



**Cyfoeth
Naturiol**
Cymru
**Natural
Resources**
Wales

The State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources. Technical Report. Chapter 1. Introduction

Natural Resources Wales

Final Report

About Natural Resources Wales

We look after Wales' environment so that it can look after nature, people and the economy.

Our air, land, water, wildlife, plants and soil – our natural resources - provide us with our basic needs, including food, energy, health and enjoyment.

When cared for in the right way, they can help us to reduce flooding, improve air quality and provide materials for construction. They also provide a home for some rare and beautiful wildlife and iconic landscapes we can enjoy and which boost the economy.

But they are coming under increasing pressure – from climate change, from a growing population and the need for energy production. We aim to find better solutions to these challenges and create a more successful, healthy and resilient Wales.

Evidence at Natural Resources Wales

Natural Resources Wales is an evidence based 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.

The State of Natural Resources Report (SoNaRR) Report Contents

This document is one of eight chapters of the State of Natural Resources Report.

Chapter 1	Introduction to the State of Natural Resources Report (SoNaRR): An assessment of sustainable management of natural resources
Chapter 2	Understanding drivers of change in natural resource use
Chapter 3	Summary of extent, condition and trends of natural resources and ecosystems in Wales
Chapter 4	Resilient Ecosystems
Chapter 5	Well-being in Wales
Chapter 6	Identifying Unsustainable Management
Chapter 7	Towards sustainable management of natural resources
Chapter 8	Assessment of the sustainable management of natural resources
Annex	Technical Annex for Chapter 3
Annex	Technical Annex for Chapter 7 (Part 1)
Annex	Technical Annex for Chapter 7 (Part 2)
Annex	Method for assigning confidence to evidence presented
Annex	Record of confidence assessments
Annex	Acronyms and Glossary of terms

All of the SoNaRR documents can be downloaded from the NRW website:
www.naturalresources.wales/sonarr.

Recommended citation for this report:

Natural Resources Wales. 2016. State of Natural Resources Report (SoNaRR):
Assessment of the Sustainable Management of Natural Resources. Technical
Report. Natural Resources Wales.

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Rhagair

Pleser yw cyflwyno Adroddiad cyntaf Cymru ar Gyflwr Adnoddau Naturiol (SoNaRR), sef ein hasesiad o lwyddiant Cymru o safbwynt rheoli adnoddau naturiol yn gynaliadwy.

Dyma un o ofynion pwysig Deddf yr Amgylchedd (Cymru) 2016, sy'n paratoi'r ffordd ar gyfer deddfwriaeth newydd sy'n mynnu ein bod yn troi ein cefn ar ystyried agweddau penodol ar yr amgylchedd yn annibynnol ar ei gilydd ac yn annibynnol ar y gymdeithas ehangach. Y nod yw symud tuag at ddull mwy cydgysylltiedig a chydweithredol o reoli ein hadnoddau naturiol.

Mae'r adroddiad yn canolbwyntio ar wytnwch adnoddau naturiol Cymru. Mae'n asesu i ba raddau y caiff adnoddau naturiol Cymru eu rheoli'n gynaliadwy. Ac – **am y tro cyntaf** – mae'r adroddiad yn cysylltu gwytnwch adnoddau naturiol Cymru â lles trigolion Cymru, sy'n ofyniad newydd mewn darn arall o ddeddfwriaeth arloesol, sef Deddf Llesiant Cenedlaethau'r Dyfodol (Cymru) 2015.

Rydym yn eich annog i ystyried pwrpas SoNaRR, sy'n driphlyg. Yn gyntaf, bydd yn cynnig sylfaen tystiolaeth i Weinidogion Llywodraeth Cymru wrth ddatblygu'r Polisi Adnoddau Naturiol Cenedlaethol, a fydd yn pennu'r blaenoriaethau ar gyfer gweithredu. Nid bwriad yr adroddiad hwn yw pennu beth y dylai'r blaenoriaethau polisi a'r atebion fod.

Yn ail, bydd yn cyfarwyddo'r drafodaeth ynghylch Datganiadau Ardal – gofyniad arall yn Neddf yr Amgylchedd – parthed y blaenoriaethau a'r cyfleoedd sydd ynghlwm wrth reoli ein hadnoddau naturiol yn gynaliadwy ar draws Cymru, ym mhob un o'n lleoedd.

Yn drydydd, mae'n cynnig llwyfan y gellir ei ddefnyddio ar gyfer trafod, ymgysylltu a chydweithredu parthed y rhan y gall **pob un** ohonom ei chwarae wrth wella gwytnwch ein hadnoddau naturiol a'n hecosystemau, fel y gallant barhau i gynnal ein lles am genedlaethau i ddod.

Mae creu'r SoNaRR cyntaf hwn wedi bod yn agoriad llygad. Nid oedd gennym unrhyw batrymau i'w dilyn, ac roedd yn newydd i bob un ohonom. Un o'r sialensiau fu darganfod nid yn unig pa fylchau a geir yn y dystiolaeth, ond hefyd sut y mae angen inni weithio gydag eraill i gasglu, dadansoddi a chyflwyno tystiolaeth. Yn awr, mae gennym well syniad o lawer.

