Natural Capital in our Catchments

Developing natural capital accounts for three of our catchments

from Southern Water

in partnership with AECOM

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1. Executive summary

We would like to thank the Natural Capital and Environmental Net Gain team at AECOM for working with us to produce this report.

Southern Water serves 2.6 million water customers and 4.6 million wastewater customers across the South East of England. While delivering these essential services, we want to protect and improve the environment, including rivers and bathing waters. We call these environmental assets our **natural capital**. These have been grouped into areas or surface water (rainfall) management catchments, and this report looks at three of these: the Arun and Western Streams, the Medway, and the Test and Itchen catchment.

Understanding the state of natural assets across these three catchments helps us prioritise what we do to improve the environment. Using natural capital accounting – a method to measure and value these assets – we can better understand the needs of these unique environments to inform our planning and investment decisions. This approach will also help us track changes in natural capital over time, as we make improvements and work in partnership with stakeholders to build, restore or improve these environments and boost its natural capital.

The key findings of this work are set out below.

The importance of agricultural land

A large proportion of land in the three catchments is agricultural. Excessive agricultural run-off into waterbodies can lead to **eutrophication – increased growth of algae in water due to high levels of certain nutrients**. Understanding the risks of eutrophication highlights the importance of engagement with landowners and managers to adopt catchment-sensitive farming and future regenerative land management practices. Particularly in the Test and Itchen catchment where almost all water sites are within **Nitrate Vulnerable Zones** (NVZs). These regenerative farming practices can also support soil health, increasing its potential to store carbon and contribute to climate regulation.

There are large woodland habitats across the three catchments as well. Woodlands deliver many benefits, such as carbon sequestration, air pollution removal and water storage, underlining the important role a broad range of habitats play in catchment management.

Sensitivity of water sites

Protecting and improving the quality of rivers and seas is a clear focus for water companies, as these ecosystems support recreation and the local economy. Rivers and seas are particularly vulnerable to impacts from our activities, including from the use of **storm overflows**. These accounts highlight that rivers are vulnerable in the Arun and Western Streams catchment, given their low **Water Framework Directive** (WFD) status. This could have downstream impacts on coastal areas, including on bathing waters.

Investing in nature-based solutions makes sense

We believe that investing in nature-based solutions can help deliver biodiversity and environmental benefits alongside business benefits, such as reducing water treatment costs. For example, the creation of wetlands can increase the natural purification of water sites leading to more resilient river systems.

Nature-based solutions such as seagrass and kelp restoration, or the regeneration of native oyster beds, are further natural ways of filtering pollutants from the water, while delivering many additional benefits such as carbon sequestration and biodiversity improvements.

2. Introduction to our catchment accounts

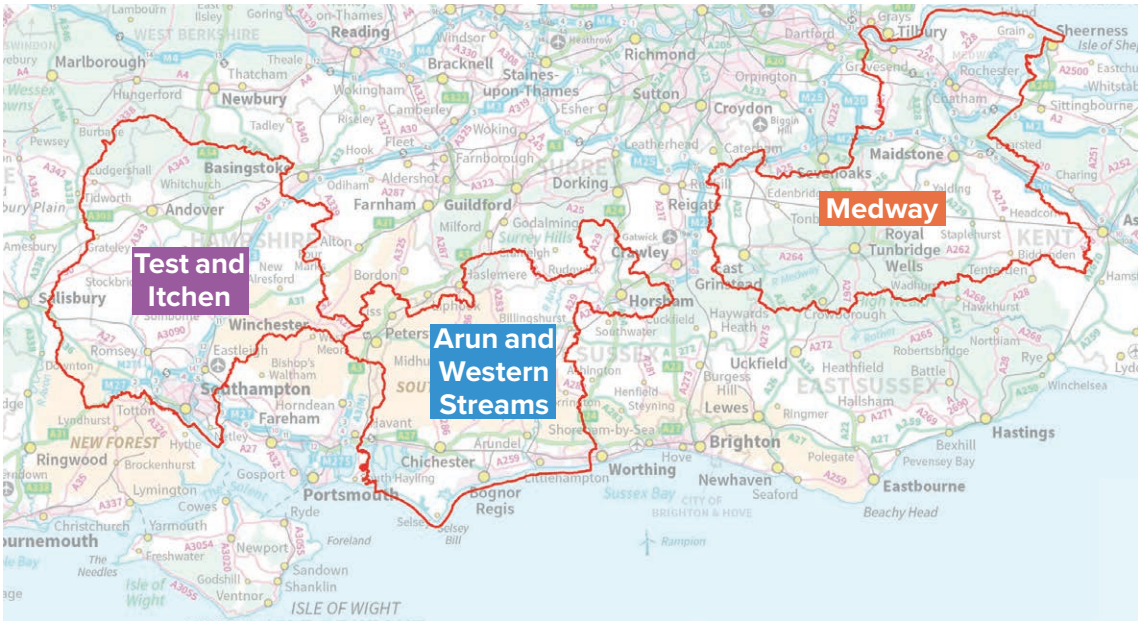
Southern Water provides essential water services to 2.6 million customers and wastewater services to 4.6 million customers across Kent, Sussex, Hampshire, and the Isle of Wight.

The findings presented in this report provide a summary of the state of natural capital within three of Southern Water's surface water management catchments: the Arun and Western Streams, the Medway, and the Test and Itchen catchment. This includes marine habitats out to one kilometre as per the Water Framework Directive (WFD) methodologies. These catchments are shown in Figure 1.

A catchment is an area where water is collected by the natural landscape – it can be a river water catchment or groundwater catchment. We have 98 groundwater catchments, 11 river catchments, and four reservoir catchments in our region. Rivers define our surface water management catchments which forms the basis for these catchment accounts. The Arun and Western Streams catchment is defined by the rivers Western Rother and Arun, West Sussex; the Medway catchment is defined by the river Medway, Kent; and the Test and Itchen catchment is defined by the rivers Test and Itchen, West Hampshire.

Natural capital refers to the elements of nature (rivers, lakes, woodlands, wetlands, etc.) that deliver benefits to people by providing **ecosystem services**, such as providing fresh water. In the South East, this includes our rivers – such as the unique chalk streams of the rivers Test and Itchen – and our bathing waters.

Figure 1: Natural capital study area



This work meets our natural capital performance commitment[1]:

Our natural capital performance commitment encourages us to better understand the condition of natural capital assets we own, influence, or are reliant on in our activities. We committed to setting up these natural capital accounts for at least three of our 11 catchments by the end of 2024–25. This allows us to understand changes in natural capital and the value of related ecosystem services because of our investments and activities.

[1] Ofwat (2019) PR 19 final determinations. Southern Water – Outcomes performance commitment appendix. Available at: ofwat.gov.uk/wp-content/uploads/2019/12/PR19-final-determinations-Southern-Water-%E2%80%93-Outcomes-performance-commitment-appendix.pdf

3. Measuring our environmental assets at a catchment level

We measured the state of natural capital in each catchment in terms of the quantity and quality of habitats, and the ecosystem services they deliver [2].

The habitats were classified into seven broad types:

- **Coastal margins**
- **Enclosed farmland**
- **Freshwaters, wetlands, and floodplains**
- **Heaths (in the category mountains, moors, and heath)**
- **Semi-natural grassland**
- **Urban green space**
- **Woodlands**

These habitats can deliver ecosystem services. Those assessed were:

- **Food (crops and livestock)**
- **Water supply**
- **Global climate regulation**
- **Air quality regulation**
- **Natural hazard regulation**
- **Water purification by habitats**
- **Water quality**
- **Recreation**
- **Biodiversity**

The flows of these ecosystem services from habitats were quantified (presented in a '**physical flow account**') and valued in monetary terms (presented in a '**monetary flow account**'), where appropriate.

The baseline year for data reporting was set at 2021, and the monetary values expressed in 2020 prices (see: '**price year**').

As a baseline account, the findings for each catchment provide a starting point from which future accounts can be compared. This will help us monitor change in our impacts and dependencies on nature.

[2] Please contact Southern Water for the full technical report, asset register, physical and monetary flow accounts, methodology, and data information behind these results.

4. What is the state of nature in our three catchments?

The state of nature was defined by the quantity (extent) and quality (condition) of natural capital in the three catchments assessed.

4.1 Terrestrial habitats

Figures 2, 3, and 4 show the land cover across each of the three catchments. Overall, the catchments are dominated by agricultural land, or 'enclosed farmland', which covered an average of 64% of the catchment areas (Table 1). This is followed by woodlands which make up between 15% and 22% of each of the catchment areas. Most of this woodland area is **broadleaved woodland**.

