Swanage Streams

Issues Appraisal & Action Plan

Dorset National Landscape

This report has been prepared in partnership with National Trust, Swanage Town Council, Planet Purbeck and Dorset National Landscape, with help from Environment Agency and Wessex Water.

Front cover image © Gen Crisford

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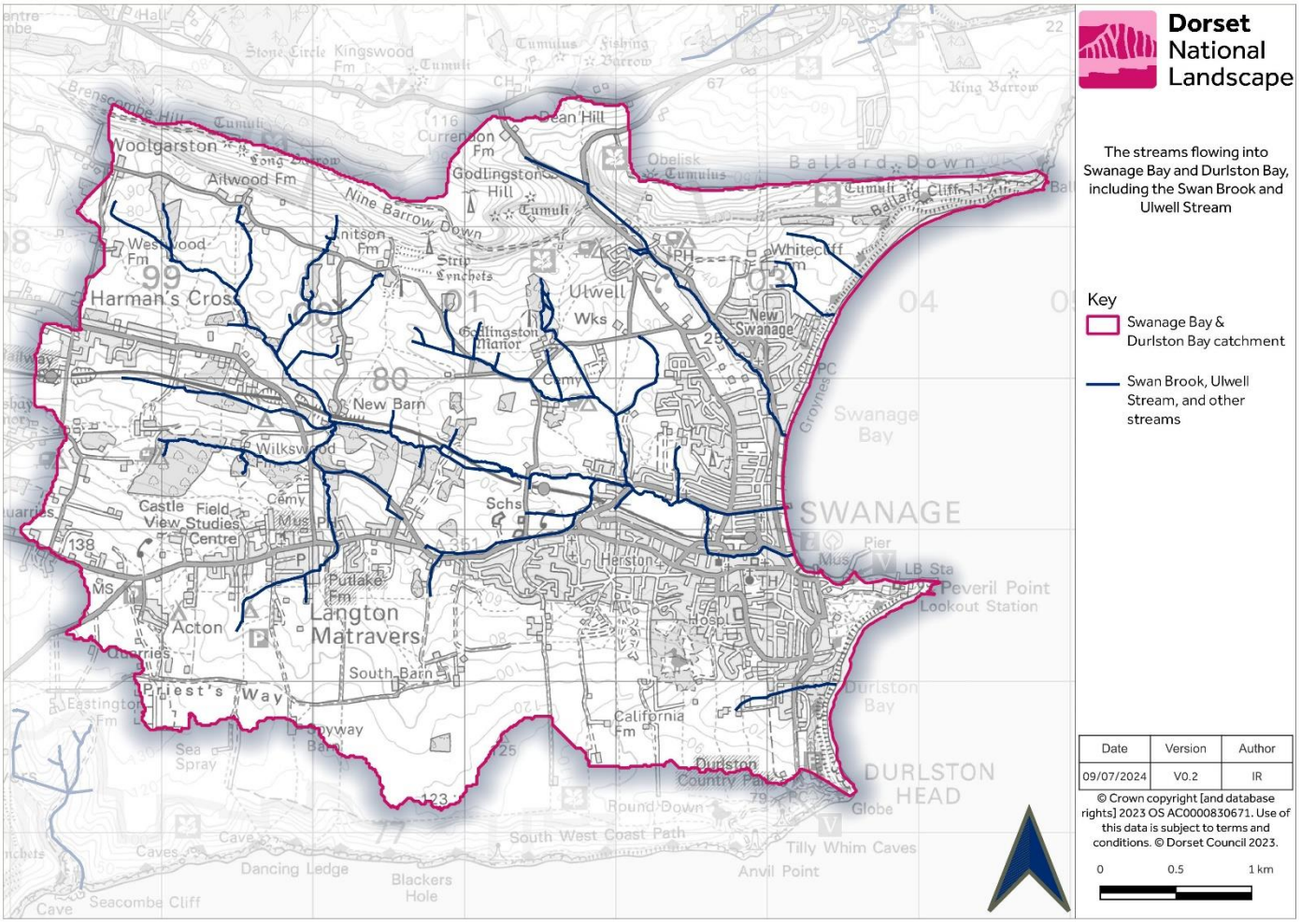
Introduction

Background

In September 2023, Sustainable Swanage in partnership with Swanage Town Council, hosted a community event focussed on the Swan Brook. As a result of this meeting, a small group consisting of Swanage Town Council, National Trust, Planet Purbeck, and Dorset National Landscape have come together as the Swanage Streams Partnership, with the aim of establishing what the next steps should be. To help, this report sets out the issues facing the Swan Brook and neighbouring streams that flow into Swanage Bay and Durlston Bay. It will also facilitate wider engagement with the community to establish local interests and priorities.

Once we have a better idea of the issues that are a priority for the local community, we can set out an approach to tackling them. This report will be supplemented with information on:

- Areas for further investigation, for example land management or flood management.
- Action, identifying opportunities for citizens & communities, environmental NGOs, and statutory agencies.
- An outline action plan



Catchment Overview

The Swan Brook is the main river within the catchment, and the only one that is monitored under the Water Framework Directive. It rises under the Purbeck Ridge at the junction between chalk and the underlying

mudstones, which it flows over until discharging into the sea at Swanage. Part of the catchment is worked for the famed Purbeck Stone. Otherwise, it is largely a rural catchment, except for Swanage at the mouth, which is a very popular tourist destination.

The entire catchment is in the Dorset National Landscape and the coastal strip, known as the Jurassic Coast, has been designated a UNESCO World Heritage site.

River length	6.02 km
Catchment area	20.06 km^2
Geology	Rises in chalk or limestone before running over mudstones to the sea.
Land use	Predominantly small livestock units and permanent grassland. Urban at mouth
Principle towns and villages	Langton Matravers, Swanage

The other streams in the catchment include:

- the Ulwell Stream, which rises at Dean Hill on London Clay before flowing through a gap in the Purbeck Ridge to the sea at Swanage, some 3.0km later.
- A small stream that flows into Durlston Bay, rising on Purbeck beds and flowing a short distance to the sea
- A number of small streams that discharge to Swanage Bay directly from the area near Whitecliff Farm.

Collectively we are referring to them as the Swanage Streams.

No river in England is in pristine condition, and it is the responsibility of the Environment Agency to monitor how far from pristine the condition of our waterbodies has deviated. It is up to us to tackle the issues affecting the Swan Brook, Ulwell Stream, and others in the catchment, and make a difference on the ground (because if we don't work together and make a difference, who will?). By conserving and enhancing existing habitats of importance, restoring habitats where possible and working with natural process, it is possible to make meaningful improvements to the condition of the water environment, and ultimately the wellbeing of communities living within the catchment.

The next sections explore the state of the streams and wider catchment, the areas that have been identified as at risk from the Environment Agency and from local people, and potential areas to explore that will help deliver our aim of improving the condition of the streams that flow into the Swanage and Durlston Bays.

This document should be seen as a starting point for discussion and is not meant to be comprehensive. We can work with communities to explore opportunities to help improve the river and wider catchment.

How to use this document

In the following sections, we go into more detail about the issues and impacts faced by the streams in the catchment, as well as suggesting some responses that the community could deliver. We also explore the state of the wider environment because this can be both a source of the threats facing the water environment, such as sediment-laden runoff, or a solution to them, such as woodland planting that reduces flood risk. It is also important to consider the environment beyond the river corridor as activity far away from the waterbody can have an effect, if connected by ditches, roads, and other flow pathways.

The three main sections of the report are: Environment, Issues & Impacts, Action. The Environment section describes the geology and soils, as this dictates how water behaves in the catchment and what the land can be used for. It also describes the coverage of both intensive and extensive land use as well as how well the landscape functions for wildlife. It is important to understand this, as improving the functioning of the wider natural environment will benefit the water environment, as set out in the Box 1. The Issues & Impacts section explores, in more detail, the EA assessment of the Swan Brook and which issues are important to those who live

and work in the area. The Action section highlights any known opportunities to improve the water environment and suggests some actions that can be delivered by communities and will make a difference.

Box 1: Working with Natural Processes

Healthy catchments store and filter water in the landscape and slow the flow of water downstream. However, modern river landscapes are very different from what nature intended. We have lost water storage and filtration in wetlands, created hard surfaces that water can rush off, and changed our river channels so they move water very quickly. Our rivers are less able to cope with the rain we have now and expect in the future, increasing the likelihood of flooding and pollution in winter and reduced flow rates and drought impacts in summer. Simplified river systems with straightened homogenous channels are ecologically far less complex than a natural catchment, and as a result have far reduced value for biodiversity.

Restoring natural processes to catchments and river system means restoring some of the natural diversity and dynamics to channels, creating a more varied morphology with a wider range of ecological niches and habitats in which wildlife can thrive. By naturalising river systems and slowing the rates at which water moves downstream, we can better protect ourselves from hazards such as flooding and pollution. A wide range of techniques can be used to naturalise streams including tree planting, riverbank restoration, building small-scale woody dams, reconnecting rivers with their floodplains and storing water temporarily on open land.

An additional benefit of restoring natural processes is that it will also help wildlife thrive. It is because of this that we use as a focus, Natural England's objective of having 30% of an area as functioning habitat. If we achieve this by restoring natural processes in the right place, we will not only have thriving plants and animals, but the water environment will also be better protected.

1 : Environment

Geology

The geology under our feet heavily influences how water moves through the catchment, the soils that form above it and the plants and animals that live here. It also influences how we use the land to produce food.

The catchment is broadly split in two, with the permeable rocks of the White Chalk subgroup, Gault Formation and Greensand Formation, along with the Purbeck Limestone Group, resulting in little surface water to the north and south of the catchment, as water is absorbed into the rock. The remaining Wealdon Group of rocks, located in the centre of the catchment, impede drainage, resulting in more surface water.

The Lower Greensand Group of sandstones and mudstones were formed approximately 100 to 125 million years ago in the Cretaceous Period. Following this, the Gault Formation and Upper Greensand Formation, again made up of mudstones, sandstones, and limestone, were formed in shallow seas between 94 and 112 million years ago. Later in the Cretaceous Period, the White Chalk subgroup was formed in shallow tropical seas approximately 66 to 100 million years ago. Still in the Cretaceous Period, but now in a terrestrial situation, the Wealdon Group of mudstones, siltstones and sandstones were formed approximately 125 to 156 million years ago in marginal coastal plains with lakes and swamps periodically inundated by the sea. The Purbeck Limestone Group were deposited in marginal coastal plains between 140 and 151 million years ago in the Cretaceous and Jurassic Periods.