O'r herwydd, rydym yn cyflwyno'r adroddiad hwn nid fel 'man gorffen', ond fel cychwyn dialog ynghylch sut rydym yn asesu ac yn gwerthuso i ba raddau a lwyddwn i reoli adnoddau naturiol yn gynaliadwy yng Nghymru.

Y tro hwn, dim ond yn rhannol rydym wedi cyflawni ein dyheadau i gydweithio, ond credwn ein bod wedi gosod sylfeini ar gyfer y dyfodol. Hoffem ddiolch i'r rheini ohonoch sydd wedi ein helpu i gyrraedd y fan hon, trwy rannu eich data a'ch profiad.

Wrth ddarllen yr adroddiad hwn, gofynnwn ichi ystyried y canlynol:

- sut y gallwch ddefnyddio'r dystiolaeth a gyflwynir yma i'ch helpu i gyflawni eich amcanion mewn ffordd fwy cynaliadwy;
- sut y gallwch wneud penderfyniadau yn eich maes a fydd yn gwella gwytnwch ecosystemau a'r manteision lles a ddaw yn eu sgil;
- sut y gallwch gymryd rhan mewn adroddiadau SoNaRR yn y dyfodol, a'n helpu i'w gwella.

Fel cymdeithas, mae'n ofynnol inni daro deuddeg yn hyn o beth. Mae arnom ni hyn i'r cenedlaethau nesaf. Edrychwn ymlaen at weithio gyda chi i sicrhau hyn.



A handwritten signature in black ink that reads "Emyr Roberts".

Dr Emyr Roberts
Prif Weithredwr



A handwritten signature in black ink that reads "Diane McCrea".

Diane McCrea
Cadeirydd



Ein Bwrdd: Diane McCrea, Dr Madeleine Havard, Howard Davies, Andy Middleton, Karen Balmer, Sir Paul Williams, Dr Ruth Hall, Elizabeth Haywood, Chris Blake, Nigel Reader, Zoë Henderson, Dr Emyr Roberts.

Foreword

We are delighted to present Wales's first State of Natural Resources Report (SoNaRR), our assessment of how Wales is doing in the sustainable management of natural resources.

This is a major requirement of the Environment (Wales) Act 2016, pioneering new legislation that demands that we move away from thinking about specific aspects of the environment in isolation from each other and in isolation from wider society. And to move to a more joined up and collaborative way of managing our natural resources.

The report focuses on the resilience of Wales's natural resources. It assesses the extent to which natural resources in Wales are being sustainably managed. And - **for the first time** – the report links the resilience of Welsh natural resources to the well-being of the people of Wales, which is a new requirement of another groundbreaking piece of legislation, the Well-being of Future Generations (Wales) Act 2015.

We encourage you to consider the purpose of SoNaRR, which is three-fold. First, it will provide an evidence base for Welsh Government Ministers in developing the National Natural Resources Policy, which will set the priorities for action. It is not for this report to set out what the policy priorities and solutions should be.

Second, it will inform Area Statement discussions – another requirement of the Environment Act – about the priorities and opportunities for sustainable management of our natural resources across Wales, in all of our places.

Third, it provides a platform from which to launch discussion, engagement and collaboration about the part that we can **all** play in improving the resilience of our natural resources and ecosystems, so that they can continue to support our well-being for generations to come.

Developing this first SoNaRR has been a learning experience. We haven't had any templates to follow and it is new for us all. One of the challenges has been to work out not only what the evidence gaps may be, but also how we need to work with others to collaborate in the gathering, analysis and presentation of evidence. We now have a much clearer idea.

We therefore present this report not as an end point, but as the beginning of a dialogue on how we assess and evaluate the extent to which we are achieving sustainable management of natural resources in Wales.

We have only partly met our aspirations for collaborative working this time around, but we believe that we have laid solid foundations for the future. We would like to thank those of you who have helped get us this far, by sharing your data and experience.

In reading this report, we ask you to consider:

- how you can use the evidence presented here to help you achieve your goals in a more sustainable way;
- how you can make decisions in your field that improve the resilience of ecosystems and the well-being benefits they provide; and
- how you can get involved in, and help us improve future SoNaRRs.

As a society, we need to get this right. We owe it to the next generations. We look forward to working with you to ensure this.



A handwritten signature in black ink that reads "Emyr Roberts".

Dr Emyr Roberts
Chief Executive



A handwritten signature in black ink that reads "Diane McCrea".

Diane McCrea
Chair



Our Board: Diane McCrea, Dr Madeleine Havard, Howard Davies, Andy Middleton, Karen Balmer, Sir Paul Williams, Dr Ruth Hall, Elizabeth Haywood, Chris Blake, Nigel Reader, Zoë Henderson, Dr Emyr Roberts.