Table 1: Summary of habitat types by catchment (Source: CEH Land Cover Maps, 2021)

	Catchment			
Broad habitat	**Arun and Western Streams (147,230 ha)**	**Medway (194,298 ha)**	**Test and Itchen (174,501 ha)**	**Total (516,029 ha)**
Coastal margins	4%	5%	1%	3%
Enclosed farmland	60%	60%	70%	64%
Freshwater, wetlands and floodplains	0.50%	1%	1%	1%
Mountains, moors and heaths	1%	1%	1%	1%
Semi-natural grassland	1%	1%	2%	1%
Urban green space	11%	15%	11%	12%
Woodland	22%	17%	15%	18%
Total	100%	100%	100%	100%

Arun and Western Streams

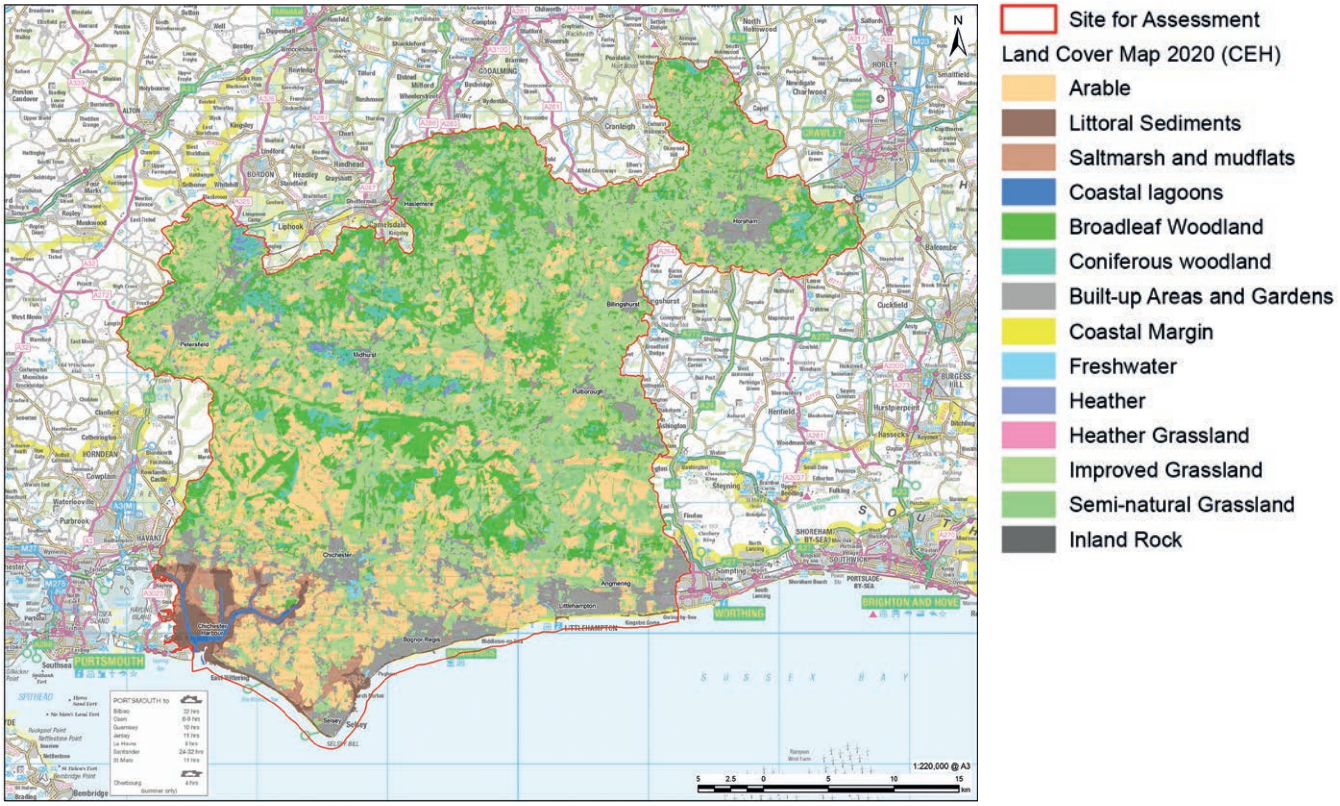
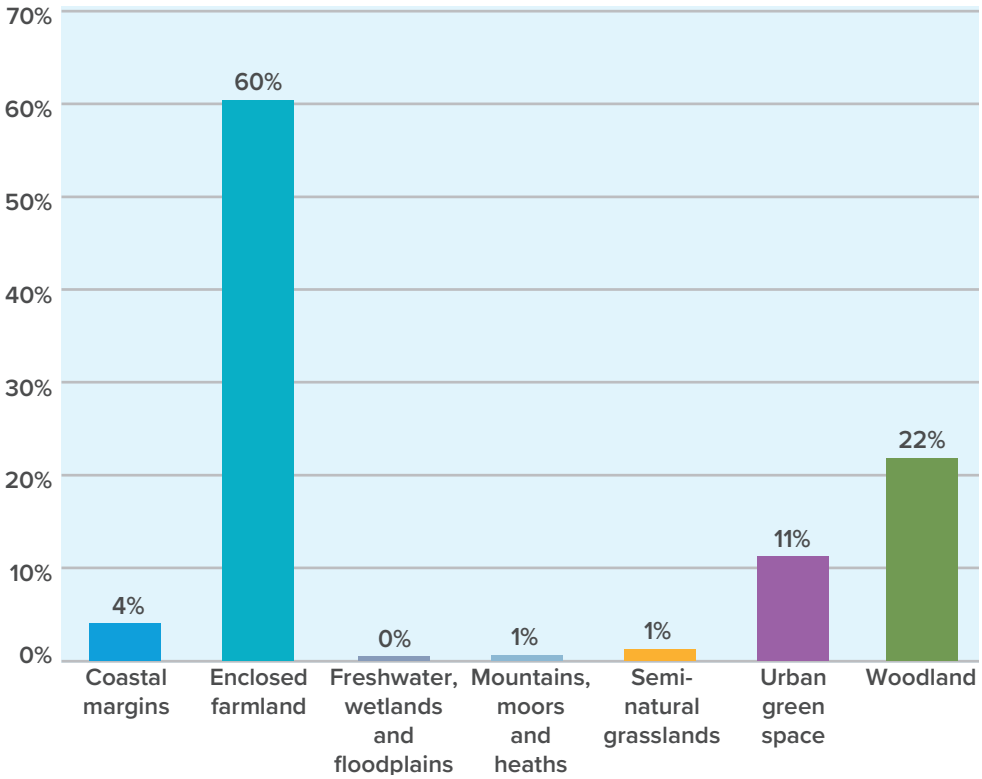
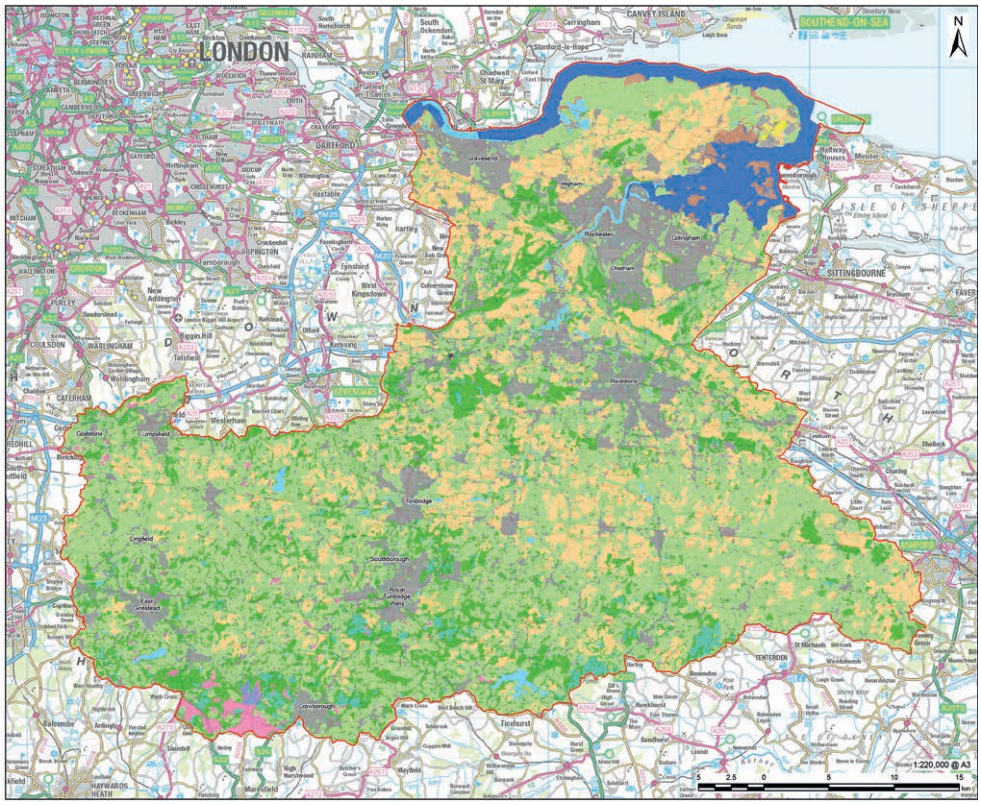


Figure 2: Land cover within the Arun and Western Streams catchment (total area 151,001 ha)