The anomaly is the headwaters of the Ulwell Stream, which rises on clay deposited some 48 million years ago and flows through a gap in the Purbeck Ridge.

The Gault / Greensand has the potential to naturally elevate the levels of phosphate found in the watercourse.

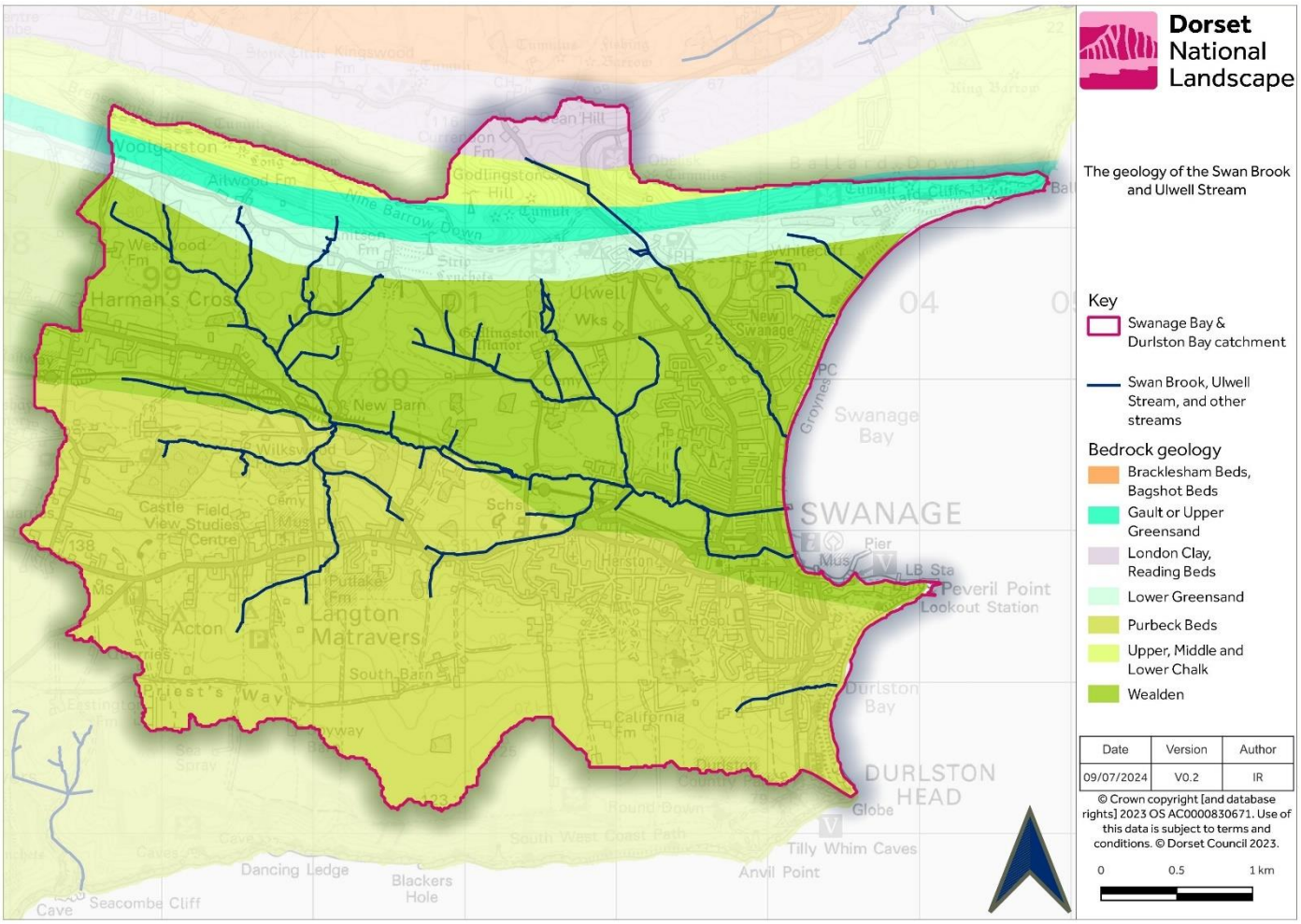
Soil types

Heavily influenced by the underlying geology, soils are at the interface between biotic (living) and abiotic (non-living) worlds. These are important stores of carbon and biodiversity in their own right and provide the foundations from which others can grow. Soils can be broadly described as basic (acid), calcareous (alkaline) and neutral. The soils of the catchment are split between freely draining lime rich soils and the impeded drainage of the valley bottom loamy and clayey soils, along with a minor area in the headwaters of the Ulwell Stream.

The dominant soil types, as characterised by Cranfield University's Soilscapes, are:

- 'Shallow lime-rich soils over chalk or limestone.' They are freely draining and have moderate fertility. They are suitable for herb-rich downland and limestone pastures, beech hangars and other lime-rich woodlands. There is low/medium potential for carbon storage. Water drains to groundwater and is particularly vulnerable to leaching of nitrate and pesticides to groundwater and surface capping.
- 'Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils.' They impede drainage and have moderate fertility. They are suitable for seasonally wet pasture and woodland habitat and can be used for grassland and arable, with some woodland. There is low potential for carbon storage. Water drains to a stream network (rather than groundwater) and the main risks are associated with overland flow from compacted or poached fields. Organic slurry, dirty water, fertiliser, pathogens, and fine sediment can all move in suspension or solution with overland flow or drain water.

The maps below show the extent of the Geology and Soilscapes in the catchment.


Dorset National Landscape
The geology of the Swan Brook and Ulwell Stream
Key
Swanage Bay & Durlston Bay catchment
Swan Brook, Ulwell Stream, and other streams
Bedrock geology
Bracklesham Beds, Bagshot Beds
Gault or Upper Greensand
London Clay, Reading Beds
Lower Greensand
Purbeck Beds
Upper, Middle and Lower Chalk
Wealden
Date | Version | Author
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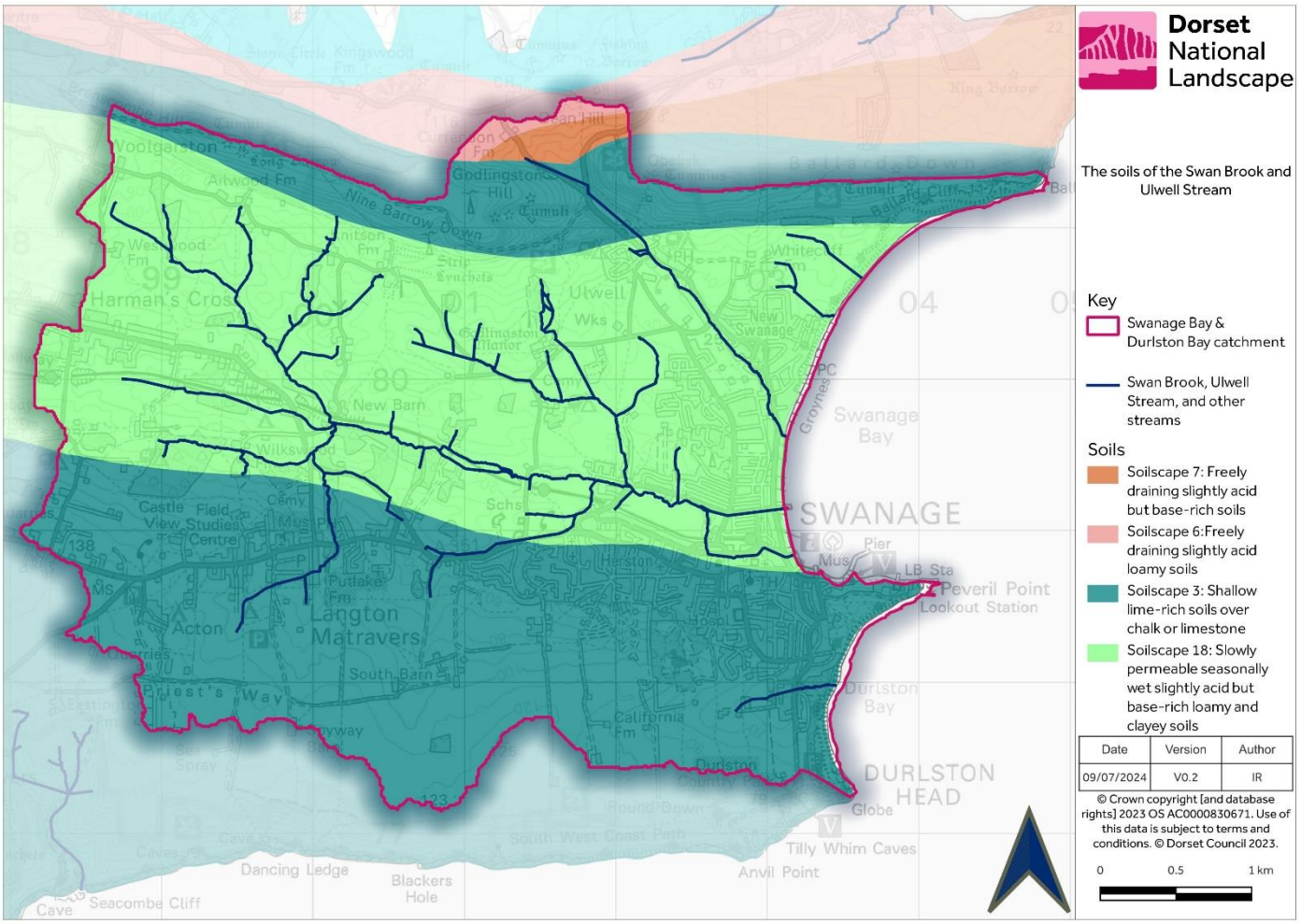
0 0.5 1 km
SWANAGE
DURLSTON HEAD
Langton Matravers
Peveril Point
Swanage Bay
Durlston Bay
Ulwell
Harman's Cross
Acton
Dancing Ledge
Blackers Hole
Seacombe Cliff
Anvil Point
Tilly Whim Caves


Dorset National Landscape
The soils of the Swan Brook and Ulwell Stream
Key
Swanage Bay & Durlston Bay catchment
Swan Brook, Ulwell Stream, and other streams
Soils
Soilscape 7: Freely draining slightly acid but base-rich soils
Soilscape 6:Freely draining slightly acid loamy soils
Soilscape 3: Shallow lime-rich soils over chalk or limestone
Soilscape 18: Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils
Date | Version | Author
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Tilly Whim Caves

Land use

The geology and soils of the catchment have strongly influenced how this land has been used. Where it is fertile and accessible to farm machinery, it may be used for intensive grass for dairy or beef. Where the soil is less fertile or the land too steep or waterlogged, then it may be more extensively used, leaving fragments of semi-natural habitats. This fragmentation of semi-natural habitat has increased greatly since the Second World War because of improved capability of farm machinery and techniques that make farming marginal land economically viable, alongside government incentives. This was driven by an increasing population and subsequent higher demand for food. As a result, over 97% of all semi-natural habitats mapped in Dorset in the 1930s have been converted to agriculturally improved arable or grassland.

