Somerset Rivers Authority

Annual Report 2020–21

Contents

ACKNOWLEDGEMENTS: Thanks to all SRA partners and contractors who contributed to this report.

Front cover image: moving a sharpened timber pile for culvert support at Egypt's Clyse (see p.14).

At a glance

KEY POINTS FROM 2020-21

£3.344m EXTRA

spent in Somerset by Somerset Rivers Authority on flood risk reduction and greater resilience

100s

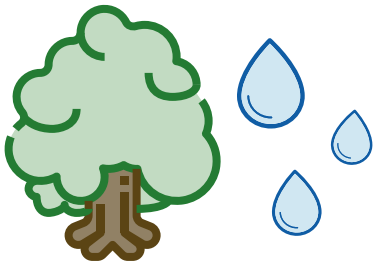
of places benefit across Somerset

of the River Parrett downstream of Northmoor Pumping Station to the M5 using water injection dredging

River Sowy-King's Sedgemoor Drain Enhancements Scheme advances and around 100 water level control structures are upgraded at Westmoor, Moorlinch and Egypt's Clyse

hills TO levels

More than 180 different activities and schemes, county-wide, to Slow the Flow of water through Natural Flood Management



More than 6,000 trees and shrubs are planted by volunteers at 23 sites through new Trees for Water Action Fund

SuDS

Somerset-specific guidance on Sustainable Drainage Systems is being produced, along with a new website. SuDS inspections are carried out countywide, works progress in Rode near Frome

more than 200

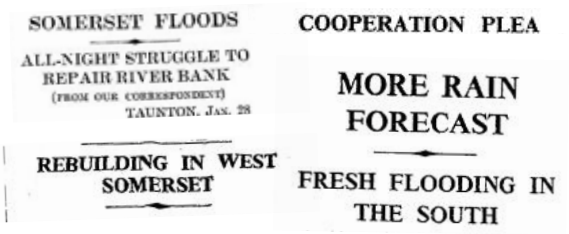
highways structures given extra cleaning to stop roads flooding, drains upgraded in Bruton, silt traps installed in Barrington and Chard, scheme designed for A39 in Carhampton

BUILDING LOCAL RESILIENCE TO FLOODING AND TO CLIMATE AND ECONOMIC CHANGE

through online training events with videos, Adapting the Levels initiatives and Moor Associations

Purpose of Somerset Rivers Authority

Somerset Rivers Authority exists for reasons rooted in the county's long history of flooding. Records show repeated flooding and repeated calls for action. After Athelney flooded twice in the winter of 1929-30, The Times reported that "adequate measures are urgently needed to prevent further disaster". After West Somerset flooded in 1952, the district council called for an inquiry "to see how in future such calamities could be avoided". After Taunton, West Somerset and 50,000 acres of the Somerset Levels (including Athelney) flooded in 1960, influential figures called for local bodies to be given more power to carry out flood prevention schemes. What happens in response? Records show a consistent pattern of some progress being made, but things then petering out as funding is reduced, flood memories recede and people's determination dwindles...


SOMERSET FLOODS

ALL-NIGHT STRUGGLE TO REPAIR RIVER BANK

(FROM OUR CORRESPONDENT)

TAUNTON, JAN. 28

REBUILDING IN WEST SOMERSET

COOPERATION PLEA

MORE RAIN FORECAST

FRESH FLOODING IN THE SOUTH


Taunton, 1960


Beer Wall, built 1969-72


Beer Wall, 2016

In broad historic terms, the purpose of Somerset Rivers Authority is to help Somerset crack persistent problems and break out of old unsatisfactory ways of tackling them. It was during the devastating floods of 2013-14 that Somerset decided to try a new approach. A range of partners drew up a 20 Year Flood Action Plan. Somerset Rivers Authority was launched in January 2015 to oversee that Plan and do the extra work that its flooding history has shown Somerset needs. Some important aspects of this work – such as enhancements of the River Sowy and King's Sedgemoor Drain – involve going back to ambitions that people had in the 1960s but could not finally fulfil, and updating them for the 21st century. Other projects backed by the SRA – for example Bridgwater Tidal Barrier, Taunton Strategic Flood Alleviation Improvements Scheme and Adapting the Levels – are looking ahead to the 22nd century, as local people and organisations seek to prepare for the water-related impacts of climate change.