Medway

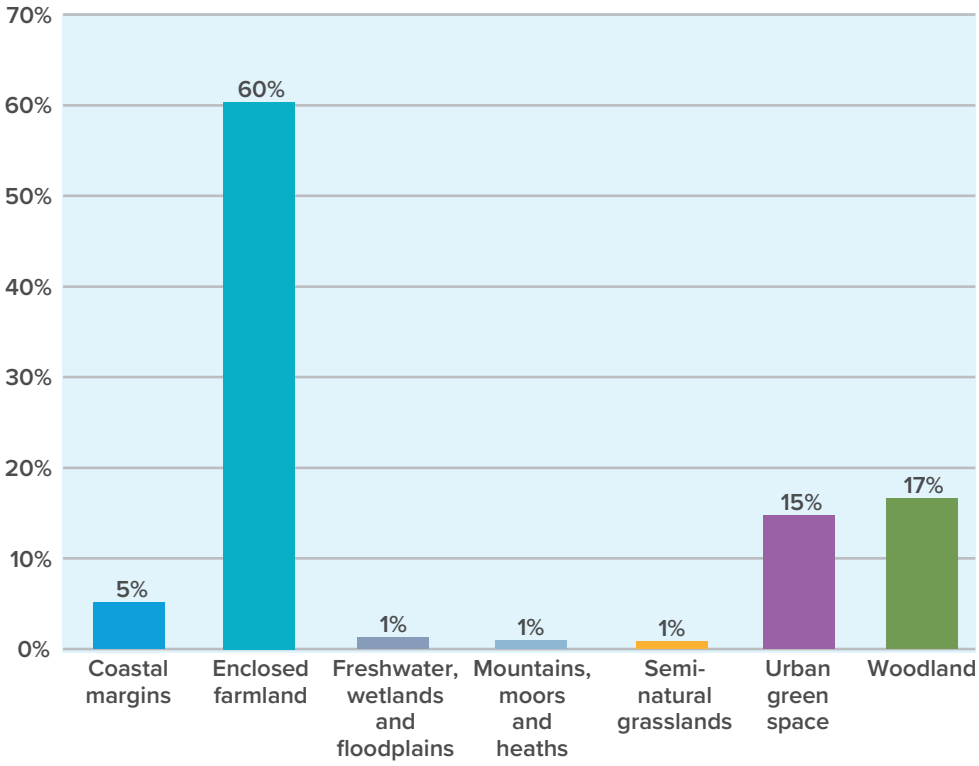


Site for Assessment

Land Cover Map 2020 (CEH)

- Arable
- Littoral Sediments
- Saltmarsh and mudflats
- Coastal lagoons
- Broadleaf Woodland
- Coniferous woodland
- Built-up Areas and Gardens
- Coastal Margin
- Freshwater
- Heather
- Heather Grassland
- Improved Grassland
- Semi-natural Grassland
- Inland Rock

Figure 3: Land cover within the Medway catchment (total area 194,855 ha)



Test and Itchen

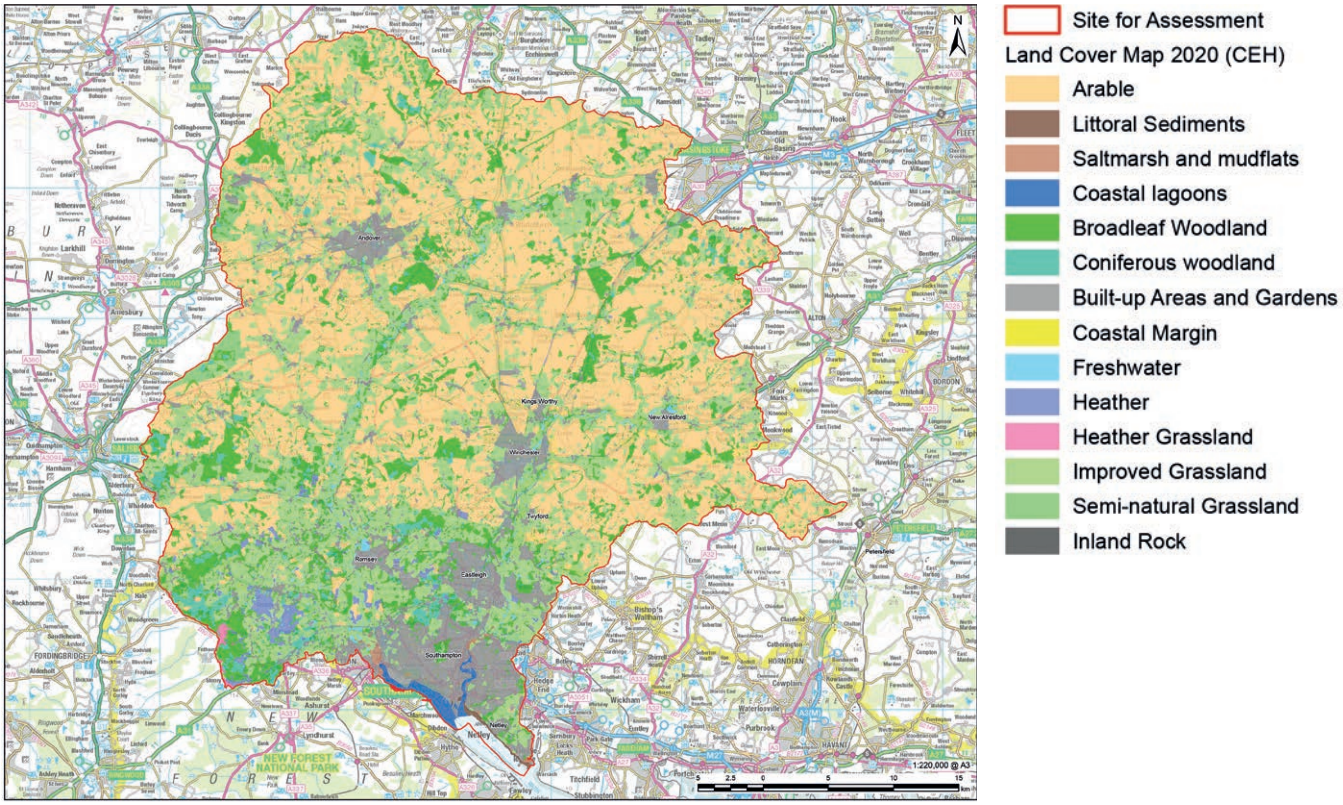
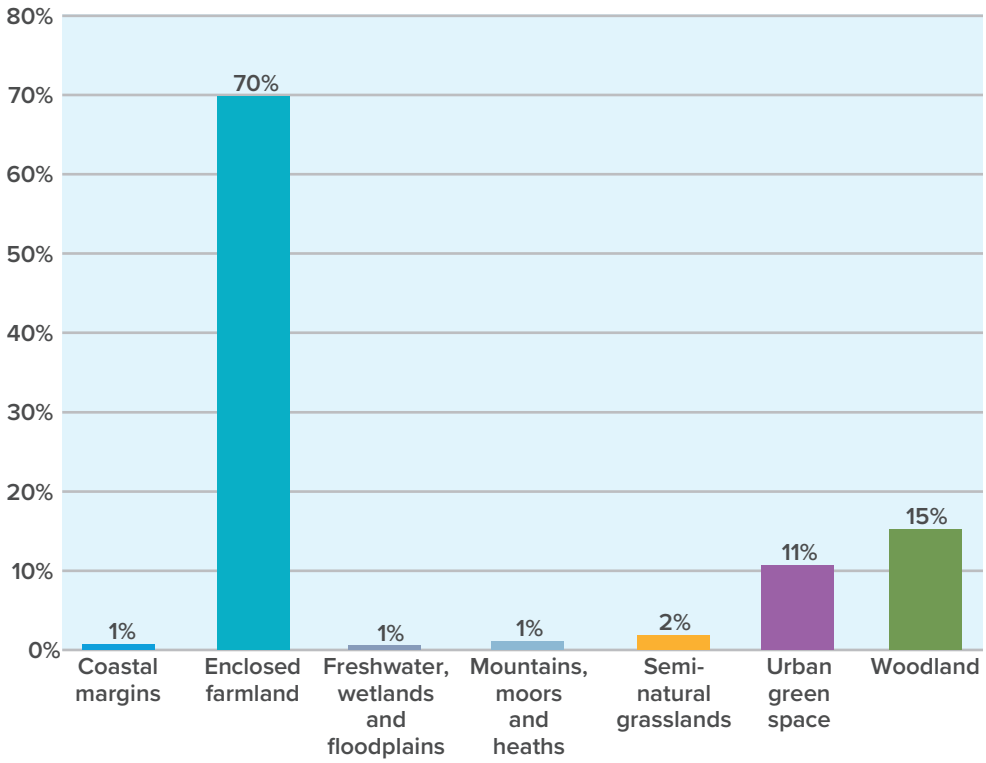


Figure 4: Land cover within the Test and Itchen catchment (total area 175,087 ha)



In terms of quantity, out of the agricultural land dominating the catchment areas, most (about 64%) is of low quality (Grades 3 and 4) according to the **Agricultural Land Class** (ALC) (Table 2). The Test and Itchen catchment had just 1% of its agricultural land classified as high quality (ALC Grades 1 and 2). This was 13% and 17% for the Arun and Western Streams and the Medway catchments respectively.