1. Introduction to the State of Natural Resources Report (SoNaRR): An assessment of sustainable management of natural resources

This report is the first of its kind for Wales. Required under the Environment (Wales) Act 2016, it builds on a number of Welsh and UK-wide assessments of the status and trends of our natural resources. It looks at the risks and threats those trends in natural resources pose to our ecosystems and to the long-term social, cultural and economic well-being of Wales, in terms defined by the Well-Being of Future Generations (Wales) Act 2015.

1.1. What does the Environment (Wales) Act 2016 require?

The purpose of SoNaRR is set out in the Environment (Wales) Act 2016 (the Act). It states that Natural Resources Wales (NRW) must prepare and publish a report containing:

- *An assessment of the state of natural resources in Wales;*
- *An assessment of the extent to which the sustainable management of natural resources is being achieved;*
- *An assessment of biodiversity (to support the biodiversity duty on public bodies under section 6 of the Act, and the publication of a list of biodiversity of principle importance to Wales under section 7);*
- *What NRW considers to be the main trends and factors that are affecting and are likely to affect the state of natural resources; and*
- *Any aspects about the state of natural resources on which NRW considers it does not have sufficient information to make an assessment.*

SoNaRR is the evidence base to which Welsh Ministers must have regard when preparing or revising the National Natural Resources Policy, and for NRW when preparing Area Statements, which facilitate the implementation of the National Natural Resources Policy. In future, evidence gathered through the development and implementation of Area Statements will be used to inform the next update of SoNaRR in 2020. SoNaRR must also be taken into account in the publishing, adopting or reviewing of National Park and Area of Outstanding Natural Beauty (AONB) Management Plans by relevant authorities. The evidence presented in SoNaRR will provide a consistent evidence base for local planning authorities when refreshing local development plans. Over time, Area Statements will provide the evidence base to inform local and strategic development plans.

In preparing SoNaRR, NRW must apply the principles of sustainable management of natural resources as set out in the Act.

SoNaRR must set out NRW's assessment of biodiversity (including the living organisms and types of habitat included in any list published under section 7 of the Act. Biodiversity is defined in the Act as:

'the diversity of living organisms, whether at the genetic, species or ecosystem level'.

For the purposes of this report, the focus has been on NRW's assessment of the state and condition of habitats and species within the marine, terrestrial and freshwater environments, which is based on existing, available data. Further evidence is required to provide a more thorough assessment of diversity of ecosystems. This broad interpretation is compatible with the Convention on Biological Diversity (CBD). The assessment set out in Chapter 3 therefore covers extent (quantity), condition (quality) and diversity, and it includes the components: habitats, species and ecosystems.

Section 7 of the Environment (Wales) Act 2016 places a requirement on Welsh Ministers to publish, review and revise lists of the species and habitats of principal importance for maintaining and enhancing biodiversity in Wales. This section replaces the now repealed section 42 of the Natural Environment and Rural Communities Act 2006. The criteria to develop a new section 7 list has been on-going during the preparation of this report. Therefore, to fulfil the requirement to provide an assessment of biodiversity, which includes the section 7 list under the Act, the list of living organisms that were provided in the section 42 list has been used. Until the new section 7 list has been published, the Welsh Ministers have adopted the list of species and habitats under the now repealed section 42 to act as an interim list.

1.2. Links to other legislation

The evidence presented in SoNaRR will be critical in informing the well-being assessments being prepared by Public Service Boards (PSBs) as part of the requirements of the Well-being of Future Generations (Wales) Act. For this reason, SoNaRR will present ecosystem services and benefits in a way that clearly links to the 7 Well-being Goals (Figure 1.1). As a statutory member of all PSBs, NRW will work with them to help interpret the implications of the evidence set out in SoNaRR for their local scale. SoNaRR can also inform the Future Trends Report to be published under the Well-being of Future Generations Act.

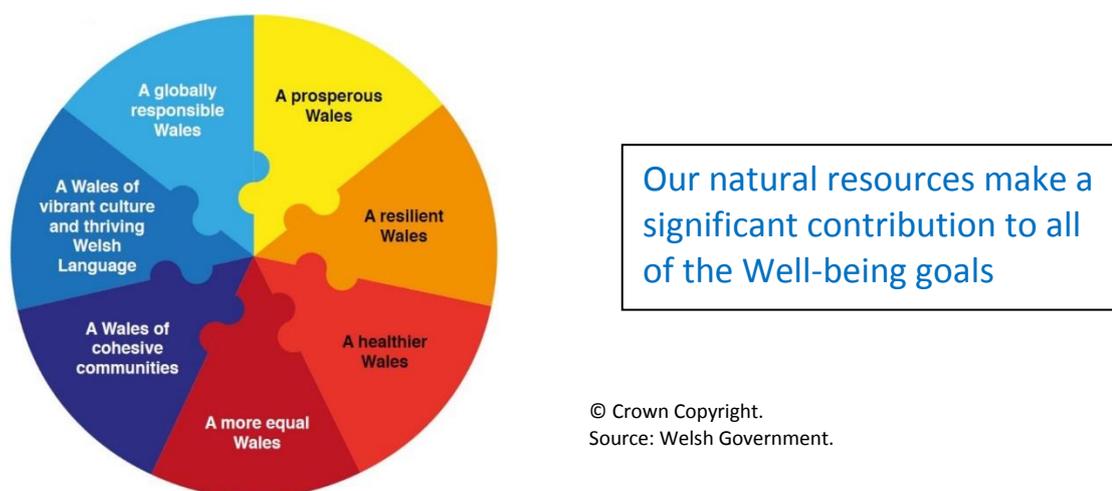


Figure 1.1 The Well-being Goals¹.