The truth is that there is no single answer to Somerset's many flooding problems, and different parts of the county have different needs. That is why the SRA was set up as a partnership between different organisations. Those organisations are limited in what they can do individually, but working together as SRA partners they can achieve more than would otherwise be possible.

Through local taxation, the SRA funds a unique depth and breadth of actions. These are grouped into five workstreams, that reflect the local priorities of the Flood Action Plan and of Somerset people, and the need to approach different challenges in different ways. In practice, SRA activities include extra maintenance, repairs and improvements; innovations; collaborations; enabling major projects to go ahead; studies, reviews, and investigations; long-term initiatives; moves that respond to Somerset's special characteristics; or combinations of the above. This report shows examples of all these things from across Somerset.

SOMERSET RIVERS AUTHORITY BOARD was made up of the following during 2020-21:

Environment Agency

Sedgemoor Creating Opportunity

NATURAL ENGLAND

MENDIP DISTRICT COUNCIL

South Somerset District Council

Somerset West and Taunton

SOMERSET County Council

Wessex Regional Flood and Coastal Committee

each represented | by **one member**

SOMERSET DRAINAGE BOARDS CONSORTIUM

Axe Brue Internal Drainage Board and **Parrett IDB** each represented by **two members**

The Board meets quarterly. Main functions: set strategy and priorities, approve budgets and programmes of work, ensure progress and encourage partnership working, be publicly accountable.

SRA MANAGEMENT GROUP

Senior officers from SRA partners meet every six weeks.
Main functions: support Board, develop policy, oversee SRA Technical Group.

SRA TECHNICAL GROUP

Officers from SRA partners and bodies such as Wessex Water, Somerset Catchment Partnership and the Farming & Wildlife Advisory Group SouthWest meet every six weeks.
Main functions: identify and assess flooding problems, provide advice and guidance, prepare proposals, manage and deliver SRA initiatives.

SRA JOINT SCRUTINY PANEL

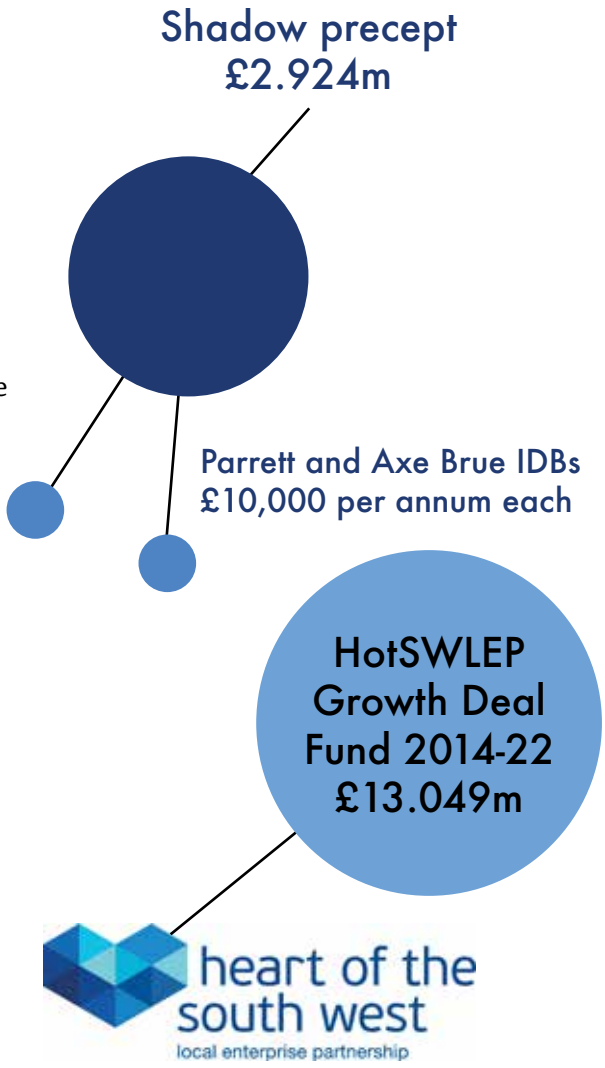
The Panel meets twice a year. Each council has two representatives, the IDBs one each. Main function: scrutiny.