Table 2. Agricultural Land Classification by catchment (%; source: Natural England, 2021)

	Catchment			
Agricultural grade	Arun and Western Streams (147,230 ha)	Medway (185,176 ha)	Test and Itchen (173,672 ha)	Total (502,180 ha)
Grade 1	4%	5%	0%	3%
Grade 2	9%	12%	1%	7%
Grade 3	49%	55%	75%	60%
Grade 4	19%	12%	11%	14%
Grade 5	0.40%	0.02%	1%	0.50%
Non-agricultural	14%	7%	7%	9%
Urban	4%	8%	5%	6%
Total	100%	100%	100%	100%

4.2 Water-based habitats and the Water Framework Directive (WFD)

Water-based habitats across the three catchments include freshwaters (e.g. rivers, lakes, and canals), coastal margins (e.g. transitional waterbodies and saltmarshes), and marine habitats. For the purposes of the WFD, catchments were subdivided into water site units.

The condition of water sites can be understood by their status under the WFD, categorised as bad, moderate, or good. Most water sites within the catchments were moderate, and none of the catchments had sites with good status. Rivers were the only group with bad status. The Medway catchment had 8% at bad, followed by the Arun and Western Streams at 2% and 1% for the Test and Itchen Catchment (Figures 5, 6, 7).

Figure 5: Arun and Western Streams – WFD status by waterbody type

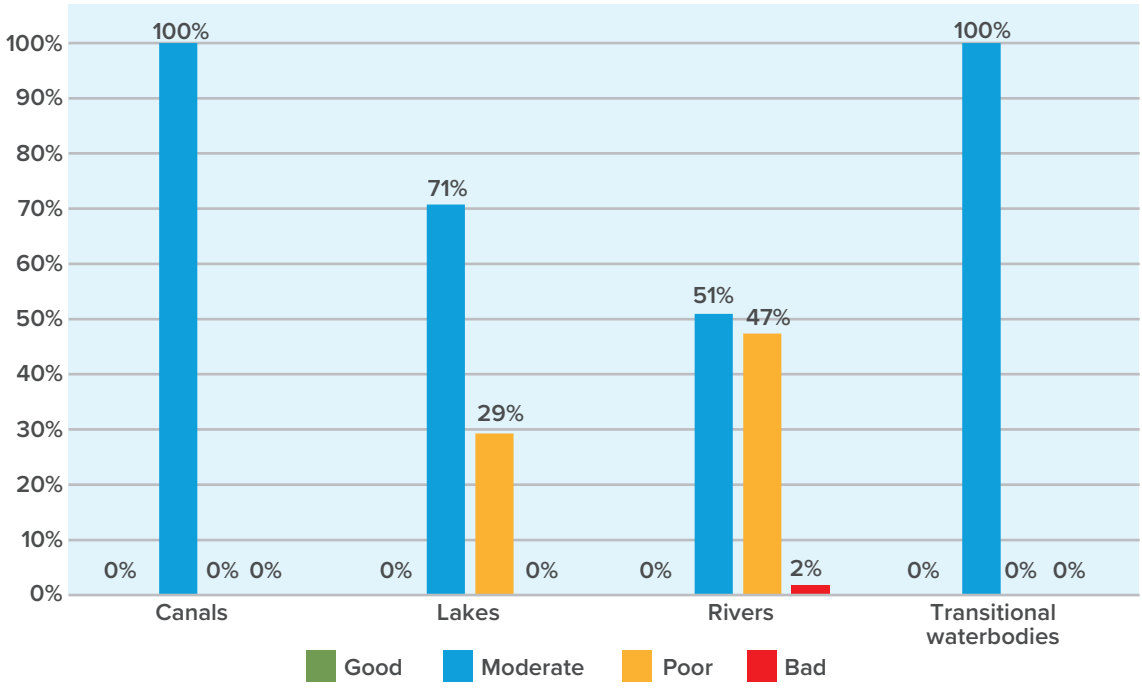


Figure 6: Medway – WFD status by waterbody type

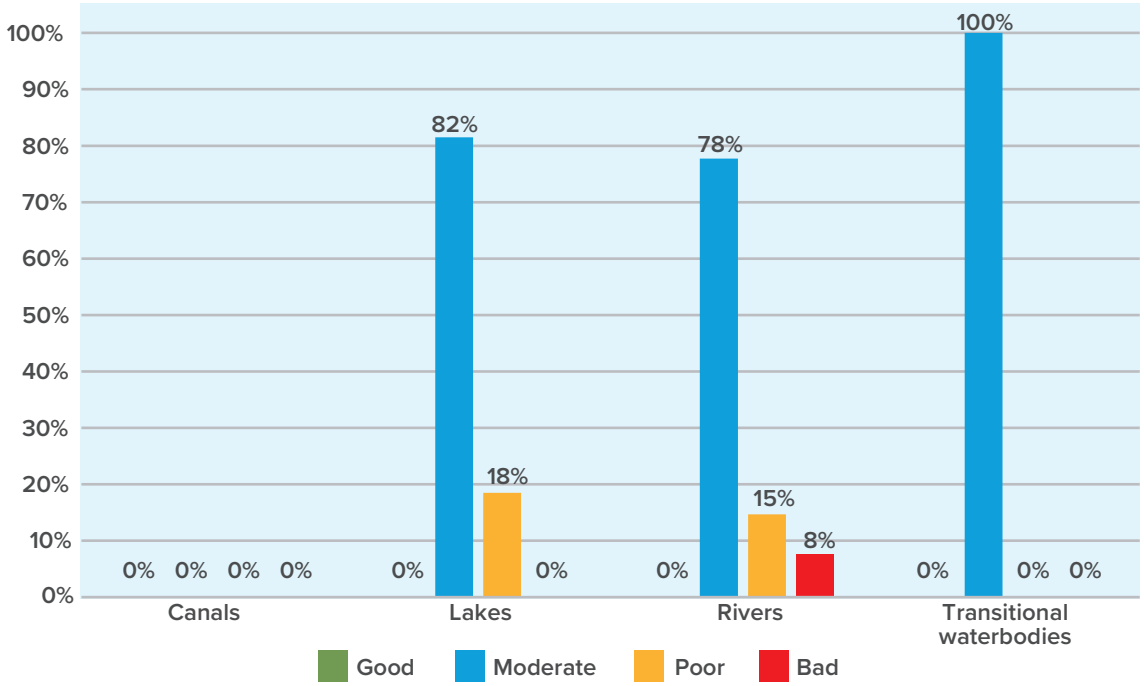
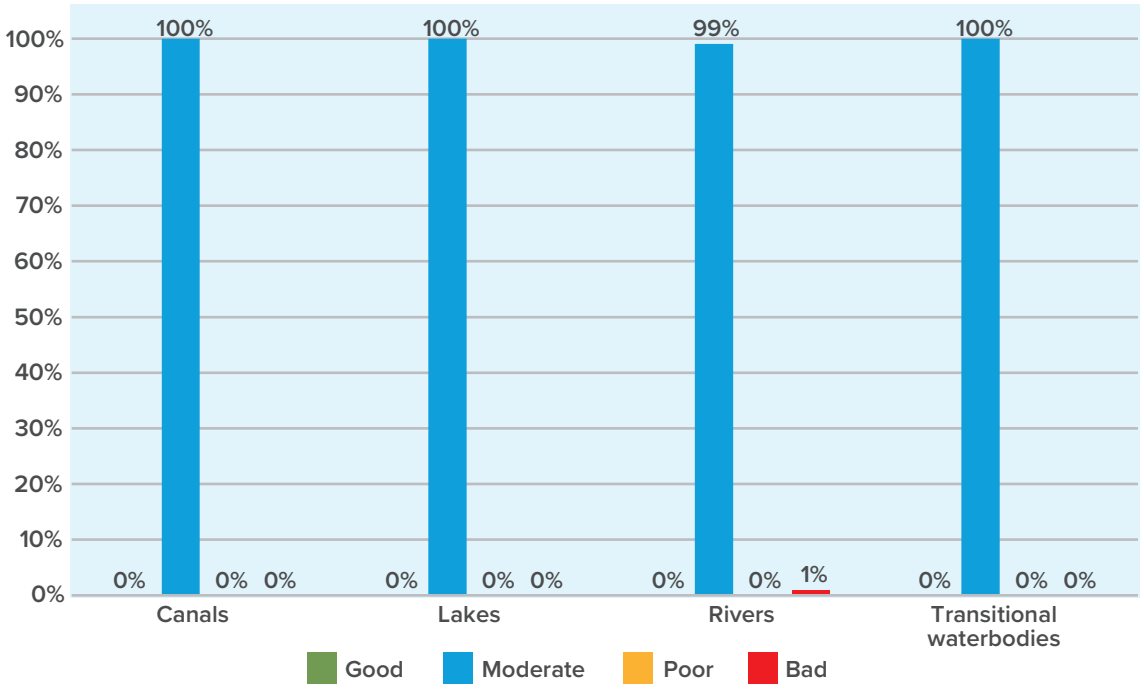


Figure 7: Test and Itchen – WFD status by waterbody type



Why are some water sites not achieving good status?

Across the three catchments, those areas not achieving good status were linked to the agricultural and water sectors (Figures 8, 9, 10). While most reasons for failure were not linked to a particular sector, around 20% were attributed to agricultural and rural land management or the water industry respectively. There were some differences across the three catchments. The Test and Itchen catchment, for example, failed largely due to urbanisation and transportation, although still followed by the water and agricultural sectors (Figure 10).

