improve the design of landscapes so that pollution is less likely to enter rivers and lakes.

Develop new technologies for the management of pollutants.

Continue to deliver Plans and Strategies (such as, River Basin Management Plans, salmon and sea trout, eel and Freshwater Pearl Mussel)

Reverse the decline of seriously endangered freshwater species (such as Back from the Brink Cymru)

Restore floodplain connectivity and floodplain wetland habitats at a landscape scale.

Significantly increase the number and quality of lowland ponds.

Prevent illegal gravel extraction from rivers.

Protect and restore freshwater ecosystems.

Research, development and implementation of water efficiency measures across all sectors.

Identify where exempt abstractions are taking place to locate abstraction hotspots where the environment may be vulnerable.

Education and awareness of the relationship between land management and freshwater ecosystem quality, with particular emphasis on engagement with agricultural colleges.

Address physical modification of freshwater ecosystems

Move to sustainable land management which protects soils and water quality.

Aim 2: Resilient Ecosystems

Plant of riparian corridors to help offset future temperature rises and control soil/nutrient loss in storm events.

Reconnect rivers with flood plains for water and carbon storage, to reduce impacts of excessive scour and erosion during high flows, and aid recovery and connectivity of floodplain habitats.

Support the Welsh Government National Strategy objectives (WG, 2020) and Wales' Planning Policy (TAN15) to take a catchment approach to flood risk management.

Demonstrate and encourage best practice, such as the widespread use of natural flood management measures and reconnecting rivers to their floodplains.

Develop integrated river-floodplain management plans that integrate land use planning, biodiversity and flood management.

Support national plans such as INNS Contingency Plans and Pathway Action Plans

Deliver collaborative catchment-scale INNS management projects

Address physical modification of freshwater ecosystems

Implement improved biosecurity measures via the water industry AMP7 and 8 process.

Use citizen science to collect INNS data, and community engagement to undertake INNS management.

Use citizen science to help better understand, measure and manage water problems.

Aim 3: Healthy Places for People

Education and awareness of the relationship between land management and freshwater ecosystem quality, with emphasis on engagement with agricultural colleges.

Protect and restore freshwater ecosystems.

Support the Welsh Government National Strategy objectives (WG, 2020) and Wales' Planning Policy (TAN15) to take a catchment approach to flood risk management.

Demonstrate and encourage best practice, such as the widespread use of natural flood management measures and reconnecting rivers to their floodplains.

Aim 4: A Regenerative Economy

From Water Efficiency Chapter

Water labelling for water appliances.

From Water Efficiency Chapter

Reduce non-supply leakage and waste through awareness- raising initiatives.

From Water Efficiency Chapter

Encourage off-line storage, Rain Water Harvesting and Grey Water Recycling. For example, on-farm storage of water for irrigation.

Identify opportunities for water transfer schemes to contribute to a regenerative economy on a UK-wide scale. For example, using water from Wales to support arable crops in England thereby improving UK food security; using funds from water transfer schemes to support restoration of freshwater ecosystems.

Opportunities to retrofit hydropower schemes to existing water management infrastructure.

Move to sustainable land management which protects soils and water quality.

Investment in new technologies which protect soils and water quality.

Research and development into the management of anthropogenic pollutants at their source e.g. preventing microplastics entering the environment.

Demonstrate and encourage best practice, such as the widespread use of natural flood management measures and reconnecting rivers to their floodplains.