SRA Funding & Legislation

Funding from local partners

For its first full year of work in 2015-16, the SRA had Interim Funding of £2.7million from the Department for Environment, Food & Rural Affairs (Defra), Somerset's local authorities and Somerset Drainage Boards Consortium. In December 2015, the Government gave Somerset County Council and Somerset's district councils the power to raise a shadow precept of up to 1.25% of 2016-17 council tax, to fund the SRA in 2016-17. The figure of 1.25% was chosen because it came close to matching the SRA's initial budget of £2.7m.

The SRA is still reliant upon annual shadow precepting and its level is still pegged to that initial £2.7m, although the actual amount of money raised has gone up. In 2020-21, it was £2.924million. In other words: the level of the charge is frozen, but as the number of households in Somerset increases every year, more people pay, so the total amount rises. The Parrett and Axe Brue Internal Drainage Boards also choose to contribute £10,000 a year each.



Funding from Heart of the South West Local Enterprise Partnership (HotSWLEP)

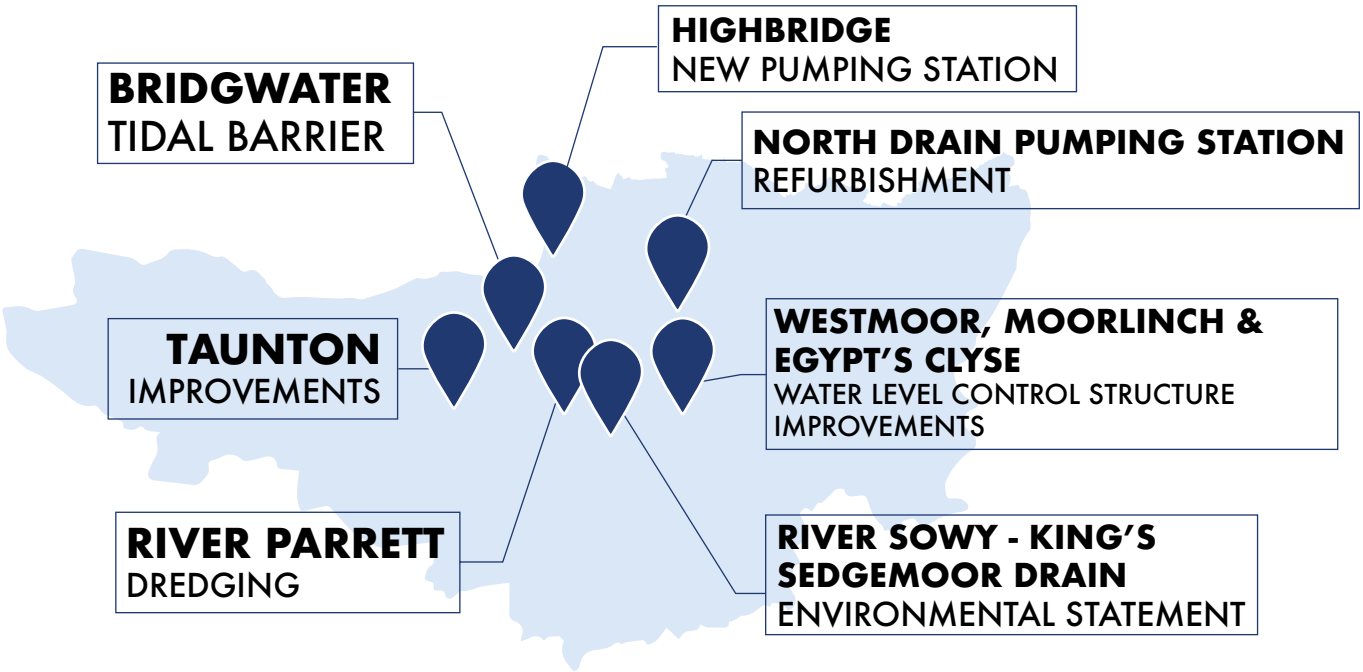
The SRA gets no central government funding from year to year. However, in 2014 Government funding of £13.049m was awarded through the HotSWLEP Growth Deal Fund for the carrying out of Somerset's 20 Year Flood Action Plan. As the body that now oversees the Flood Action Plan, the SRA has been spending this Growth Deal funding on several major projects, including dredging, River Sowy-King's Sedgemoor Drain enhancements and other activities covered in this report.