Within the water industry, wastewater treatment (over 80%), specifically sewage discharge and the use of **combined sewer overflows**, were seen as the largest contributing activities.

Figure 8: Arun and Western Streams – WFD lakes and rivers – reasons for failure by sector (total instance = 319)

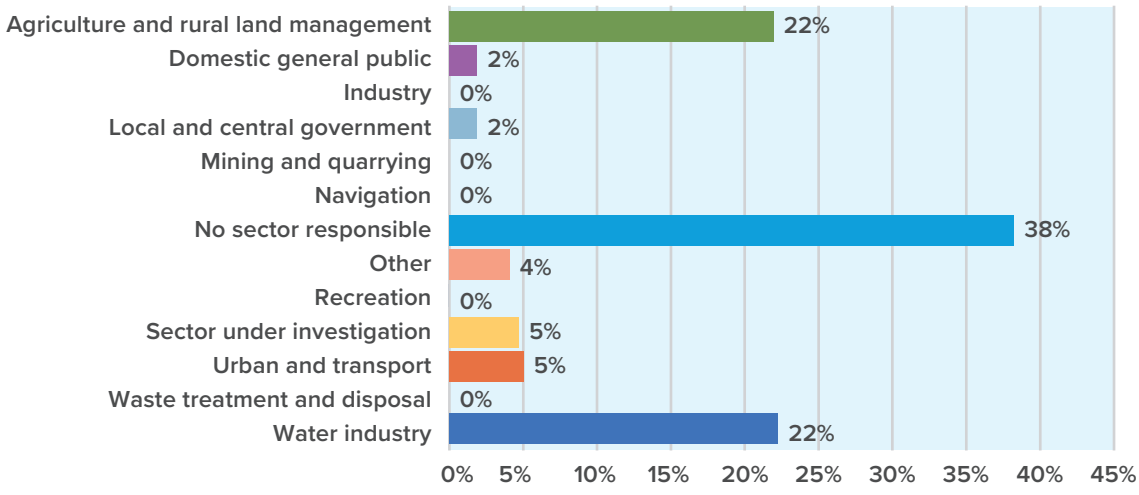


Figure 9: Medway – WFD lakes and rivers – reasons for failure by sector (total instance = 635)

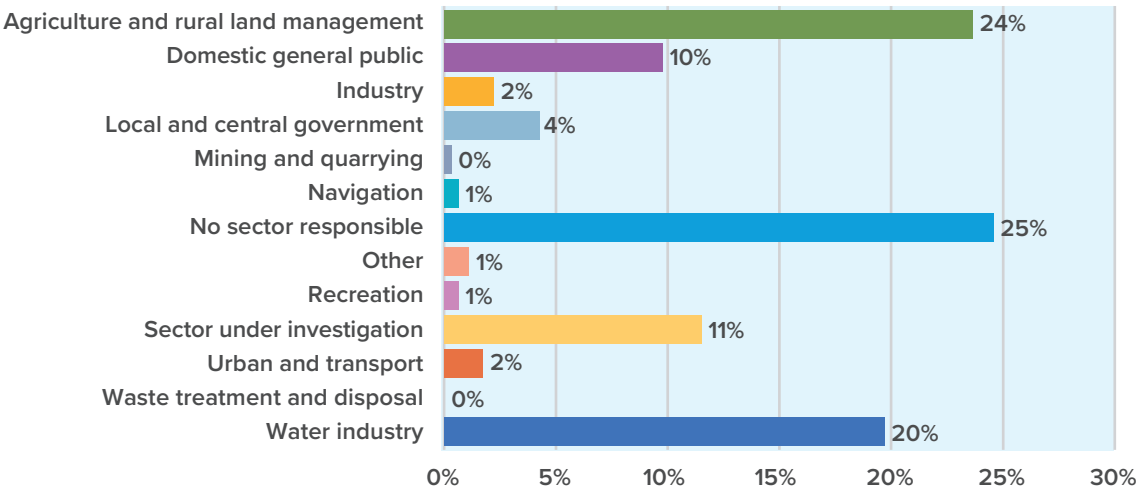
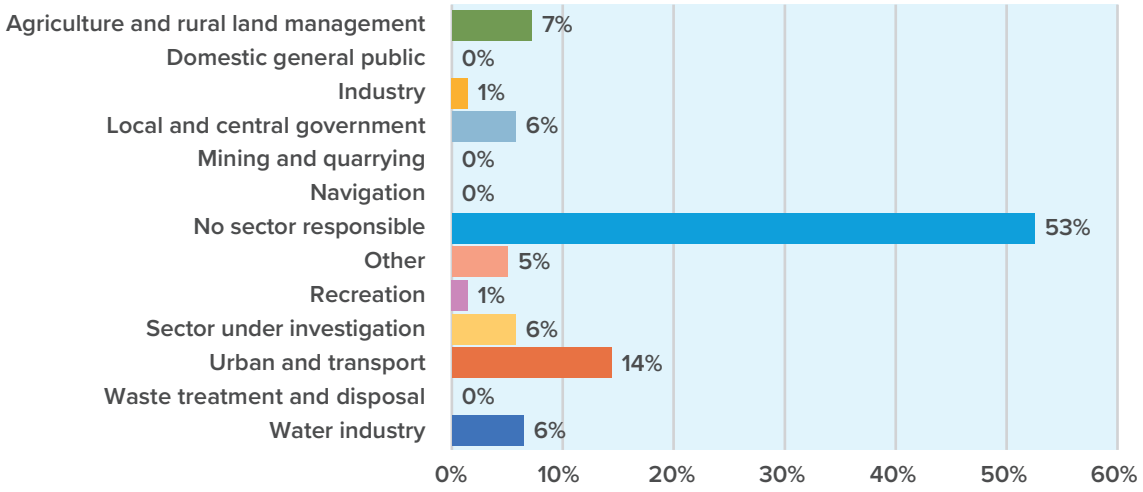


Figure 10: Test and Itchen – WFD lakes and rivers – reasons for failure by sector (total instance = 139)



All catchments included water sites within **Nitrate Vulnerable Zones** (NVZs) – areas at risk of nitrogen pollution – although most were found in the Test and Itchen catchment.

Only the Arun and Western Streams catchment hosts bathing water sites. Out of nine bathing water sites, six were found to be of excellent status and three in good status (i.e. none with the lower sufficient or poor status).

4.3 Environmental designations in the three catchments

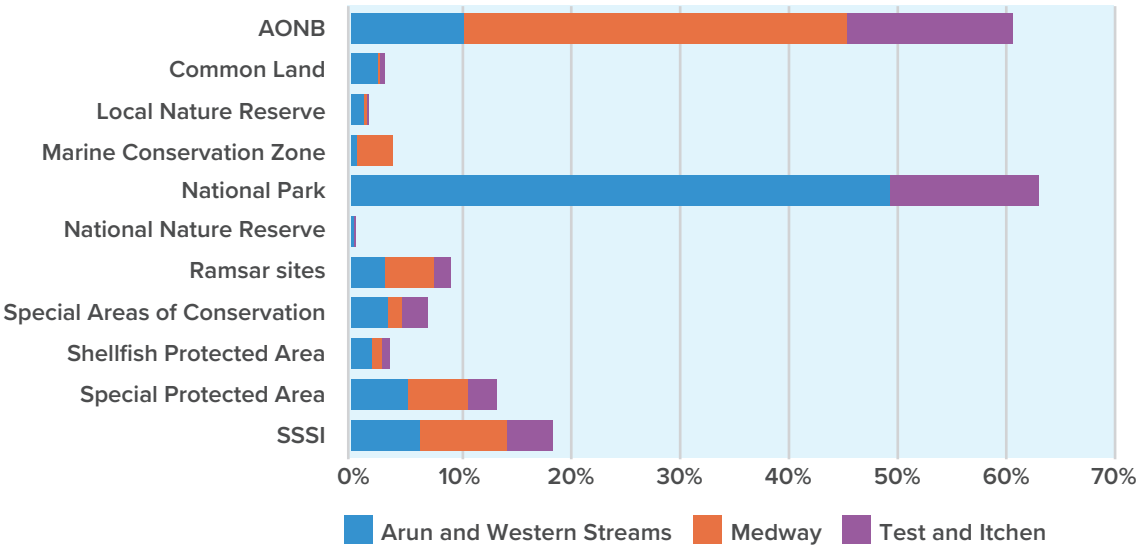
The most prominent **environmental designations** included within the three catchments were found to be **National Parks, Areas of Outstanding Natural Beauty** (AONBs), and **Sites of Special Scientific Interest** (SSSIs) (Figure 11).

The majority of SSSIs within the catchments were in 'favourable' condition (over 40%) or 'unfavourable recovering' condition (over 30%). However, about a third of the SSSI area within the Arun and Western Streams catchment was found to be in 'unfavourable declining' condition.

Ancient Woodland accounts for around 10% of the catchment areas, with the majority being Ancient and Semi-Natural Woodland.