At sea, the Marine Strategy Framework Directive (MSFD) is a key driver for sustainable management of natural resources. The overarching aim of the MSFD is to achieve Good Environmental Status (GES) by 2020. Welsh Government is the competent authority for the inshore area, from the high water mark to 12 nautical miles.

The UK Marine Policy Statement 2011 provides a framework for the development of the first marine plans in the UK and requires planning to take an ecosystem approach. The first Welsh National Marine Plan is currently being developed and will be a key mechanism for achieving the sustainable management of marine natural resources as well as a tool for achieving Good Environmental Status under MSFD.

1.3. What are natural resources?

Natural resources are defined in the Act as:

- a) *Animals, plants and other organisms.*
- b) *Air, water and soil.*
- c) *Minerals.*
- d) *Geological features and processes.*
- e) *Physiographical features.*
- f) *Climatic features and processes.*

These individual components defined in the Act combine and work together in many ways and at many scales, from which humans use and obtain benefits. These components and processes work together and are referred to as ecosystems (Figure 1.2).

The way in which ecosystems are grouped in SoNaRR follows the system of the National Ecosystem Assessment (NEA)², which groups separate habitat types into the UK Broad Habitats or ecosystems.

Using these ecosystems allows us to:

- distinguish and group together the different habitats generally found there;
- describe the services we get from them and map the benefits across to well-being;
- look at threats or risks to the resilience of those ecosystems;
- identify opportunities and design management interventions around the land, water and sea uses that occur there.

We have decided to use these ecosystems as the thread throughout the report. This aligns with previous work by the UK National Ecosystem Assessment and work which followed.

It is important to recognise that benefits derive not just from the ecosystems themselves, but also from the interactions between ecosystems and human systems. The relationship between people and place is an important element of well-being. A consideration of landscape, for example, can provide the context for bringing natural

and human elements together around place. SoNaRR therefore considers and presents information in ways which can be integrated around place at national, regional and local scales.

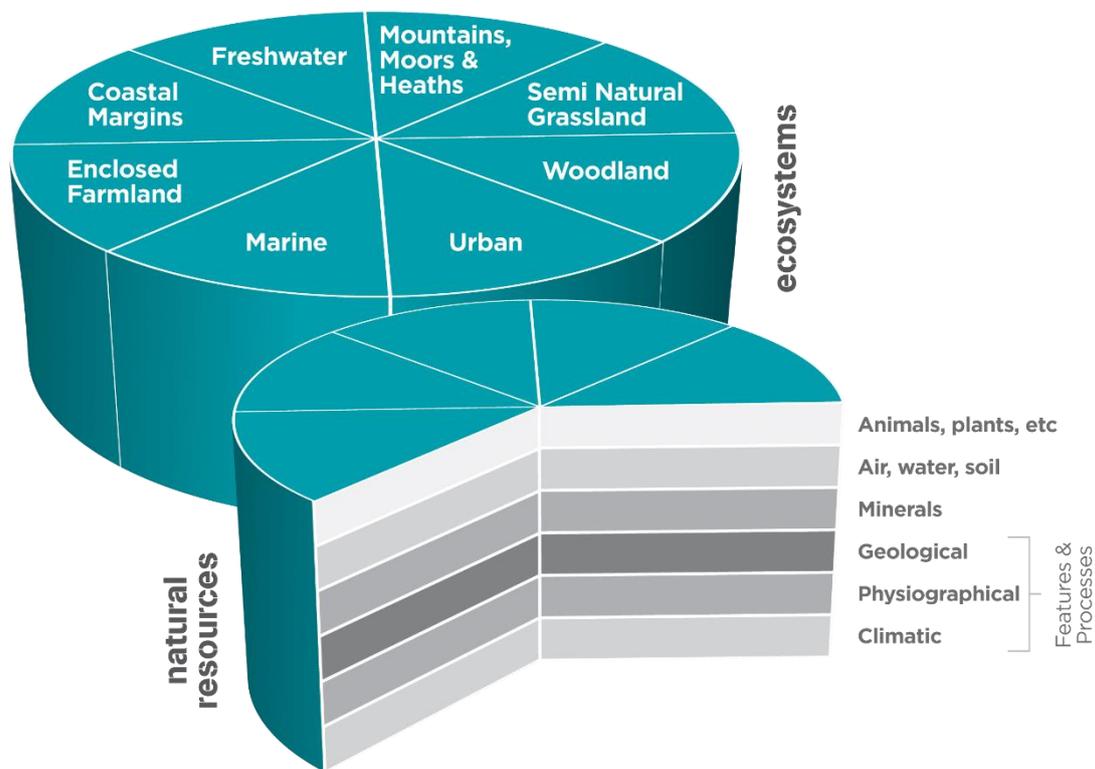


Figure 1.2 How natural resources and ecosystems interrelate.