Legislation

In October 2020, the SRA Chair Cllr David Hall wrote to the Taunton Deane MP Rebecca Pow, in her capacity as Parliamentary Under Secretary of State with responsibility for flooding at Defra. Cllr Hall asked about progress with legislation required to put the SRA on a secure long-term footing and give it the power to raise its own share of council tax. He stated that the SRA Board "firmly believes that the SRA being a major precepting authority is vitally important to ensure the residents of Somerset continue to enjoy an extra level of flood protection into the future." Ms Pow replied that because Parliament had a very large legislative programme to work through, increased because of the coronavirus pandemic and new working arrangements, it had not been possible to make progress with Rivers Authorities legislation. She added: "I appreciate that this will be disappointing to the Board but do reassure you that I remain supportive of the Authority and the important work that it does, and will continue to explore opportunities for potential routes that may be appropriate for taking this forward." She emphasised that the Government had no plans to remove the SRA's shadow precept arrangements, so the SRA could continue to operate while needed and wanted locally.

W1 DREDGING & RIVER MANAGEMENT

2020-21 SUMMARY: Work has included pioneer dredging along the River Parrett from a point 750 metres past Northmoor Pumping Station down to the M5 bridge; the development of detailed designs for enhancing the River Sowy and King's Sedgemoor Drain in 2021, including a successful public consultation about this scheme, and the refurbishment of around 100 water control features at Egypt's Clyse, Moorlinch and Westmoor; financial support for the Bridgwater Tidal Barrier, Taunton improvements, a flood protection scheme for homes in Highbridge, and repairs and improvements at North Drain Pumping Station; plus the development of detailed designs for a flow station on the River Parrett in Langport, to be built in summer 2021. The map below shows a selection.



Somerset Rivers Authority spends more on Dredging and River Management than it does on any other workstream. Schemes are designed and delivered for the SRA by a range of partners and contractors. Money comes from either council tax or the Heart of the South West Local Enterprise Partnership's Growth Deal Fund – or sometimes both.

The three main strands are:

- major SRA projects
- major projects led by other bodies and backed by the SRA
- smaller projects

Many projects are complex and take more than a year to deliver. It is often said that if some matters were simple, they would already have been dealt with by someone else! But working together, SRA partners get results through innovation, sophistication and good old-fashioned determination.

MAJOR PROJECTS
1. Pioneer dredging and silt monitoring

W1

Background

A few months after the devastating floods of 2013-14, the Environment Agency spent £6million on pioneer dredging 8km (5 miles) of the River Tone and the River Parrett, down to Northmoor Pumping Station. Continuing in 2016, the Environment Agency pioneer dredged the next 750 metres (0.47 miles) of the Parrett downstream of Northmoor Pumping Station. Somerset Rivers Authority (SRA) funded this 2016 work. In 2018, the SRA funded pioneer dredging of the 2.2km (1.4mile) stretch of the Parrett between Beazley's Spillway at Stathe and its confluence with the River Tone at Burrowbridge.

2014 pioneer dredging

The pioneer dredges of 2014, 2016 and 2018 removed around 270,500m^3 of silt. They put the rivers' capacity to carry water back close to what it was in the 1960s, when – in response to the big floods that hit Taunton and Somerset in 1960 – the channels of the Parrett and Tone were made bigger and the River Sowy was created (see page 11). The three pioneer dredges – combined with Environment Agency investment in temporary pumps and pumping facilities – significantly reduced flood risks to people, properties, roads and land across a large part of the Somerset Levels and Moors.

Over the winter of 2015-16, in December 2017, December 2018, and January 2020 the SRA funded maintenance dredging of the Parrett and Tone. The aim of maintenance dredging is to prevent silt re-accumulating and flood risks increasing. The SRA also funds twice-yearly silt monitoring. Monitoring shows where silt has been newly deposited, so that dredging can be targeted effectively.

2016 maintenance dredging

Maintenance dredging and silt monitoring on the Parrett and Tone are carried out for the SRA by the Parrett Internal Drainage Board (IDB). The Parrett IDB acts under a Public Sector Co-operation Agreement with the Environment Agency, and works closely with the Environment Agency and Natural England to make sure that activities comply with numerous legal and environmental requirements.