Looking in a bit more detail at the land use of the catchment, we can split it down into a number of categories that are described below. The figures are derived from a study undertaken in 2018 that mapped land use in the Dorset National Landscape from existing data, aerial photography, and satellite images. For the purposes of this report, we have divided the description into intensive and extensive land use, but it is not as simple as that in reality because agricultural is often a mix of improved and semi-improved grassland, some of which is ploughed, reseeded, and fertilised. Other areas are used for extensive grazing and are not routinely ploughed and reseeded, with cattle providing the only nutrients applied to the land.

Intensive land use

Improved grassland covers just over half of the catchment area. Improved grassland will predominantly be used to support beef and dairy cattle and sheep. The grassland will be planted 'leys' dominated with grass species, such as ryegrass, possibly with clovers. that are periodically ploughed up and replanted. To maintain their condition, they will be treated with nitrates and phosphates several times during the growing season. There is a minimal area of arable in the catchment, which reduces the risk of sediment contamination to the watercourse.

In total, intensive land use covers close to 56% of the catchment area and has the potential to have impacts on the water environment of the Swanage Streams.

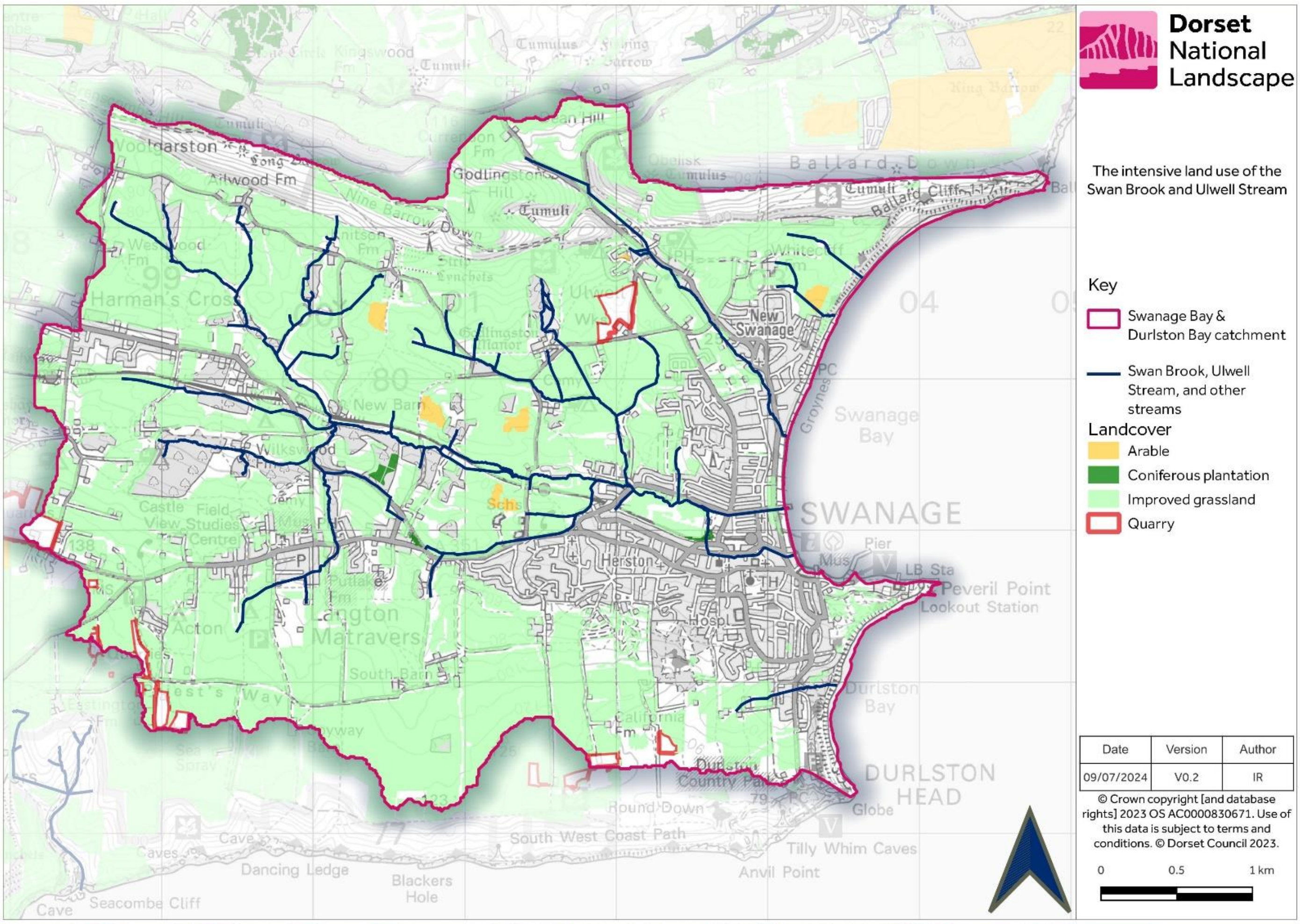
Extensive land use

Covering 12% of the catchment areas is broadleaved woodland, including wet woodland and 3% scrub. This is about average for Dorset. Semi-improved grassland is not as rich in wildlife as semi-natural grasslands because it has been improved in the past to favour a grass-dominated sward. However, having not been ploughed up recently and as intensively managed, it holds great potential for restoration back to semi-natural habitat. There is 6% semi-improved grassland within the catchment.

Since 2018 a number of farms within the catchment have entered new Countryside Stewardship agreements, and now practice more extensive farming methods that include active habitat restoration as well as more nature-friendly farming practices such as reduced grazing intensity and reduction in fertilizer use. Although these changes are not yet reflected in the statistics above and maps below, they will also lead to improved hydrological function within the catchment, reducing nutrient loads and increasing the land's ability to retain water in the upper catchment areas.

Other land use

Urban land cover takes up 21% of the area, which is a large percentage compared to others, and there is an additional 3% that has been classified as gardens (though this category is hard to define because the individual areas are quite small). Quarries make up approximately 1% of the area.


Dorset
National
Landscape
The intensive land use of the Swan Brook and Ulwell Stream
Key
Swanage Bay & Durlston Bay catchment
Swan Brook, Ulwell Stream, and other streams
Landcover
Arable
Coniferous plantation
Improved grassland
Quarry
Date | Version | Author
09/07/2024 | V0.2 | IR
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SWANAGE
Swanage Bay
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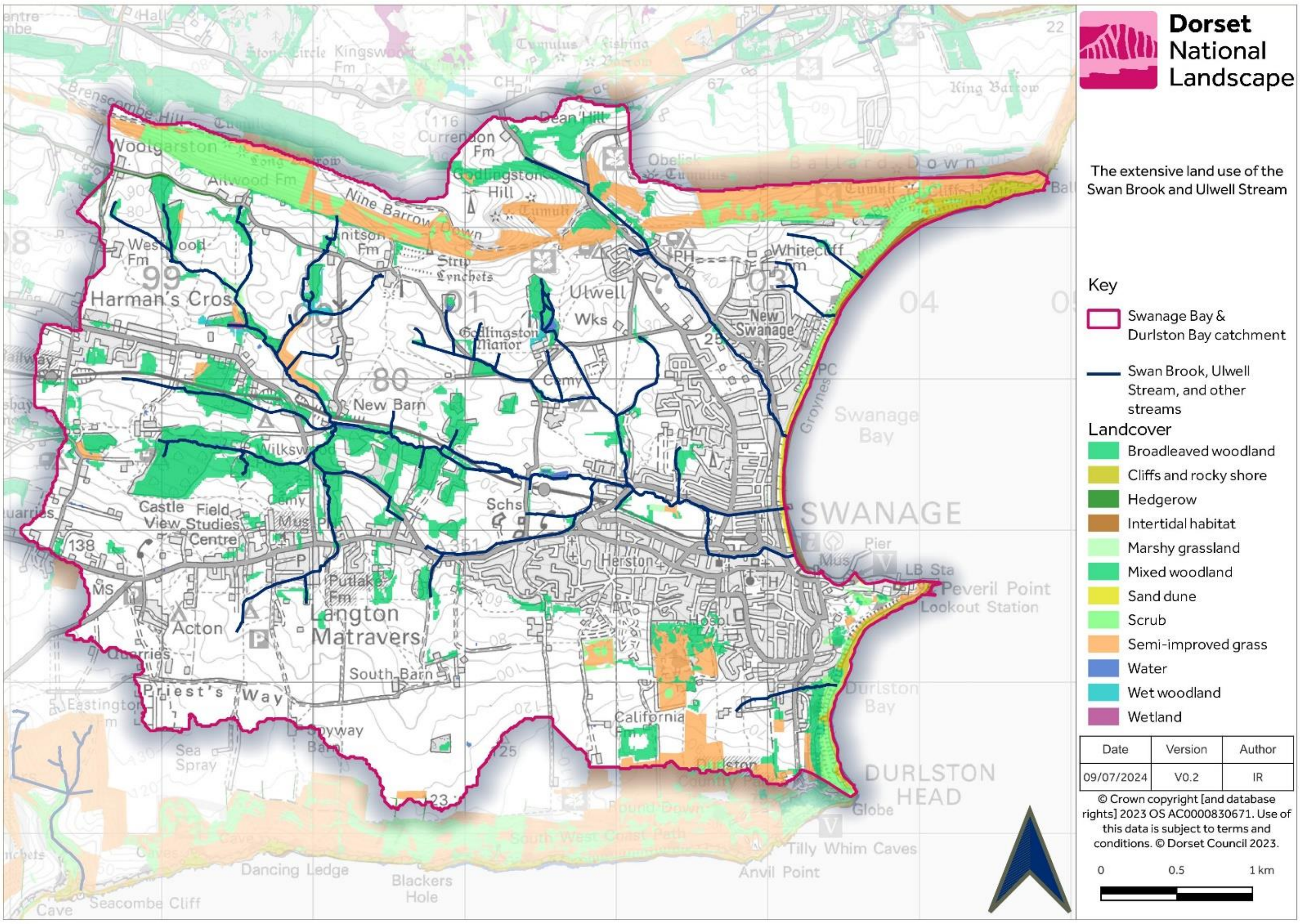
New Swanage
South West Coast Path