Figure 11: Extent of environmental designations by catchment

(%; source: Natural England,)



4.4 Biodiversity

Biodiversity refers to the variety of all life on Earth. We measured biodiversity through biodiversity units, which represent the biodiversity value of habitats and rivers within an area, measured using Natural England's Biodiversity Metric 3.1[3]. The calculation is based on the distinctiveness (i.e. type of habitat and rarity protective status), condition, extent, and strategic significance (i.e. areas with a special designation and/or with key ecological functional role) of habitats.

The Medway catchment was found to have the highest number of baseline biodiversity units compared to the other two catchments. Woodlands, specifically **broadleaved woodland**, were found to deliver the greatest number of biodiversity units for all three catchments.

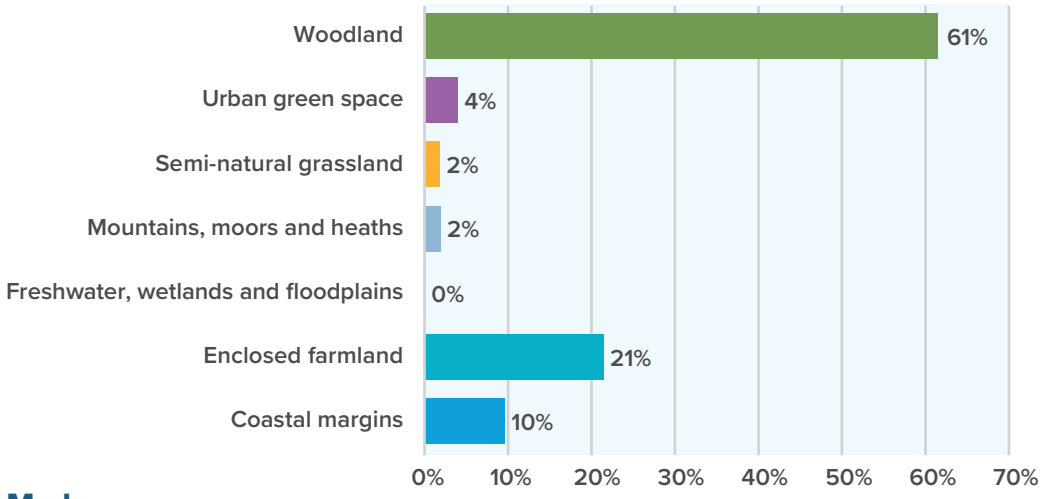
Table 3. Summary results of the baseline biodiversity assessment (2021)

Baseline biodiversity units	Arun and Western Streams (147,230 ha)	Medway (185,176 ha)	Test and Itchen (173,672 ha)	Total (502,180 ha)
Habitat units	917,065	1,171,071	871,646	2,959,782
River units	5,531	7,166	5,361	18,058

[3] Natural England (2021) Biodiversity Metric 3.1 (JP039). Available at: publications.naturalengland.org.uk/publication/6049804846366720

Arun and Western Streams

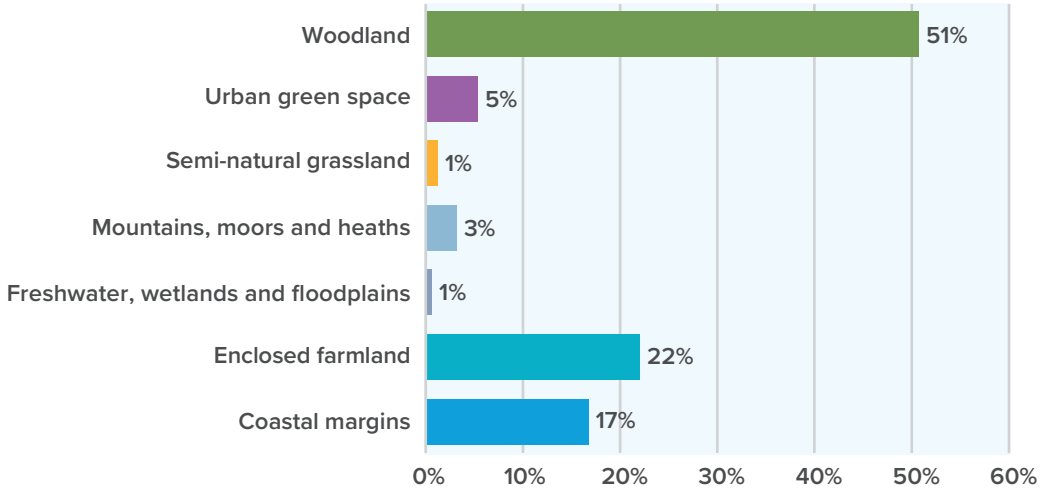
Figure 12: Baseline biodiversity units for area-based habitats (total units = 917,065 ha)



Habitats in the Arun and Western Streams catchment had 917,065 biodiversity units, most coming from broadleaved woodlands (about 60%). Rivers had 5,531 biodiversity units.

Medway

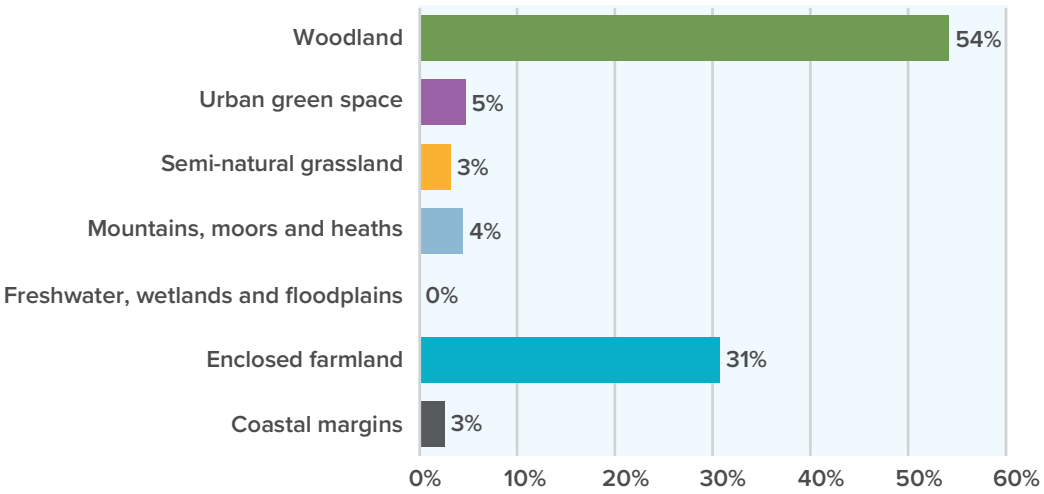
Figure 13: Baseline biodiversity units for area-based habitats (total units = 1,171,071 ha)



Habitats in the Test and Itchen catchment had 871,646 biodiversity units, most coming from broadleaved woodlands (about 53%). Rivers had 5,361 biodiversity units.

Test and Itchen

Figure 14: Baseline biodiversity units for area-based habitats (total units = 871,646 ha)



Habitats in the Medway catchment had 1,171,071 biodiversity units, most coming from broadleaved woodlands (about 53%). Rivers had 7,166 biodiversity units.

5. Physical and monetary flows of ecosystem services

The way living things interact with each other and their physical environment creates an ecosystem. The following section provides details by ecosystem services delivered across the three catchments in 2021.

5.1 Food

5.1.1 Crops

About one million tonnes of cereal crops were estimated to be produced across the three catchments in 2021, with 45% of these crops linked to the Test and Itchen catchment and the remaining split relatively evenly between the Arun and Western Streams and Medway catchments (Table 4).

About 216,000 tonnes of leguminous crops – crops including peas and soya beans – were estimated to be produced across the three catchments in 2021, with about 40% linked to the Medway catchment followed by the Test and Itchen catchment (about 30%) and the Arun and Western Streams catchment (about 25%).

Together, total crop production was estimated to have generated nearly £120 million in value in 2021. Most of this was attributed to cereal crops.

Table 4. Physical and monetary flows from crop production

	Cereal crops		Leguminous crops		
Catchment	Volume (tonnes/ year)	Value (£k/year)	Volume (tonnes/ year)	Value (£k/year)	Total value (£k/year)
Arun and Western Streams	290,150	22,395	53,907	6,408	28,803
Medway	302,595	25,063	91,545	10,796	35,859
Test and Itchen	477,235	446,304	70,531	8,394	54,698
Total	1,069,981	93,762	215,982	25,598	119,360

5.1.2 Livestock

It was calculated that there were over 180 thousand cows across the three catchments in 2021. The total value of livestock production was estimated to be nearly £70 million; most being attributed to sheep versus cow rearing (Table 5).

Table 5. Physical and monetary flows from livestock

	Cows		Sheep	
Catchment	Number of cows per year	Gross margin (£k/year)	Gross margin (£k/year)	Total value (£k/year)
Arun and Western Streams	57,381	6,859	15,146	22,005
Medway	81,215	9,708	21,437	31,145
Test and Itchen	43,913	5,249	11,591	16,840
Total	182,509	21,816	48,174	69,991

5.2 Water supply

All three catchments include water sites which are used for public water supply.

The total volume of water taken from the catchments in 2021 was around 150 million cubic metres (m^3) of water, most of which came from the Test and Itchen catchment (43%) followed by the Medway catchment (36%) and the Arun and Western Streams catchment (26%). This public water supply provides an estimated £69.2 million of benefits in 2021.