2020 dredging trial

In 2016 consultants from HR Wallingford produced a report on *Opportunities for further dredging in Somerset*. This recommended the SRA to test water injection dredging (WID) techniques. In autumn 2016, funded by and on behalf of the SRA, the Parrett IDB led a trial of WID techniques using international specialists Van Oord and their vessel Borr. The success of this trial prompted a more extensive trial of WID in 2017, which again was effective. In November 2018 a five-year contract for dredging along the River Parrett was let to Van Oord by the Parrett IDB, on behalf of the SRA. In January 2020, after the completion of maintenance dredging by the Borr, the vessel was used in a short pioneer dredging trial along the Parrett. This was successful, and so plans were made for more Parrett pioneer dredging in January 2021.

ACTIVITY IN 2020-21

River Parrett pioneer dredging down from beyond Northmoor to the M5

Pioneer dredging in January 2021 covered 2.2km (1.37miles) of the River Parrett, downstream of the 750 metres (0.47miles) dredged by the Environment Agency for the SRA in 2016.

January's dredging was undertaken for the SRA by the Parrett IDB, working closely with the Environment Agency and Natural England, and using Growth Deal funding from the Heart of the South West Local Enterprise Partnership.

Van Oord's water injection dredging vessel Borr was mobilised at Dunball Wharf on Saturday 16 January, and moved upstream to a temporary compound near Westonzoyland Pumping Station. Dredging began the day after. High river levels and consistent seaward flows enabled dredging to continue for an average of 10 hours a day, every day for 14 days, mostly in daylight. (A feature on the SRA's website, from last year's annual report, explains in detail how water injection dredging works on the River Parrett - https://www.somersetriversauthority.org.uk/WIDhow)

Van Oord's staff and Parrett IDB officers had to operate within challenging coronavirus restrictions and Somerset Rivers Authority is grateful to them all for their hard work in difficult circumstances.

The Borr was demobilised back at Dunball Wharf on Sunday 31 January and a post-works bathymetric survey was done the next day. Around 22,000m^3 of consolidated silt deposits were removed from the 1.37 miles of the Parrett down to the M5 bridge, so making the capacity of this stretch of the river align with the 2016 dredge.

Dredging down to the M5 has had three main benefits. Firstly, it has reduced flood risks for properties in the Northmoor area. Secondly, it has been helping to reduce the risks of agricultural damages, which tend to be worst from spring and summer floods (as seen in 2012). Thirdly, it has created better possibilities for managing flows of water around the Somerset Levels. It will help the SRA and its partners to make further improvements, like those planned for the River Sowy and King's Sedgemoor Drain in summer 2021. It also complements the pioneer dredging done in 2019 between Stathe and Burrowbridge.

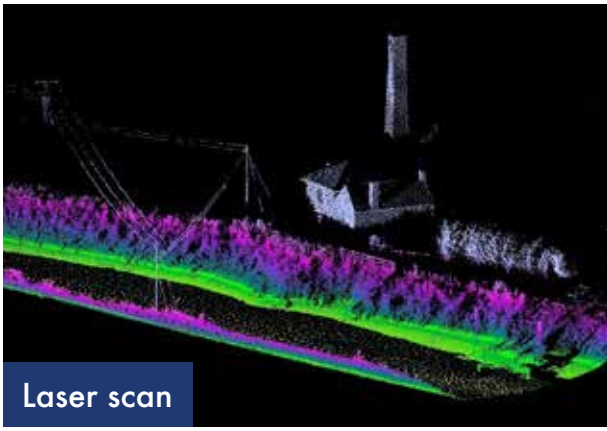
Stathe to Burrowbridge dredging follow-ups

In 2019, 2.2km (1.4miles) of the River Parrett between Beazley's Spillway at Stathe and the confluence with the River Tone at Burrowbridge were dredged. This scheme was led for the SRA by the Parrett IDB, working closely with the Environment Agency, Natural England, contractors WM Longreach and local specialist sub-contractors. The SRA used Growth Deal funding from the Heart of the South West Local Enterprise Partnership.

Exceedingly wet weather in November 2019 meant that a few tasks had to be postponed. In 2020-21 these included some final bank restoration and re-seeding, plus mitigation activities such as the planting of old varieties of apple tree, and erecting fencing.