Dorset
National
Landscape
The extensive land use of the Swan Brook and Ulwell Stream
Key
Swanage Bay & Durlston Bay catchment
Swan Brook, Ulwell Stream, and other streams
Landcover
Broadleaved woodland
Cliffs and rocky shore
Hedgerow
Intertidal habitat
Marshy grassland
Mixed woodland
Sand dune
Scrub
Semi-improved grass
Water
Wet woodland
Wetland
Date | Version | Author
09/07/2024 | V0.2 | IR
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0 0.5 1 km
SWANAGE
Swanage Bay
Durlston Bay
DURLSTON HEAD
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Harman's Cross
New Swanage
South West Coast Path

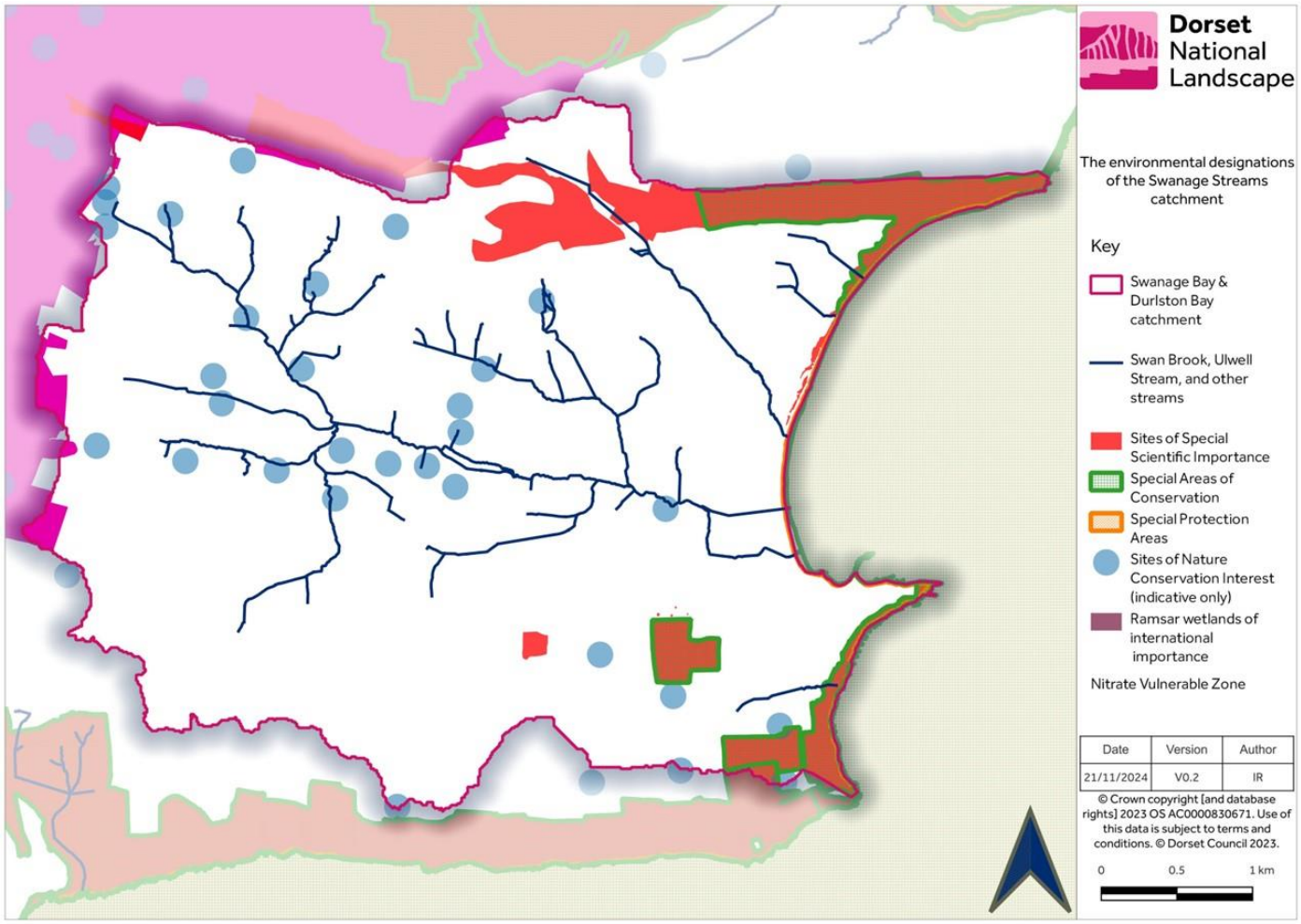
There are parts of four Sites of Special Scientific Interest (SSSI) within the catchment, covering approximately 165ha. These are South Dorset Coast, Belle View Quarry, Purbeck Ridge (East), and Townsend SSSIs.

A number of these SSSIs are covered by other international designations: Townsend SSSI is part of the wider St Albans Head to Durlston Head Special Area of Conservation (SAC); South Dorset Coast SSSI is part of both the wider St Albans Head to Durlston Head SAC and Isle of Portland to Studland Cliffs SAC; Purbeck Ridge (East) SSSI is part of the wider Isle of Portland to Studland Cliffs SAC.

There are 27 Sites of Nature Conservation Interest covering approximately 150ha.

The importance of the catchment is not necessarily reflected in the number of designations, but nevertheless, it will act as a stepping stone from the surrounding areas of importance. In the immediate vicinity of the catchment are a number of other important environmental designations. These are Corfe Common SSSI, Brenscombe Heath SSSI, Studland and Godlingston Heath SSSI, Dorset Heathlands Ramsar site, Dorset Heaths SAC, Dorset Heaths (Purbeck & Wareham) & Studland Dunes SAC, Dorset Heathlands SPA, Solent and Dorset Coast SPA, Studland to Portland SAC, Purbeck Coast Marine Conservation Zone.

A Nitrate Vulnerable Zone fringes the catchment to the north and the west.



2 : Issues & Impacts

Water Framework Directive assessment

The Environment Agency classify waterbodies such as Swan Brook into categories that reflect their overall condition. Unfortunately, the Ulwell Stream and others within the wider catchment are not currently assessed. The categories are **High** > **Good** > **Moderate** > **Poor** > **Bad**. The Swan Brook is categorised as **Poor**. The aim is to have waterbodies classed as Good, so the brook is currently considered to be a failing watercourse. It was also classified as Poor in 2015, 2016, and 2019, and Moderate in 2014.

This overall classification is based on a number of components and an evaluation of each of these.

The areas that the Environment Agency monitor to produce their classification are summarised below. There is more detail behind these categories, which is available from the Catchment Data Explorer website[1].

Classification area		Condition assessment category
	Overall	**Poor**
Ecological	Biological	**Poor**
	Hydromorphological	**Supports Good**
	Physico-chemical	**Good**
	Specific pollutants	**No data**
Chemical	Priority substances	**Good**
	Other pollutants	**Does not require assessment**
	Priority hazardous substances	**Bad**

Threats:

The specific elements that are currently failing in the Swan Brook are:

Condition assessment category name	Primary cause of low rating	Root causes
Biological	• Macrophytes and Phytobenthos (essentially plants and algae)	• Poor river morphology as a result of flood protection structures, modified stream channels, land use, and loss of natural riparian vegetation.
Priority hazardous substances*	• Polybrominated diphenyl ethers (PBDE) • Mercury and its compounds	• More information is needed to understand the sources of PBDE and Mercury.

* It should be noted that this assessment is not based on real data for the Swan Brook, but a modelling of water quality based on similar rivers elsewhere in the UK. There is no available data on PBDE and mercury compounds in the Swan Brook. As they are persistent chemicals there is also very little that can be done to reduce levels.

[1] https://environment.data.gov.uk/catchment-planning/WaterBody/GB108044009920

Impacts:

The impacts on the biology of the Swan Brook are reduced diversity and abundance of aquatic life, from plants and algae to invertebrates, fish, amphibians, birds and mammals, compared to what you would expect in a natural stream of similar characteristics. Little is currently known about the impacts of the hazardous substances on wildlife, and this an area of further work for the Environment Agency.

Local assessment

To get a local perspective, we consulted other stakeholders about their views on the threats facing the Swanage Streams, including Dorset Council, Wessex Water, and the Environment Agency, amongst others. We did this in 2015 and updated it in 2021. The main issues are flooding, bathing water quality, and rural runoff (including nutrient enrichment).

In addition, the identified causes of poor morphology resulting from flood defences, local assessment identified historical straightening of the channel, and intensive agricultural use within the floodplain as further causes of decline.

The combined areas of most concern, as identified by the Environment Agency and local stakeholders are:

Issue	Cause	Impact
Degraded channel morphology, leading to homogenous, simplified habitats	Flood defence construction. Historical agricultural modification of channels through straightening, canalisation and drainage.	Diminished aquatic biodiversity
Degraded channel morphology, leading to faster flow	Historical straightening throughout the catchment leading to channel incision, exacerbated by dredging and removal of natural woody debris.	Increased flood risk downstream
Elevated levels of sediment and nutrients within the channel, smothering gravels and reducing oxygen levels leading to eutrophication	Intensive agricultural activity in the floodplain. Wastewater overflows including sewage via storm water overflows	Diminished aquatic biodiversity
Loss of wetland habitat	Land drainage for agricultural improvement	Increased flood risk downstream, diminished wildlife