1.4. Why are natural resources important?

Wales faces many challenges, such as securing energy and fuel supply, creating jobs and income, tackling poverty and inequality, tackling the threats of climate change, flooding and drought, and improving people's health and well-being.

Poorly managed natural resources and ecosystems increase the long-term risks to well-being and ultimately make these challenges more difficult.

Meeting these challenges needs fresh ideas and a radical, new, more joined-up way of thinking and doing things. This includes how individuals, communities and organisations in Wales collectively maintain, enhance and use natural resources more wisely.

Wales' natural resources provide us with many economic, social and cultural benefits, including:

- The Gross Value Added (GVA) for Welsh agriculture as a whole is £385 million³. This underpins the £6.1 billion annual turnover and £1.55 billion GVA attributed to the on-farm production and food manufacturing sector⁴.

- 951 million litres of drinking water per day⁵.
- 1.5 million green tonnes of timber a year⁶.
- The Gross Value Added (GVA) of the Welsh forestry sector is £499.3M⁷. This figure relates to forestry and logging, the manufacture of wood and products of wood and cork, and the manufacture of paper and paper products, but excludes for example the GVA of woodland-based recreation businesses.
- 14 million tonnes of aggregates a year⁸.
- 8,919 gigawatt hours of energy from renewable sources, and rising (2014 figures)⁹.
- In 2014, 1,500 businesses were engaged in producing renewable energy in Wales, with sales of £958 million, and employing 2,000 people on a Full Time Equivalent basis¹⁰.
- Welsh soils store 410 million tonnes of carbon¹¹, as well as being the basis for all agriculture.
- At a UK level, the annual value of pollination services to agriculture and horticulture is £690m¹².
- 10 million overnight trips and 90 million day visits from GB visitors, with a further 932,000 international visits, generate a total expenditure of £2,870 million in Wales (2014)¹³.
- Over a quarter of the adult population in Wales meet the recommended level of physical activity through participation in outdoor pursuits¹⁴.
- Evaluation of the Wales Coast Path found that the economic value derived from the health benefits of walking on the path was £18.2million¹⁵.
- The historic environment sector in Wales supports 30,000 jobs and contributes £840m to national GVA¹⁶.

These benefits, and more, will be needed to support the well-being of future generations, and all of them rely on healthy, resilient ecosystems. However, the way we manage our natural resources to produce benefits can have a profound effect on their ability to continue to deliver these and other benefits.

1.5. What is the sustainable management of natural resources?

The Act defines the sustainable management of natural resources as:

...using natural resources in a way and at a rate that maintains and enhances the resilience of ecosystems and the benefits they provide. In doing so, meeting the needs of current generations without compromising the ability of future generations to meet their needs, and contributing to the achievement of the well-being goals set out in the Well-being of Future Generations Act.

It includes taking action to promote, and not taking action that hinders, this objective. This is explored further in Figure 1.3.

Box 1.1 What do we mean by resilience?

The benefits our natural resources provide are wholly reliant on the way that ecosystems function. Ecosystems are considered to be **resilient** if they are able to cope with disturbance or change so that they maintain their functioning and ability to deliver benefits.

The Act recognises a number of attributes of ecosystems that support resilience, including their scale and extent, connectedness, condition, diversity, and ability to adapt.

1.6. The NRW long-term vision for SoNaRR

The Act sets out a step change in the approach to the management of natural resources in Wales. It demands that we move away from thinking about specific bits of the environment in isolation from each other and from wider society.

We are at the start of a journey to develop and present a more integrated evidence base on the natural resources of Wales. In this, our first assessment, we are reliant on data and evidence collected and analysed to meet specific functional requirements. It is not yet a fully integrated evidence base.

We want SoNaRR to be recognised and used by a wide range of users, not just policy makers in Government. Our ambition is that businesses will draw on the evidence in SoNaRR to inform their choice of where and how to invest, so that they are more resilient to future pressures. We expect the wider public sector in Wales to use SoNaRR to build the resilience of ecosystems into their decision making and to help with the integration of plans and programmes. To achieve this ambition, we will need to present the evidence using a range of different media to suit the needs of the audience.

This first SoNaRR is not a full reflection of this ambition. It is the start of an iterative process which builds on the best evidence and knowledge available for Wales. Approaches and methods developed especially for this analysis and others drawing on the UK NEA and follow on work, are drawn on throughout the assessment and adapted to ensure their relevance to Wales' legislative context. However, there are clearly gaps in our evidence which we explicitly highlight in the report and suggest where more work is required.

We will improve the way we present the evidence and data in future reports so that the links between natural resources and ecosystems, the benefits they provide, the risks to achieving those benefits, and the potential opportunities for better management can be clearly demonstrated and tracked. The importance of place, and the relationship people have with places, will be critical to this process. We are committed to learning and adopting good practice through a continual review of our approach and the approaches used by others.