Silt monitoring

The Parrett IDB has continued silt monitoring along the Parrett and Tone to inform the SRA's dredging programme. The two rivers are divided – for the purposes of data-gathering and analysis – into a series of sections. Each section is 50 metres apart. There are 67 sections of interest on the River Tone, making a total of 3.35 kilometres (2.08 miles), and 243 sections on the River Parrett, totalling 12.15 kilometres (7.55 miles). Surveys are usually carried out twice a year, at the end of summer when silt deposition tends to have reached its annual peak, and at the end of winter when silt levels are low because of natural processes of scouring.



Laser scan

Techniques used include single beam and multi-beam 'bathymetric' (underwater) surveys of the channel bed, and laser scanning of the banks, to measure any changes in height. The aim is to build up a useful and detailed picture of seasonal and year-on-year trends. In practice, not every cross-section of the Tone and Parrett is individually scrutinised twice a year. Attention is focused on priority areas, for pioneer dredging or maintenance dredging. For example, the Parrett IDB now has regular, consistent data for the 102 sections (5.1 kilometres or 3.17 miles) where maintenance dredging is targeted.

Flux monitoring is also important. This measures levels of turbidity, which means in very simple terms how clear or cloudy a river is, in other words how much sedimentary material has been washed into a river or stirred up. Knowing more about where sediment comes from and where it is going – or not going – helps the SRA to understand where dredging should take place, to what degree. Flux monitoring has been performed at New Bridge Sluice on the River Tone and at Oath Lock Sluice on the River Parrett. Much of this work has been commissioned by the Parrett IDB, for the SRA, from the local marine environmental scientist Dr Rob Nunny.

The SRA's long-term ambition is to get a better understanding than anybody has ever had before of how the tidal River Parrett-River Tone system really works. This quest is being greatly helped by collaborations with scientists.

MAJOR PROJECTS

2. River Sowy/King's Sedgemoor Drain enchancements

Monk's Leaze Clyse

Crandon

Crandon

Background

The River Sowy is used by the Environment Agency to take excess water away from the River Parrett near Aller. Water flows into the Sowy through the Monk's Leaze Clyse sluice, goes down via Beer Wall to King's Sedgemoor Drain (KSD) near Greylake, then re-joins the Parrett at Dunball.

During the floods of 2013-14, after Monk's Leaze Clyse was opened fully, flood waters fell 80 centimetres in two days. No other single act had such a dramatic effect. It was described by one senior officer as being "like magic". In wet winters since, the Sowy has again helped to take pressure off the Parrett and allow for earlier and longer pumping.

The Sowy is a man-made river. It was conceived as a Parrett Flood Relief Channel after downpours deluged 50,000 acres of Somerset (including Taunton) in October 1960.

The first plan in 1961 was for a channel that could carry 30 cubic metres of water per second into a widened KSD. After long arguments about cost, the Sowy was scaled back to 17 cubic metres per second (cumecs).

Work started in 1969, and took three years.

However – though the Sowy was built smaller than first suggested – all associated sluices or bridges were built or modified so they could deal with 30 cumecs and the system could be made larger once funding was available in future.

Somerset Rivers Authority is now picking up the possibilities left to us all by an earlier generation.