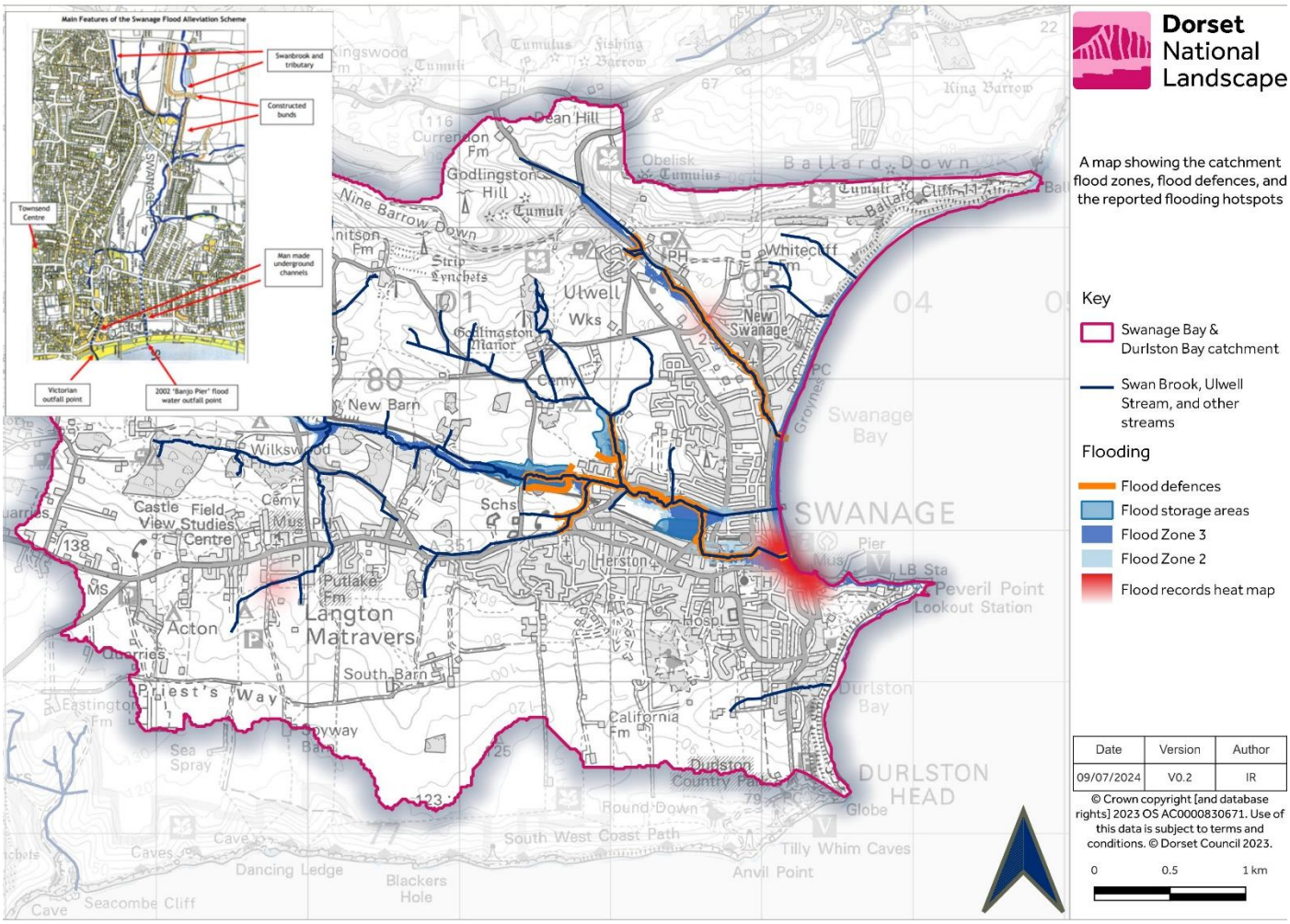
Further work is required to identify issues and impacts for the other streams within the catchment.

What we know

Flooding:

The Swan Brook is a small catchment, with headwaters converging before passing into Swanage town, where the mouth of the channel is located. Within Swanage, Flood Zone 3 areas are highlighted on the following map, showing that land has a high probability of flooding from rivers and the sea[2]. Flood Zone 3 exists along the length of the Ulwell Stream also.

[2] https://flood-map-for-planning.service.gov.uk/flood-zone-results?polygon=%5b%5b398393,80455%5d,%5b398393,80982%5d,%5b398628,82124%5d,%5b401953,81194%5d,%5b404170,81150%5d,%5b403946,76672%5d,%5b398337,76526%5d,%5b398393,80455%5d%5d&center=%5b401253,79325%5d&location=Swanage



The town of Swanage has flooded in the past, with the highest river level ever recorded in January 2013, and a significant flood event registered in 1990. Substantial alleviation infrastructure was implemented after this event (from 1993-1997), with the majority centred around the lower reaches of the Swan Brook, on the approach and stretch which passes through Swanage.

The construction of the scheme included[3]:

- Two reservoir bunds on the outskirts of town and a shallow bund at King George's field.
- Widened and straightened channel adjacent to the original channel of the Swan Brook.
- Additional channel underneath Victoria Avenue to the additional discharge point at Banjo Pier.
- Telemetry sensors to measure water depths along the channel, which are linked and monitored by the Environment Agency.
- Automatic and manually controlled sluice gates at strategic points to stop and direct the water flow away from the businesses in the town centre.
- In addition, the Ulwell Stream flood risk is managed via historic straightening and culverting of the channel for the lower half of its reach.

Concerns remain that this scheme will not suffice if heavy rain coincides with a spring tide. A recent heavy rain event (January 2024) caused significant damage to Shore Road, as floodwaters breached the drain covers.

[3] https://www.rgs.org/schools/resources-for-schools/jurassic-coast-of-dorset-and-east-devon/swanage-flood-alleviation

More widely, Dorset Council's Local Flood Risk Management Strategy[4] lists the following objectives that apply to the catchment:

1. Understand flood risk across Dorset.
2. Manage the likelihood and impacts of flooding.
3. Help Dorset's communities manage their own flood risk.
4. Ensure flood risk is considered in local and development proposals.
5. Improving flood prediction, warning, response, and flood recovery

EA flood risk management plans[5] include the development of flood warning systems, improving flood resilience and Natural Flood Management schemes as well as wastewater management and beavers.

Channel and floodplain morphology:

The streams within the catchment are characterised by straightened channels with simplified morphology. Along with land drains throughout much of the agricultural catchment, this accelerates the rate at which water flows off the land, thereby increasing flood risk; the resultant lack of habitat diversity both in-channel and within the riparian zone and floodplain mean the modified channel morphology is also a principal cause of their current ecologically impoverished condition.

We know that the constructed flood defences are necessary to protect the residents of Swanage. They have, however, created an unnatural system that has the potential to have ecological impacts. Further work is required to look at what these impacts are, if any, and how we can compensate for them. Further work is also required in the headwaters to better understand the naturalness of the systems, and opportunities for improvement. Increasing our understanding of geomorphological processes within the catchment is a key action.

Rural runoff issues:

The relatively intensive agricultural management of over half the catchment (reduced vegetation roughness, soil compaction and land drains within upper sections of catchments) has reduced the capacity for the upper catchment to absorb and retain water in the soil. In periods of heavy rain surface run-off is frequent, and this is locally exacerbated where it coincides with the impacts of impermeable surfaces of roads and urban development.

Alongside flood damage, soil erosion and loss can be significant, particularly within arable systems. Where connected to the streams, this will result in elevated levels of sediment and nutrients (which adhere to the sediment) within the water column and lying on the riverbed. The impact is smothering of gravels for spawning fish and insects, as well as some rooting plants. Nutrient enrichment ultimately leads to reduced oxygen levels, so the whole system is less able to support wildlife in the numbers you would expect.

Priority hazardous substances

National modelling of hazardous substances has put all rivers in England at risk of contamination of mercury and polybrominated diphenyl ethers. We do not know the specific impacts on the catchment, and the only remedy is time as they are both almost impossible to remove from the system once there. The historical causes are coal-fired power stations, with the mercury distributed on the wind, and flame retardants that contained polybrominated diphenyl ethers in fire-fighting foam, electronic equipment, and textiles, amongst others.

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[4] https://www.dorsetcouncil.gov.uk/documents/35024/280970/Local+Flood+Risk+Management+Strategy+for+Dorset+%28Technical+Report%29.pdf/72585472-02bc-18f1-cd78-f40752127225

[5] https://environment.data.gov.uk/flood-planning/explorer/cycle-2/place?name=Swanage%20Bay&easting=403998&northing=79866&local-type=Bay

Areas for investigation

Addressing the human and ecological impacts of poor channel morphology and rural runoff issues requires further investigation to ensure we deliver solutions that are best for people and nature, and that work with natural processes. The following sections explore potential opportunities in a little more detail.

Land Management

Land plays a key role in regulating water quality as water moves through the landscape. By mapping a series of indicators that determine water quality risk, we have identified areas for potential action that could improve water quality.

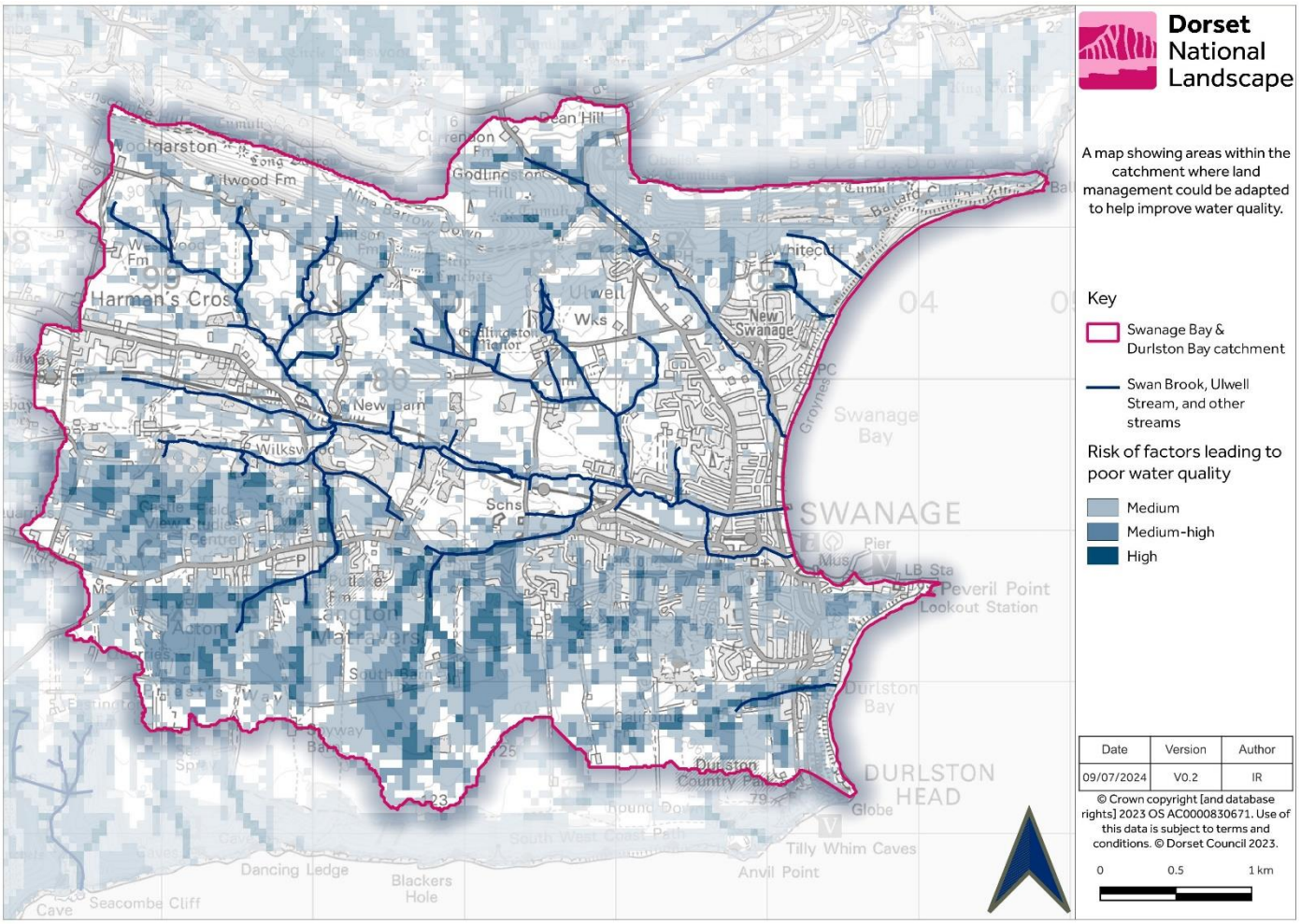
The indicators we have mapped are:

- **Land use risk**: some land uses pose a high inherent risk of diffuse pollution. For example, arable land typically poses more risk to water quality than more natural habitats.
- **Slope**: Slope is a risk factor that poses a threat to water quality, with steeper slopes representing a higher risk.
- **Soil type**: Some soils are particularly prone to erosion, while others represent a risk due to rapid leaching of pollutants in solution.
- **Hydrological connectivity**: In some locations water is more likely to run over the land surface and pick up sediment, due to the shape of the land. These pathways have potential for contaminated water to enter the river.
- **Proximity to watercourse**: Areas in the 'riparian corridor' (near the riverbank) are more likely to be connected to the watercourse, and therefore pose a higher risk.

The following map shows where these areas of risk occur. The darker shaded areas have a greater risk of water quality being degraded in the catchment. These represent priority areas for investigation and action.

In terms of action, nothing can be done about slope, soil type or proximity to watercourse. However, there are opportunities through changing land use, which in turn can reduce the chances of contaminated water entering the streams (reducing hydrological connectivity). This can vary from establishment of grass buffers that intercept pollution-laden overland flow in high-risk areas through to land use change away from risky cropping and grazing regimes. The most significant benefits could be a change in grassland production away from a rye grass dominated sward to one that included more deep-rooting herbal species that increase infiltration rates of rainwater. This approach could be considered alongside reduced stocking numbers and adoption of pulse grazing. The details of what is suitable from both a water quality and farm business perspective would be assessed on a site-by-site basis.

When planning land use change, it is also important to consider where multiple benefits could be delivered, and further mapping can inform action that would also benefit carbon sequestration, enhanced biodiversity, and improved access.


Dorset National Landscape
A map showing areas within the catchment where land management could be adapted to help improve water quality.
Key
Swanage Bay & Durlston Bay catchment
Swan Brook, Ulwell Stream, and other streams
Risk of factors leading to poor water quality
Medium
Medium-high
High
Date
Version
Author
09/07/2024
V0.2
IR
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0
0.5
1 km
SWANAGE
DURLSTON HEAD
Swanage Bay
Durlston Bay
Peveril Point
Lookout Station
Dean Hill
Harman's Cross
New Swanage
Dancing Ledge
Blackers Hole
Anvil Point
Tilly Whim Caves
Seacombe Cliff

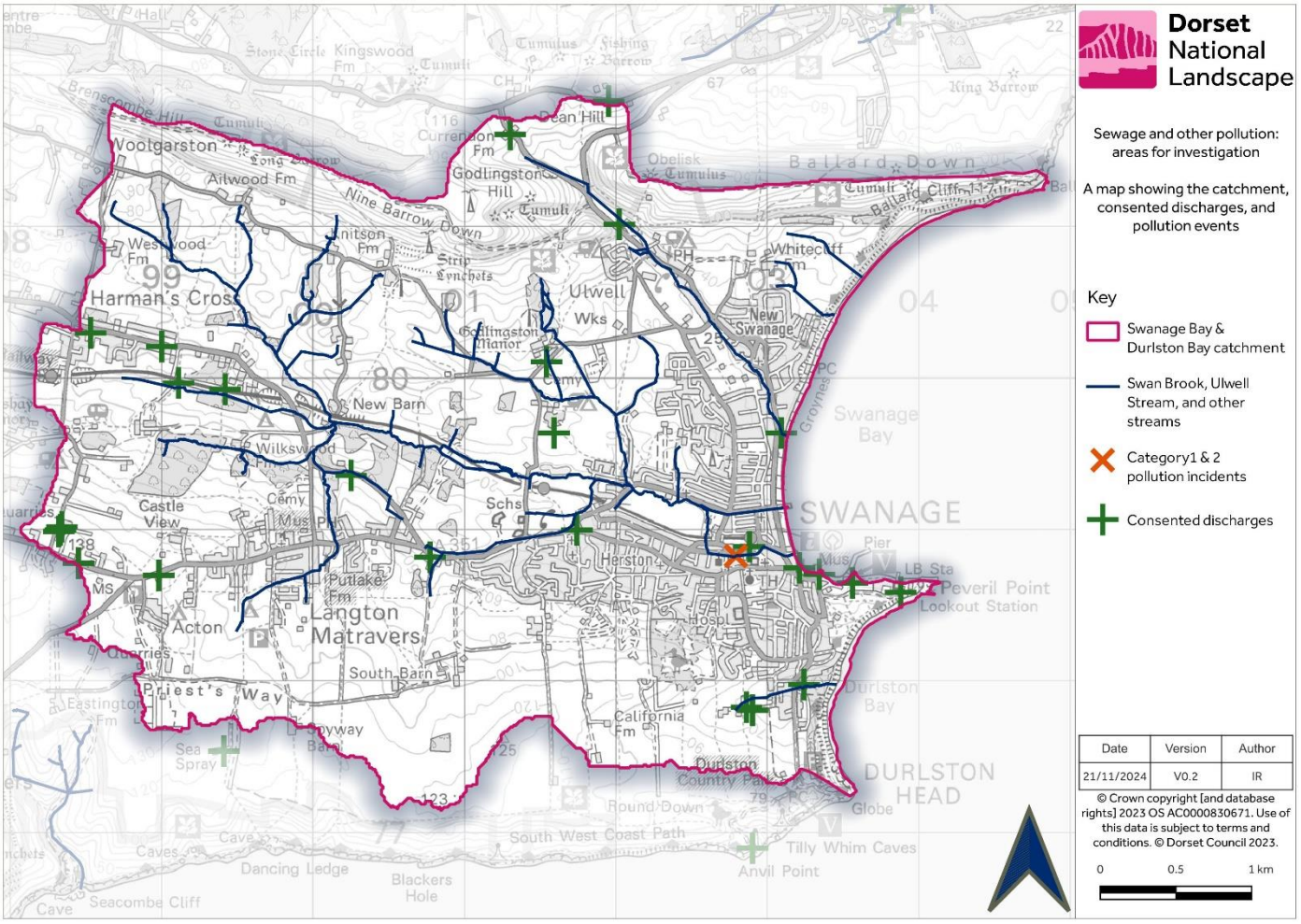
Sewage

There are 28 consented discharges within the catchment, as shown in the following map. Of these, 15 are linked to domestic properties, three to businesses and 10 to Wessex Water. 12 discharge to soakaways and nine to the streams within the catchment. A further six discharge to the sea.

The Wessex Water assets are Swanage Sewage Treatment Works, Herston Cross storm overflow, High Street / Seymore Road storm overflow, Ulwell Water Treatment Works, and five Pumping Stations. For those that discharge to the steams within the catchment, there was a total of 79 discharges in 2023, with 43 from Durlston Road pumping station, 18 from Shore Road storm overflow, five from Herston Cross storm overflow and 13 from Harman's Cross pumping station.

Focussing on domestic discharges, the problem for the functioning of the river is not the number of consented discharges, but that some of them may not be operating correctly. Regular maintenance is required to ensure that the effluent leaving the system is as clean as it can be. Raising awareness of the issue and best-practice management are the best course of action here.

In addition to the consented discharges, there has been one significant (Category 1 & 2) pollution incidents between 2001 and 2021. This is also shown on the following map. There have been 29 Category 3 incidents (a lower pollution risk), the majority of which are classed as 'other', so not associated with agriculture or the water industry, and 28 Category 4 incidents (which have no environmental impact).



Flow

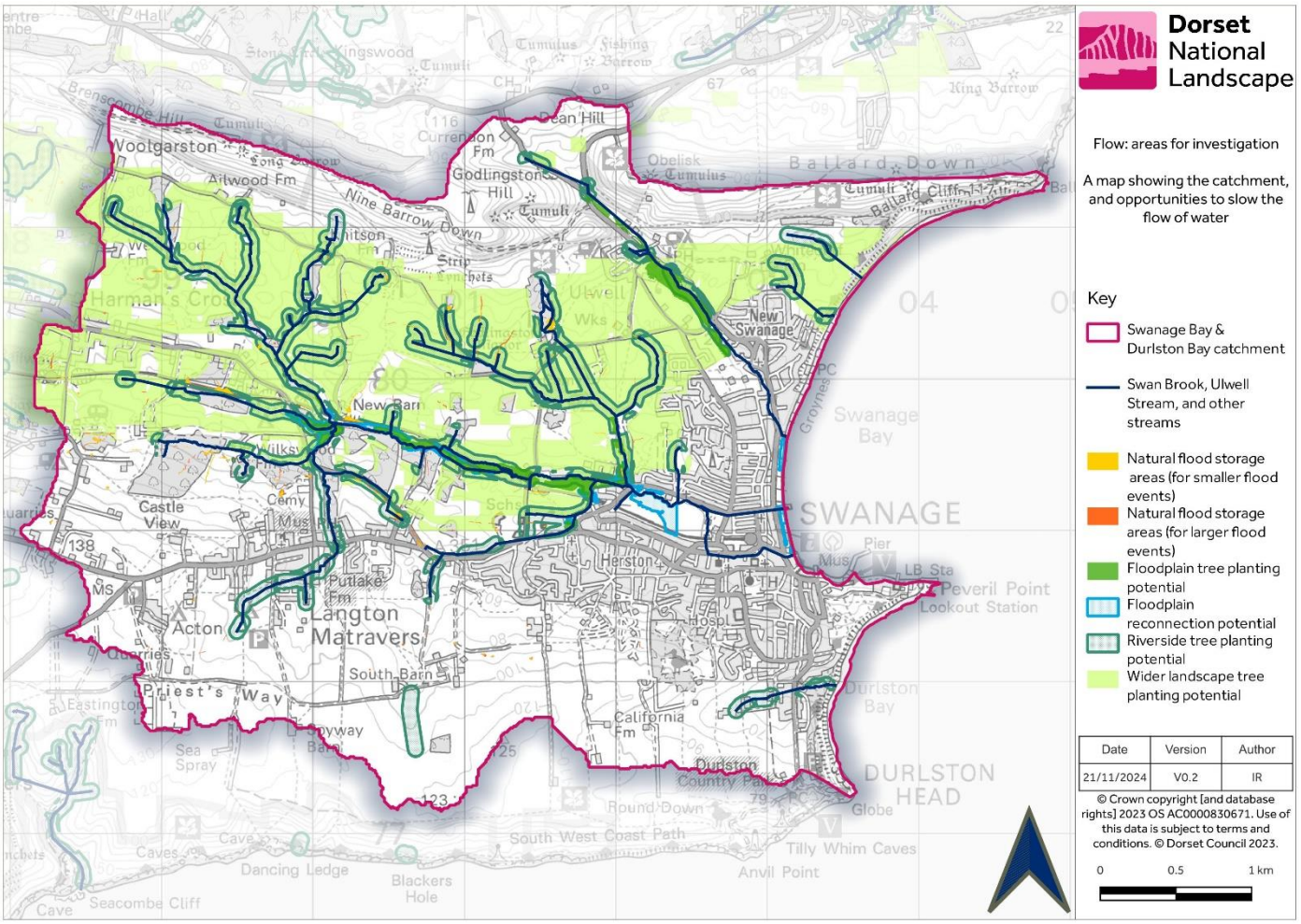
Though rivers and streams provide many benefits, they can also cause harm, particularly through flooding. This can be from the river itself, groundwater, and from overland flow. There have been significant flooding events in the catchment, affecting people living in Swanage particularly. These were in 1990 and 2013, with flood defence infrastructure constructed following the 1990 flooding.