1.7. The approach to the assessment

This report looks at the pressures on natural resources and ecosystems and how we are managing them. It covers the whole of Wales, including Welsh seas to 12 nautical miles. It does this from three perspectives:

- Firstly, looking at the environmental status of both natural resources and ecosystems (extent, condition and trends) and then, from that assessment, highlighting where the resilience of ecosystems is compromised;
- Secondly, looking at relationships between ecosystems and the benefits they provide for well-being. This will help society to understand what is potentially at stake and where opportunities may lie;
- Thirdly, looking at the ways in which the use and management of natural resources are regulated. To assess whether they are currently being managed sustainably or unsustainably, and identifying “systems failures”. This is where management and human activity have created or are continuing to create negative ecosystem impacts, which present risks for future generations. This will help to identify mechanisms to work with or improve to achieve sustainable management.

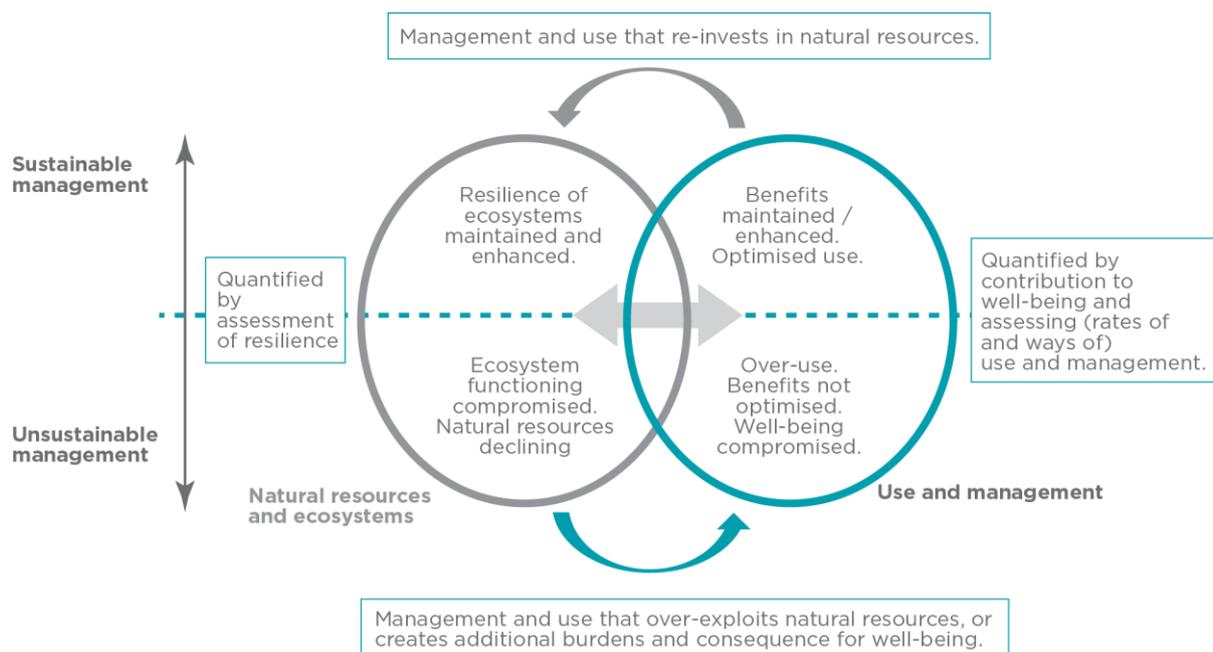


Figure 1.3 Characteristics of sustainable management and unsustainable management.

Using a combination of this information, we begin to make an assessment of the risks to well-being posed both by the shortcomings in the resilience of ecosystems, and the use and management of natural resources.

Figure 1.3 shows how this is considered. The state of natural resources and the resilience of ecosystems is set out on the left side of the diagram, where we use methods to explore how healthy our ecosystems are. The way and rate at which we are managing and using our natural resources is represented on the right side of the diagram. This includes an assessment of ecosystem benefits and the potential to

deliver more. It looks at issues for well-being created by over-use or mismanagement. By defining the characteristics of both sustainable and unsustainable management, we are able to assess the extent to which sustainable management is being achieved.

SoNaRR is different from “state of environment” reports because it draws conclusions about the relationships between natural resources and well-being that can help Wales to better plan for the future. It focuses on addressing the drivers of change and managing the risks and potential consequences for well-being. The emphasis on sustainable management allows all of us to question not just the *what?*, but the *so what?*

The report has been framed around the approach used for integrated reporting by the United Nations Environment Programme, European Environment Agency, and others. This approach has been adapted for Wales in particular to draw out information on the potential impacts on the nation’s well-being (Figure 1.4).