Table 6. Physical and monetary flows of public water supply

Catchment	Volume of water abstracted (thousands m^3/year)	Benefits from public water supply (£k/year)
Arun and Western Streams	32,056	14,746
Medway	54,133	24,901
Test and Itchen	64,240	29,550
Total	150,428	69,197

5.3 Global climate regulation

How was global climate regulation measured?

Global climate regulation services were measured using **carbon sequestration – capturing, removing, and storing CO_2** – by habitats, and evaluating their physical and monetary flows. Physical flows represent the amount of carbon sequestration in tonnes of **carbon dioxide equivalents** (CO_2e) per year, while monetary flows represent the annual monetary value of that carbon sequestration. Two approaches were taken because carbon factors vary, the first using the **Water Industry National Environment Programme** (WINEP) standards of measurements (metrics) and the second using estimates from Natural England (2021)[4].

How much carbon were habitats sequestering in the three catchments?

Using the WINEP metrics, habitats across all three catchments sequestered about 721,000 tonnes of CO_2e in 2021. The value of these carbon sequestration benefits was estimated to be nearly £177 million (Table 7).

Using the Natural England metrics, habitats across all three catchments sequestered about 1.4 million tonnes of CO_2e in 2021. The value of these carbon sequestration benefits was estimated to be nearly £345 million, nearly double the estimate using the WINEP metrics (Table 7).

Under both metrics, the Arun and Western Streams catchment and the Medway catchment each accounted for around 35% of this result, with the remaining 30% linked to the Test and Itchen catchment.

Which habitats were sequestering the most carbon?

Woodlands accounted for about 90% of the total amount of carbon sequestered, although covering just about 20% of catchment areas. For the Test and Itchen catchment, woodlands accounted for nearly all the carbon sequestered (91.7% with the WINEP metrics and 99.6% using Natural England metrics).

Water-dependent habitats, including coastal margins and freshwater, wetlands, and floodplains, together accounted for 3.4% and 4.3% of the total amount of carbon sequestered, using the WINEP and Natural England metrics respectively, while covering about 4.1% of the catchment areas.

[4] Natural England (2021) Carbon Storage and Sequestration by Habitat 2021 (NERR094). Available at: publications.naturalengland.org.uk/publication/5419124441481216

Table 7. Physical and monetary flows of carbon sequestration

Habitat	WINEP metrics		Natural England metrics	
	Volume of carbon sequestered (tonnes of CO_2e/year)	Value of carbon (£k/year)	Volume of carbon sequestered (tonnes of CO_2e/year)	Value of carbon (£k/year)
Arun and Western Streams				
Coastal margins	13,643	3,343	19,663	4,817
Enclosed farmland	9,525	2,334	11,482	2,813
Freshwater, wetlands and floodplains	0	0	4,822	1,181
Mountains, moors and heaths	604	148	-48	-12
Semi-natural grassland	765	187	0	0
Woodland	234,926	57,557	466,654	114,330
Total	259,463	63,568	502,572	123,130
Medway				
Coastal margins	9,448	2,315	9,878	2,420
Enclosed farmland	12,543	3,073	18,794	4,605
Freshwater, wetlands and floodplains	0	0	18,443	4,519
Mountains, moors and heaths	1,285	315	-102	-25
Semi-natural grassland	667	163	0	0
Woodland	228,380	55,953	468,921	114,886
Total	252,323	61,819	515,935	126,404
Test and Itchen				
Coastal margins	1,622	397	1,976	484
Enclosed farmland	13,046	3,196	-6,814	-1,669
Freshwater, wetlands and floodplains	0	0	6,386	1,565
Mountains, moors and heaths	1,334	327	-107	-26
Semi-natural grassland	1,273	312	0	0
Woodland	192,475	47,156	386,246	94,630
Total	209,749	51,389	387,688	94,983
All catchments				
Grand total – all habitats	721,535	176,776	1,406,195	344,518

5.4 Air quality regulation

Across all three catchments, the absorption of air pollutants by vegetation resulted in about £1.2 billion in avoided damages to health in 2021. The Medway catchment and the Arun and Western Streams catchment accounted for the largest portions of this value, at about 35% each. The Test and Itchen catchment accounted for 30% of this benefit.

Woodlands were found to provide the most of these air quality regulation benefits, contributing about 80% to the total absorption of air pollutants.

5.5 Natural hazard regulation

Across the three catchments, the total value of flood regulation benefits from woodlands and wetlands was estimated at about £74 million in 2021. Wetlands contributed the most to this benefit, specifically in the Medway catchment at about £44 million compared to £14.5 million for the Arun and Western Streams and £4.8 million for the Test and Itchen catchment (Table 8).

Woodlands also provide flood regulation benefits. Woodlands were found to store nearly 25,000 cubic metres (m^3) of water in 2021, which was associated with a replacement cost of nearly £11 million. In other words, it would cost about £11 million to construct a reservoir to store the same amount of water. As with wetlands, woodlands in the Medway catchment contributed the most to woodland flood regulation benefits, about £3.8 million, while this was the least for the Test and Itchen at about £3.1 million (Table 8).

Table 8. Physical and monetary flows of flood regulation

Catchment	Woodlands		Wetlands	Total value of flood regulation (£k/year)
	Water storage (m^3/year)	Value (£k/year)	Value (£k/year)	
Arun and Western Streams	8,818	3,792	14,544	18,336
Medway	8,861	3,810	43,952	47,763
Test and Itchen	7,299	3,138	4,790	7,928
Total	24,978	10,740	63,286	74,027

5.6 Water purification

Healthy and biodiverse coastal wetlands, such as saltmarshes, purify water by filtering and removing pollutants and excess nutrients. Across all three catchments, the value of water purification benefits from coastal wetlands was estimated to be around £45 million in 2021. Nearly 70% of this value was attributed to the Medway catchment, where the area of coastal wetlands is higher than the other catchments.

Table 9. Monetary flows of water purification by coastal wetlands

Catchment	Value of water purification benefits (£k/year)
Arun and Western Streams	10,435
Medway	31,535
Test and Itchen	3,436
Total	45,407

5.7 Water quality

Good water quality supports biodiversity and improves **water resilience**. Good water quality benefits society by providing recreational opportunities for users like anglers, rowers, walkers, and bird watchers.

Water quality was assessed by looking at the status of water sites under the WFD, which was presented in Section 4.2. This baseline assessment is helpful because any improvement or decline in water quality due to our activities can be valued in the future by considering the expected change in the WFD status.

5.8 Recreation

There were an estimated two million recreational visits in 2021 to all three catchments, which were associated with around £8 million in benefits.

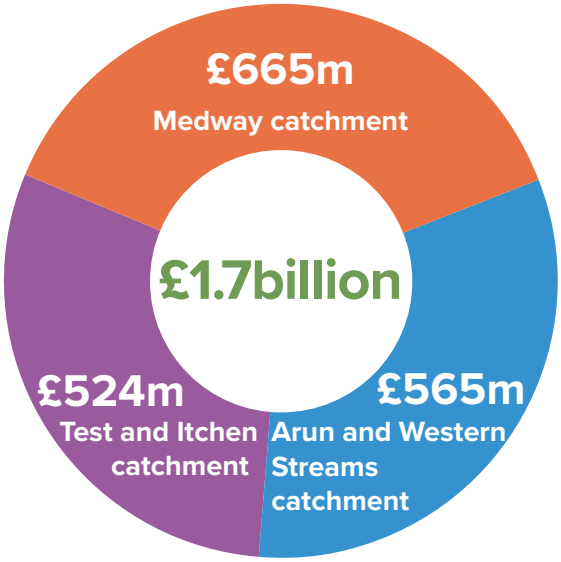
Most of these recreational benefits were associated with the Medway catchment (nearly 70%), followed by the Arun and Western Streams catchment (20%) and the Test and Itchen catchment (over 10%) (Table 10). The greater benefits in the Medway catchment may be because of the coastal areas present, as well as from navigation and boating such as canoeing.

Table 10. Physical and monetary flows of recreational visits

Catchment	Number of visits (thousand/year)	Total value of recreation (£k/year
Arun and Western Streams	343	1,606
Medway	1,263	5,536
Test and Itchen	202	979
Total	1,808	8,121

5.9 Summary of annual value of ecosystem services in the three catchments

The total annual value of ecosystem services in 2021, across all catchments, was found to be about £1.7 billion, divided into:



Of the total value, nearly 90% is attributed to ecosystem services that deliver benefits to society ('**societal value**'), rather than to private organisations ('**private value**') (Table 11).

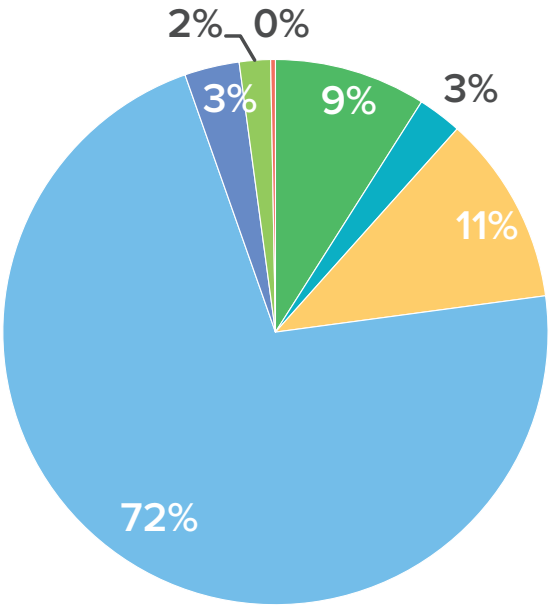
The largest monetary value was linked to air quality, which accounted for £1.2 billion, about 70% of the total value for each catchment (Figures 15, 16, 17). This was followed by food (crops and livestock) and global climate regulation (carbon sequestration) services.