Slowing the flow of water through the catchment by, for example, holding it back in wetlands or improving infiltration into the soil through removal of land drains, and woodland planting, can reduce the incidence of flooding, as well as support the functioning of the existing 'hard engineered' flood defences. The Environment Agency have undertaken mapping of where the best opportunities are for working with natural processes to reduce flooding. The solutions include planting of trees in the riparian corridor (next to the river), in the floodplain or in the wider landscape. They also include reconnecting the river to its floodplain, where appropriate, so that they function naturally, holding flood water and releasing it more slowly downstream, and therefore avoiding the damaging flood peaks. Another solution to this is creating natural flood water storage areas in priority areas. This is less extensive than floodplain reconnection, but still valuable.

From January 2025 to March 2027, the National Trust and their tenants' will be creating wetlands in the headwaters, with the aim of reducing flood risk downstream, alongside improving nature. Monitoring of these measures will help our understanding of how water moves through the system, and future actions can be planned that further reduce flood risk and enhance biodiversity.

The map below shows where opportunities have been identified in the Swanage Streams catchment.

Like the biodiversity opportunity mapping, these maps are only a guide and a prompt for discussions with landowners and farmers.



Habitat

Rivers and streams are vital for healthy and functioning landscapes because they act as corridors for species to move along, connecting important isolated fragments of habitat together and allowing wildlife to thrive. By better managing existing habitats and restoring lost habitats, we can make a positive contribution to the health of the Swanage Streams and the wider landscape.

Mapping undertaken by the Dorset National Landscapes has identified important core habitats for semi-natural grassland, broadleaved woodland, wetland, and lowland heathland. There are 51ha of important grassland at 31 sites within the catchment, and 567ha of important woodlands at 137 sites. There no heathland sites, as the right geological conditions do not exist. There is only one wetland site within the catchment, which is an indication of historical loss of this habitat type. It should be a priority for restoration. Dorset National Landscape also mapped how these sites are connected to each other through sympathetic land management. this is called the nature network.

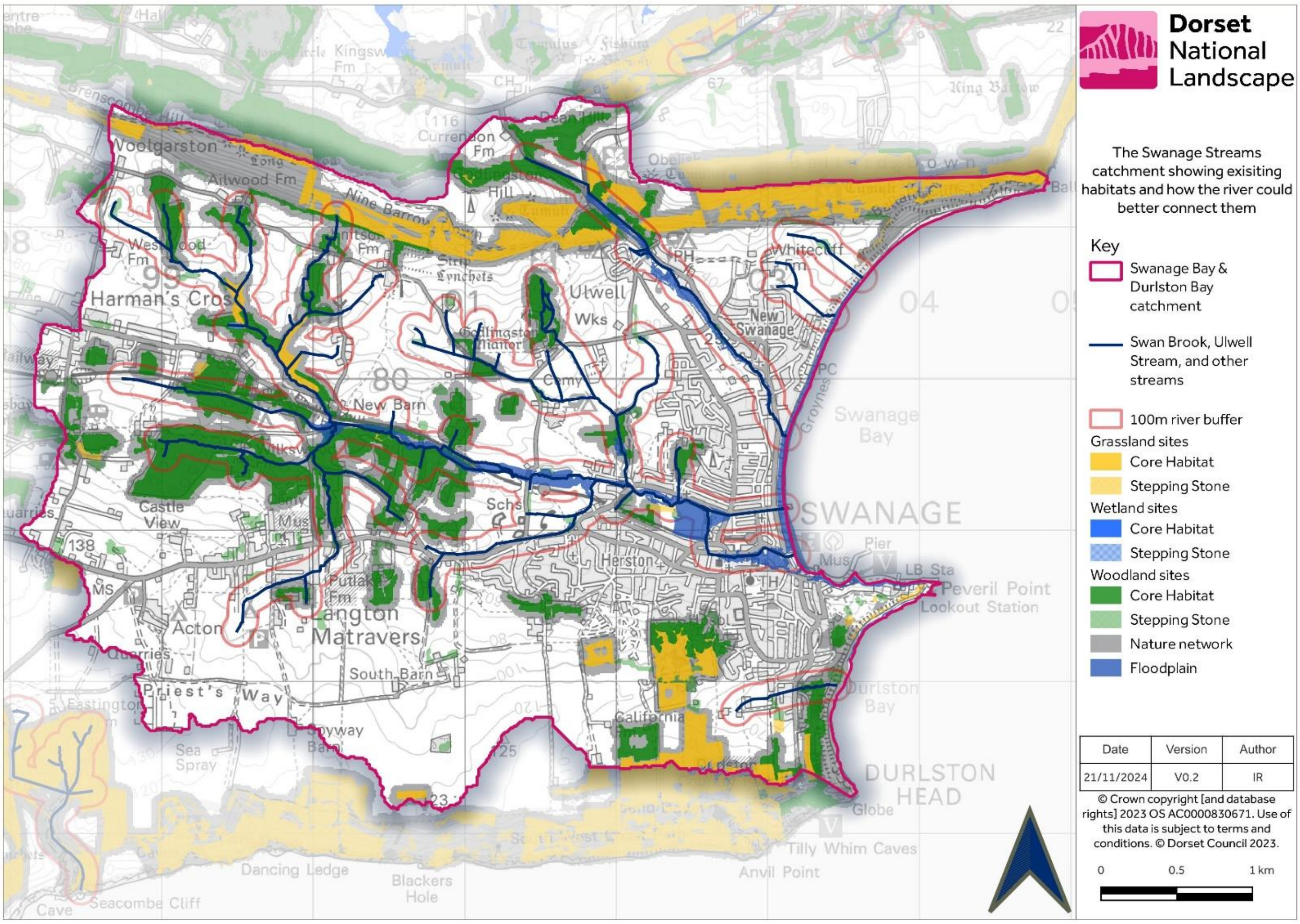
The map below shows a 100m buffer around the river, and how this connected to the core sites within the catchment, and their nature network. Opportunities to restore habitat in this buffer will support species movement along the Swanage Streams and should be a priority for action.

It is important to note that these maps only make suggestions, and details need to be explored further on a site-by-site basis. They also do not consider the quality of existing habitat, so surveys are required to make sure that proposals will not impact existing high-quality sites. The intended use of the maps is to help inform conversations with interested landowners and not as a vision for what the area should look like.

In terms of action, we can use these maps to help us plan where to start conversations with farmers and foresters. Priority habitats for restoration and enhancement would be wetlands, wet woodland and wet grassland, as these will have maximum impact for the river environments as well as for climate sequestration (capturing and locking away excess carbon dioxide in the atmosphere) and reducing downstream flooding. A number of farmers are already embracing these changes, particularly National Trust tenants, and we can support other farmers to access grants to make changes. Examples of funding that is available are Countryside Stewardship or the Nature for Climate Fund.

As well as restoring habitats, we also need to ensure good management of the existing habitats and where possible, sympathetic management within the buffer areas. This could be habitat restoration, but could also be, amongst other things, managing grassland with fewer inputs, introducing herbal leys, or letting hedgerows grow out.

By delivering for biodiversity, we would also be helping to meet the UK government's ambition of managing 30% of land for wildlife by 2030.


Dorset National Landscape
The Swanage Streams catchment showing exisiting habitats and how the river could better connect them
Key
Swanage Bay & Durlston Bay catchment
Swan Brook, Ulwell Stream, and other streams
100m river buffer
Grassland sites
Core Habitat
Stepping Stone
Wetland sites
Core Habitat
Stepping Stone
Woodland sites
Core Habitat
Stepping Stone
Nature network
Floodplain
Date
Version
Author
21/11/2024
V0.2
IR
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0
0.5
1 km
SWANAGE
Swanage Bay
Ulwell
Harman's Cross
Langton Matravers
Durlston Bay
DURLSTON HEAD
Peveril Point
Herston
New Barn
Dancing Ledge
Blackers Hole
Tilly Whim Caves
Anvil Point
Seacombe Cliff
Priest's Way
Woolgarston

Morphology

There are many ways of tackling poor morphology. One of the simplest is leaving large woody debris within the channel, as this is a key driver of natural function. However, in a landscape where the river is constrained by historic and current use, this may not always be an appropriate aim. Other ways of tackling poor morphology include restoring the channel to its original dimensions and course, and by creating greater connections with the floodplain, so that wetlands are introduced back into the landscape. Furthermore, breaking up of land drains within fields can create the wetland habitats missing from the floodplain. Increasing the wetness of the floodplain can result in improved water quality entering the streams, which is good for wildlife, slowing the flow of water down stream, which is good for reducing flood risk, and providing habitat for rare and threatened wetland species.