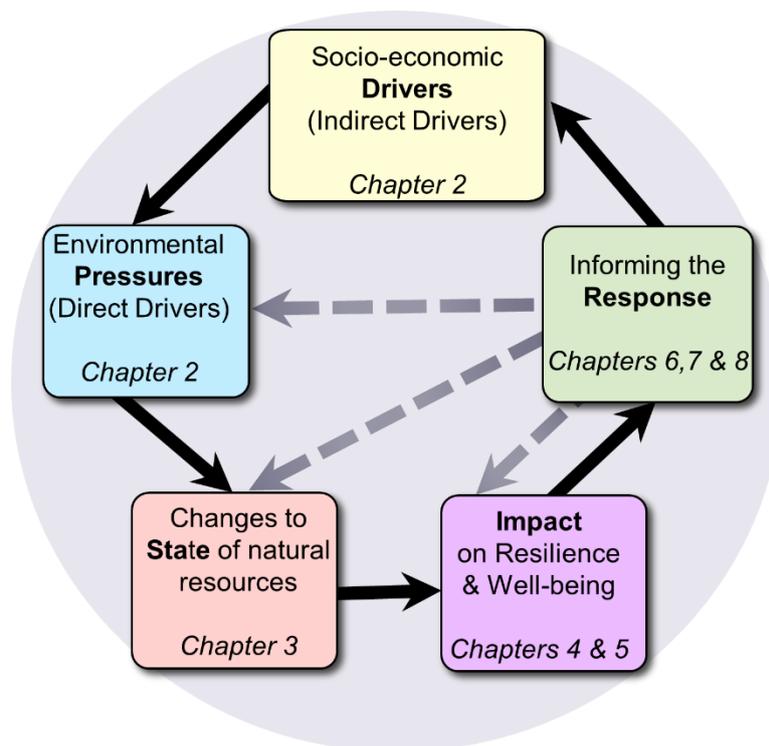


Figure 1.4 Our approach to SoNaRR by chapter.

Chapter 1 Introduction and approach

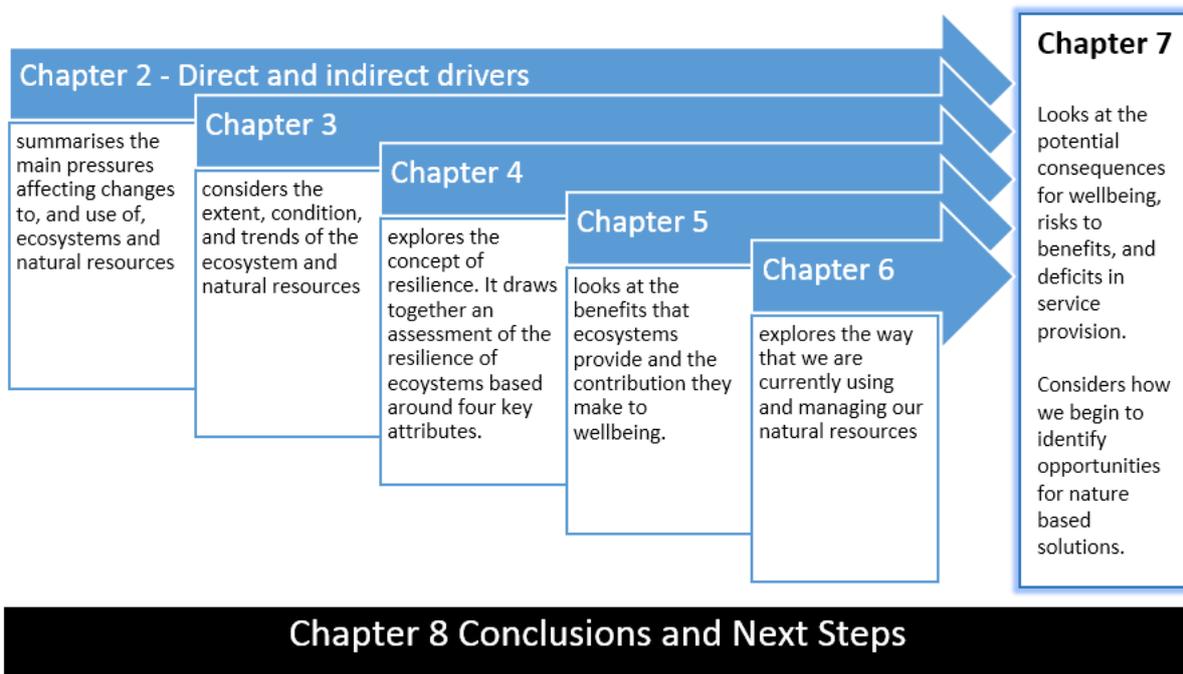


Figure 1.5 The structure of the chapters in this report.

Chapter 2 provides an overview of the social, economic, cultural and technological drivers of change to natural resources and ecosystems in Wales.

Chapter 3 sets out our assessment of the state of natural resources in Wales. We consider the extent, condition and trends of our natural resources and ecosystems. This allows us to consider the biophysical resilience of these natural resources in Chapter 4, based on the attributes set out in the Act (Box 1.1).

Chapter 5 describes the various benefits we get from our natural resources and ecosystems (Figure 1.6). It builds up a picture of the benefits for well-being, where there is greater potential for enhancing these benefits and where there are deficits (negative impacts). If we can firstly understand the benefits and their contribution to well-being, we can then consider the future risks to those benefits. If there are issues with the resilience of ecosystems, then what does this mean for well-being?