Table 11. Total monetary flows of ecosystem services (2021)

		Monetary flows of ecosystem services (£k/per year)			
Ecosystem service	**Type of value**	**Arun and Western Streams**	**Medway**	**Test and Itchen**	**Total**
Food (crops and livestock)	Private	50,808	67,004	71,538	189,351
Water supply	Societal	14,746	24,901	29,550	69,197
Global climate regulation[1]	Societal	63,568	61,819	51,389	176,776
Air quality regulation	Societal	404,964	426,563	358,805	1,190,332
Natural hazard regulation	Societal	18,336	47,763	7,928	74,027
Water purification	Societal	10,435	31,535	3,436	45,407
Recreation	Societal	1,606	5,536	979	8,121
Total private value		50,808	67,004	71,538	189,351
Total societal value		513,655	598,117	452,087	1,563,859
Grand total		564,464	665,121	523,625	1,753,210

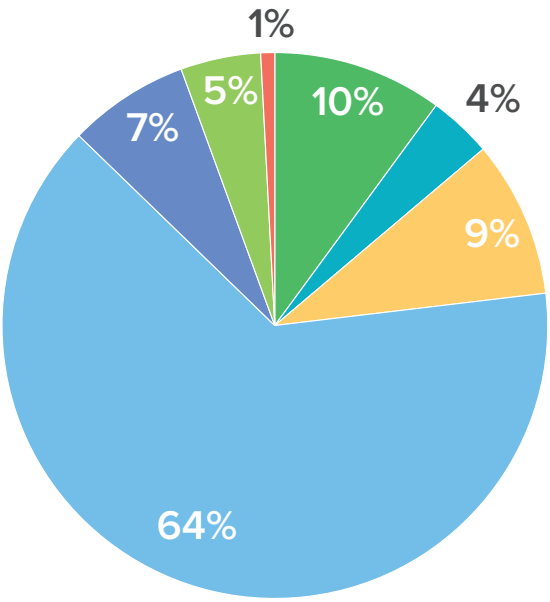
Arun and Western Streams

Figure 15: Estimated value of ecosystem service provision (% of 564,464 £k/year)



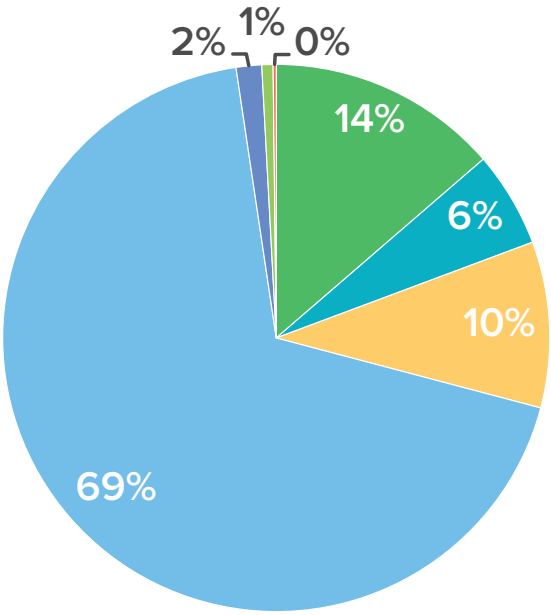
Medway

Figure 16: Estimated value of ecosystem service provision (% of 665,121 £k/year)



Test and Itchen

Figure 17: Estimated value of ecosystem service provision (% of 523,625 £k/year)



6. Concluding comments

Continuing to embed natural capital into our decision-making will further strengthen catchment resilience to deliver a range of environmental benefits now and in the future. It can reduce costs to customers and increase trust with our key stakeholders.

Now that we have completed natural capital accounts for these three catchments, our next step is to complete the analysis for all 11 of our catchments. This will provide a full picture of the natural capital assets within our operating area. We can then use this baseline to measure progress over time, as we invest in improvements in natural capital across our catchments.

7. Glossary of key terms

Term	Definition
Agricultural Land Class	Classifies agricultural land into 'grades' based on its quality for production: from excellent quality (Grade 1) to very poor quality (Grade 5).
Air quality regulation	Ability of habitats to remove pollutants from the air and therefore reduce impacts on human health.
Areas of Outstanding Natural Beauty (AONB)	Areas designated for protection and management due to their significant landscape value.
Biodiversity	The variety of living species – an important natural capital asset and supporting ecosystem service because nature would not be able to function without it.
Biodiversity unit	A biodiversity unit represents the biodiversity value of habitats within an area, calculated with Natural England's Biodiversity Metric. The calculation is based on the distinctiveness (i.e. type of habitat and rarity protective status), condition, extent, and strategic significance (i.e. areas with a special designation and/or with key ecological functional roles) of habitats.
Broadleaved woodland	Woodland areas which contain over 80% broadleaved species. Broadleaved trees, likes oaks and beeches, are those which do not have needles (which are known as coniferous trees).
Carbon factors	Rate at which different habitats release or emit carbon into the atmosphere. It is measured by tonnes of carbon dioxide equivalent (CO_2e) per hectare per year.
Carbon sequestration	Ability of habitats to absorb carbon dioxide from the atmosphere and contribute to global climate regulation.
Carbon dioxide equivalent	(CO_2e) A measure used to compare greenhouse gas emissions on the same basis, by converting all gases to the equivalent amount of carbon dioxide.
Combined Sewer Overflows (CSO) or storm overflows	A combined sewer system collects rainwater, household sewage, and other wastewater into one pipe. Storm overflows act as safety valve when these systems get overwhelmed, usually because of too much water during heavy rain, and overflow into nearby waterbodies. They are used to prevent homes, businesses, and roads from flooding.
Ecosystem services	The flows of benefits which ecosystems provide to humans. These services are important for society and economy and make human life possible. They include water supply, global climate regulation, natural hazard regulation, biodiversity, recreation, etc.
Environmental designation	Areas which have special protected status because of their natural and cultural importance.
Eutrophication	Process of pollution whereby a body of water becomes too rich in nutrients, usually coming from sewage or fertiliser run-off. This can increase plant and algal growth, which can lead to a lack of oxygen in the water and negative effects on biodiversity.
Food (crops and livestock)	Ability of habitats to supply food for human consumption.
Global climate regulation	The ecosystem processes by which atmospheric functions are regulated. It is often measured through carbon sequestration.
Greenhouse gas	Gases (like carbon dioxide) in the atmosphere that can trap heat and cause warming.
Monetary flow account	Presents the annual monetary value of the physical flows of ecosystem services.

Term	Definition
National Park	Areas protected to conserve and enhance natural beauty, wildlife, and cultural heritage and to provide opportunities for public enjoyment.
Natural capital assets	Stocks of natural resources (rivers, lakes, woodlands, wetlands etc.) which support the provision of ecosystem services.
Natural hazard regulation	Ability of habitats like wetlands and woodlands to protect humans from flooding, among other hazards. For example, vegetation in woodlands can slow down the flow of water and store water from rain to reduce flood risk.
Nitrate Vulnerable Zones (NVZs)	Areas designated as being at risk from agricultural nitrate pollution.
Physical flow account	Presents the annual quantitative flows of ecosystem services delivered from the natural capital assets.
Price year	The base year used to compare monetary values. In this study, the price year was set at 2020, meaning all values were converted to 2020 prices for comparability.
Private value	Value gained to the organisation owning or directly managing the land. This mainly relates to the value of crop and livestock production which is gained by private landowners.
Recreation	The active enjoyment of the natural environment by humans through, for example, walking, fishing, and canoeing.
Sites of Special Scientific Interest (SSSI)	Designated areas that support many characteristic, rare and endangered species, habitats, and natural features.
Societal value	Value external to private organisations and accrued to society.
Surface water management catchment	A geographic area defined naturally by surface water hydrology and for which action plans are drafted in implementing the Water Framework Directive.
Water Framework Directive (WFD)	Sets out rules to halt deterioration in the status of water bodies in the UK. It aims to improve the quality of water and ensure waterbodies achieve good quality status.
Water Industry National Environment Programme (WINEP)	Sets out the programme of work for water companies in England to improve the environment. WINEP was developed by the Environment Agency.
Water purification by habitats	Ability of habitats and ecosystems to remove and filter pollutants and contamination from waterbodies (for example, wetlands).
Water quality	The characteristics of water which give it the ability to provide its beneficial uses (e.g. swimming, drinking). It is measured using the status of a waterbody under the Water Framework Directive (WFD).
Water resilience	Ability of waterbodies to cope with or recover quickly from negative events such as pollution.
Water supply	Provision of water for public use, for example for drinking and bathing.

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