3 : Actions

Current action

Through our previous engagement with organisations and individuals over the winter of 2020, several potential opportunities were highlighted for the Swanage Streams catchment:

1. Wessex Water have developed Drainage and Waste Water Management Plans[6] that set out how Wessex Water will enhance their assets and networks to ensure they continue to deliver for their customers and the environment in a sustainable and affordable way and in the face of future challenges such as population growth and climate change. These will inform their submission to business plan submission to Ofwat in 2024, known as PR24, which sets out the level of investment over the period 2025 – 2030. Pollution risk has been identified as very significant, sewer collapse risk as moderately significant, blockages risk as moderately significant, risk associated with 1 in 50-year storms as very significant, storm water overflow performance risk as moderately significant, and risk of water recycling centre flow compliance failure as very significant. Compared to other catchments in the Wessex Water area, these combined risks are seen as a relatively small problem to address but moderately difficult to deliver. The plan to address these risks is available online[7]. Combined Sewage Overflows have discharged a number of times over the past three years, but not above a threshold where further action would take place.
2. Litter Free Dorset works with agencies, businesses, and local groups to engage with communities surrounding bathing water locations across the Dorset Coast and find collaborative solutions that improve everyone's enjoyment of Dorset beaches. LFD has previously worked in partnership with Sustainable Swanage and maintains a local presence via their work with community groups and promotion of the Sustainable Business Network.
3. Riverfly Surveys have been taking place over last two years in one location on the Swan Brook, as part of a partnership programme to monitor sites across Purbeck, set up by Dorset Wildlife Trust and the National Trust. Two additional sites on the Swan catchment have been identified, pending ground-truthing and additional volunteer capacity.
4. Water quality assessments have been ongoing on National Trust tenanted farmland which falls into the Swan Brook catchment, in 11 locations since 2021. A further two locations for Water quality assessments have just started (Autumn 2023).
5. A programme of freshwater awareness has been established as part of Planet Purbeck.
6. National Trust have secured funding for a programme of wetland restoration projects including the headwaters of several tributaries within the Swan catchment, schedule for implementation beginning in 2024. These are mostly on tenant farms and are part of a wider transition towards more nature-friendly and environmentally resilient farming systems.

Future action

Partners:

1. Follow up with Wessex Water to help deliver ambitions set out in their Draining and Waste Water Management Plans and their forthcoming business plan for 2025-2030.
2. Support farmers to access funding that allows them to manage their land better for the water environment. Enhanced payment rates are now available specifically for this through Countryside Stewardship. Further options also include:
    a. Landscape Recovery Scheme. A partnership of 42 Purbeck farmers and landowners came together in 2023 and submitted an application for a 20-year programme of nature-recovery

[6] https://wessexwater.maps.arcgis.com/apps/MapSeries/index.html?appid=e371301c24ca4228b36db3a3a6ba8560
[7] https://maps.wessexwater.co.uk/webapps/dwmp/docs/strategies/29541-swanage-drainage-and-wastewater-strategy.pdf

focussed land management, including a significant part of the Swan catchment. Although this application was unsuccessful, the intention is to reapply when the next round of funding is announced, expected in 2025

   b. Woodland Creation Grants from the Forestry Commission. There are high priority areas for woodland planting along the fringes of the streams that address water quality[8].
   c. Catchment Sensitive Farming[9]

3. National Trust have secured Defra funding for NFM measures in six farmland sites, with works commencing in 2025. In addition to the restoration in these six locations, one of the project outputs is to scope and develop further opportunities for future NFM projects elsewhere in the catchment, using these initial six sites as 'proof of concept'.
4. A wider landscape-scale monitoring plan is being developed for South Purbeck, which will incorporate the Swanage Streams Catchment Plan, alongside monitoring of habitats, species, soils, coastal erosion, and the impacts of people. If successfully implemented, this will form part of the Purbeck Landscape Recovery project.
5. Promote community engagement and awareness activities which encourage an appreciation of the Swanage Streams, a better understanding of the issues facing the condition of the catchment and solutions to improve it.
6. Involve local communities in catchment restoration through consultation with the community, partner-led activities and advocating for / supporting "at-home initiatives." Potential community-led actions could include:
   a. Advocating for reduced water usage in Swanage.
   b. Advocating to reduce negative impacts of dogs (flea treatment pollution) and litter.
   c. Creating an opportunity map for initiatives e.g., pond creation & natural flood management.
   d. Implement Slow the Flow initiatives on private and communal land (e.g., gardens & schools); and participate in guided volunteering activities to Slow the Flow on farmland.
   e. Identify and remove invasive plants on the watercourse.
   f. Participate in a programme of water monitoring (e.g., water chemistry sampling, Riverfly, Water Guardian programme, fixed point photography, target species monitoring).

Approach

Combining the issues facing the Swanage Streams, and opportunities – either already being delivered or explored in the future – into an action plan will help focus efforts of citizens & communities, environmental NGOs, and statutory agencies.

The action plan is presented below:

[8] https://www.forestergis.com/Apps/MapBrowser/
[9] https://www.gov.uk/guidance/catchment-sensitive-farming-reduce-agricultural-water-pollution

Theme	Action	Timescale	Likely cost	Who will deliver it	Who's it aimed at	What will it tackle				
						Flood	Morphology	Land management	Habitat	Behaviour & knowledge
Partnership	Establish a locally based partnership to oversee delivery	Short	££	Planet Purbeck	Communities, Farmers & Land Managers, Statutory agencies, NGOs					X
Partnership	Work with statutory agencies to raise the profile of the Swanage Streams and ensure that action is taken to improve their condition	Ongoing	££	Dorset National Landscape	Statutory agencies	X			X	X
Raise awareness	Raise awareness of the issues facing the Swanage Streams, and what people can do to help	Ongoing	££	Planet Purbeck	Communities					X
Raise Awareness	Use this plan as an engagement tool to better understand the issues facing the Swanage Streams and seek help to deliver the ambitions set out in it.	Short term	££	Planet Purbeck, Swanage Town Council	Communities, Farmers & Land Managers					X
Increased understanding	Develop and deliver a strategic monitoring plan for citizen scientists	Short term – development Ongoing - delivery	£££	National Trust, Dorset National Landscape	Communities, Farmers & Land Managers					X
Increased understanding	Support ongoing and new water quality assessment	Short term	££	National Trust	Communities, Farmers & Land Managers					X
Increased understanding	Deliver landscape-scale monitoring of the Swanage Streams Catchment	Ongoing	£££	National Trust	Communities, Farmers & Land Managers					X
Work with farmers	Support farmers in the Swanage Streams catchment to better manage their land for water: support to enter Countryside Stewardship	Ongoing	££££	National Trust	Farmers & Land Managers	X	X	X	X	
Work with farmers	Support farmers in the Swanage Streams catchment to better manage their land for water: delivery of Natural Flood Management	Medium term	££££	National Trust	Farmers & Land Managers	X	X	X	X	
Work with farmers	Support farmers in the Swanage Streams catchment to better manage their land for water: habitat restoration	Ongoing	££££	National Trust, Dorset National Landscape	Farmers & Land Managers	X	X	X	X	

'Likely cost' key:

- £ = tens of pounds
- ££ = hundreds of pounds
- £££ = thousands of pounds
- ££££ = large complex projects requiring a mix of revenue and capital funds in the region of thousands of pounds

Summary

The Swanage Streams catchment is made up of a number of small streams, principle of which is the Swan Brook, with the market town of Swanage at its mouth. The Swanage Streams drain a pastoral catchment with varied geology, considering its size: chalk to the north, limestone to the south, and clay in between. Woodland and intensively managed grassland are the predominant land cover, along with a sizeable urban coverage. The entire catchment is within the Dorset National Landscape, and it borders the Jurassic Coast World Heritage Site. Within it are several nationally and internationally important wildlife designations.

The Swan Brook is classified as poor by the Environment Agency is therefore considered a failing watercourse in need of improvement. The main reasons for failure for their perspective is the impact of flood defences on plant life within the stream. However, a wider consultation with local organisations, farmers and business identified further issues. The combined issues are summarised below:

- Degraded channel morphology, leading to unnatural conditions & faster flow. This in turn leads to and diminished plant life and increased flood risk.
- Elevated levels of sediment and nutrients within the channel, smothering gravels and reducing oxygen levels. This in turn leads to diminished fish, plant, and insect life.
- Loss of wetland habitat, leading to increased flood risk and diminished wildlife.

If we, in partnership with citizens, communities, and farmers of the catchment, want to make a difference to the state of the Swanage Streams, there are some steps we need to take. These are summarised below:

Partnership building

To deliver on our collective vision for the Swanage Streams, we need to establish an effective locally led partnership to oversee delivery. We also need to effectively engage with statutory agencies, so that they can help adopt and deliver on our shared ambitions.

Awareness raising

As well as practical hands-on opportunities to improve the state of the river, walks, talks, demonstrations and other awareness raising activities could take place to highlight the success of any projects and highlight what could be done about some of the issues, for example better septic tank management.

Knowledge & understanding

Interested community members could be trained in simple river monitoring techniques, from looking at the insect life that lives in the stream through the chemical properties of the water. Undertaking regular monitoring would give the community early warning of pollution incidents and an opportunity to inform the relevant authorities. It would also allow the community to monitor the effectiveness of any restoration undertaken. It would also create a sense of ownership and pride in this important habitat. Greater frequency of monitoring would also allow us to strengthen the statutory agencies' basic monitoring regime.

Further research, with the help of interested community members, could help improve our understanding of water quality issues faced by the streams, and the ideal geomorphological conditions we should be aiming for.

Further work could also be undertaken to identify hotspots for invasive species, habitat loss and erosion, and where there are opportunities for re-wilding rivers.

Enhancement

This would restore the natural processes of the rivers and floodplains where it has been altered. This would allow aquatic plants and fish species to thrive. Looking beyond the river itself, reconnecting the rivers to the floodplain

and restoring wet woodland and wet grassland would help the river both to function naturally and to better connect isolated habitats throughout the catchment.

By working with the farming community in the catchment to make changes to the way the land is managed, we could reduce sediment runoff and therefore nutrient pollution. It could also improve rainwater infiltration and therefore delay and reduce flood peaks.

At strategic locations throughout the catchment, interventions such as small leaky woody dams, gully blocking, removal of land drains, and tree and hedge planting could be installed to slow the flow of water over the land and increase storage of water within the soils. By doing this we could delay and potentially reduce flood peaks and reduce sediment runoff. The nature of the works involved would allow volunteers to help with delivery.