Chapter 6 explores how Wales is currently using and managing its natural resources, and identifies some of the risks created by failures in the current management system. By focusing on areas of greatest risk and flagging where there could be potential for delivering enhanced benefits, we will help Welsh Government and other policy-makers to identify priorities for sustainable management.

Drawing on the evidence presented in the preceding chapters, Chapter 7 sets out a natural resources and well-being risk register for Wales. This starts to draw some conclusions on the potential consequences for well-being, if the resilience of our

ecosystems and natural resources are put at risk. It then considers how these risks might be managed through spatial mapping techniques – to begin to identify integrated place-based solutions.

The final chapter summarises the evidence within the report, including our assessment of the extent to which sustainable management is being achieved, and our overall assessment of biodiversity. It draws conclusions from the report to highlight some of the high-level opportunities for maintaining and enhancing resilience of ecosystems and the benefits they provide.

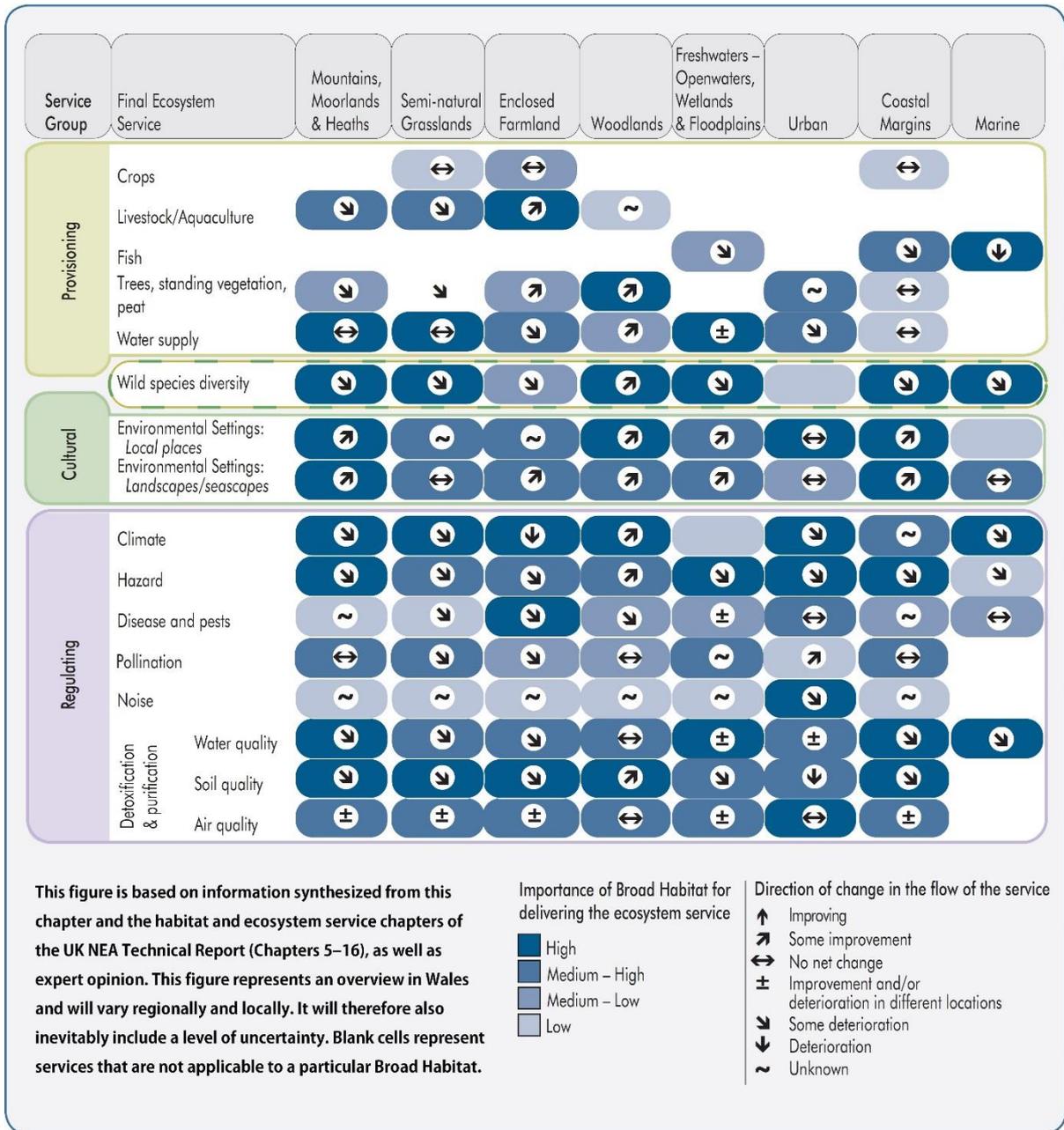


Figure 1.6 UK NEA assessment of relative importance of Broad Habitat in providing ecosystem services, from which benefits for well-being are derived. The darker the shading, the more important is the relationship between the broad habitat and the ecosystem service¹⁷. © 2011 UK National Ecosystem Assessment.

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(“Accessed” refers to the date the link was last accessed)

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