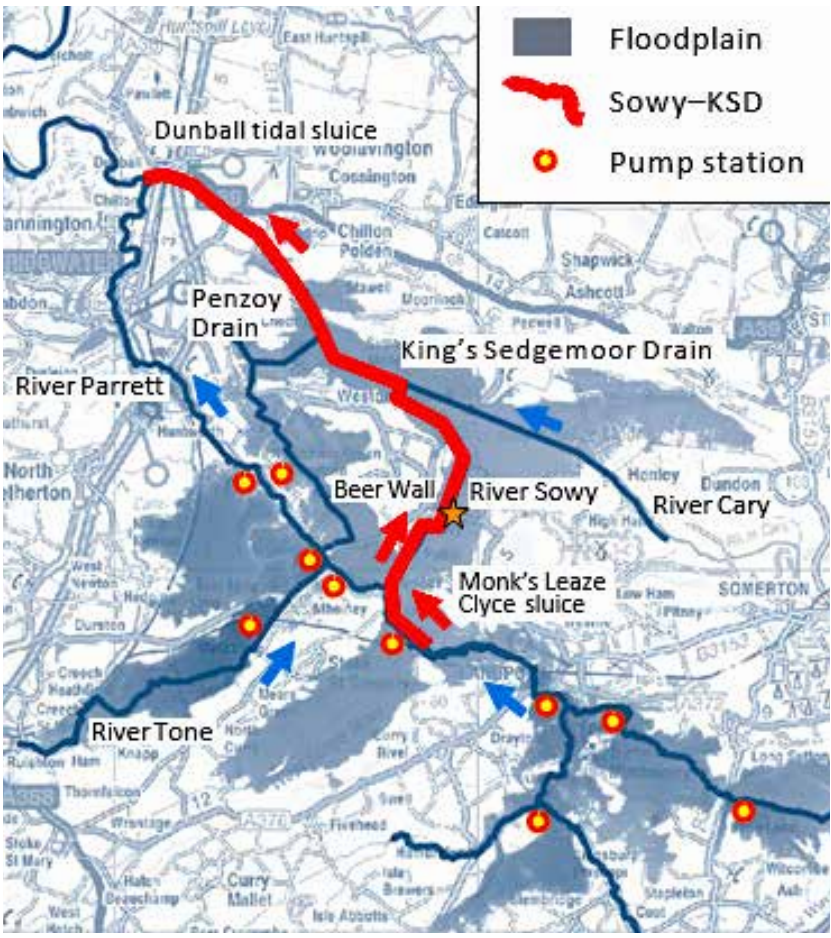
Providing more capacity in the Sowy-KSD system, so that it can be used more effectively, is a key aim of Somerset's 20 Year Flood Action Plan, which is overseen by the SRA.

Sowy-KSD works in recent years have included the creation of new river channels under the busy A372 at Beer Wall along with tilting weirs, to help stop the road flooding as it did for weeks in 2014; the installation of a new water level control gate near Chedzoy, to help better protect the Chedzoy and Andersea area; the removal of obstructive masonry from under Dunball Old Bridge, which carries A38 traffic southbound; and de-silting of bridges to increase channel capacity at Parchey and Dunball.

All these works are part of a programme to reduce flood risks across 150 square miles. Now, as back in the 1960s, the intent is to reduce the risks of flooding – particularly summer flooding – for moors upstream of Langport and some lower roads, and for moors west of the Parrett. Doing this will help to protect people, homes, farms, businesses, land and infrastructure.

Activities during 2020-21

A milestone was reached in August 2020 when the Environmental Statement for the first phase of the River Sowy-King's Sedgemoor Drain (KSD) Enhancements Scheme went out for public consultation, online because of the coronavirus pandemic. The Environmental Statement's non-technical summary, 14 chapters and 16 appendices can be read at https://consult.environment-agency.gov.uk/wessex/river-sowy-and-ksd-enhancements/



In simple terms, the Environmental Statement was legally required to show that the potential impacts of this Scheme had been properly investigated and assessed. The Environmental Statement therefore included many detailed designs to show exactly what works were proposed, and examinations of the Scheme's effects upon water, flora and fauna, cultural heritage, landscape, population and health and noise. It also looked at the cumulative impacts of different elements. Five responses were received, relevant issues were addressed, and so the Environment Agency determined that the Scheme should proceed.

The Sowy-KSD Enhancements Scheme is being delivered for Somerset Rivers Authority by the Environment Agency and partly funded by Growth Deal money from the Heart of the South West Local Enterprise Partnership (HotSWLEP). In October 2020, HotSWLEP agreed to give the Sowy-KSD Scheme more time to spend its remaining allocation of Growth Deal funding. The deadline was previously the end of March 2021, but Phase One construction activities must now be completed by November 2021.

The Environmental Statement represented an enormous amount of complex detailed work, which continued following its publication, to optimise and de-risk the Scheme still further. Phase One of the Sowy-KSD Enhancements Scheme will raise low spots in banks and create new banks. Channel-widening at selected locations will be achieved through new environmental features such as three sections of two-stage channel (deeper main channel, shallow shelved channel sides), three embayments (shelves) and the creation of a backwater (smaller channels close to the existing channel). The capacity of the Upper Sowy from Monk's Leaze Clyse down to the A372 Beer Wall will be maintained at 17 cubic metres per second (cumecs). The target for the Lower Sowy (from Beer Wall to the confluence with the KSD) is 24 cumecs, an increase of 40%, and for the KSD down to Parchey Bridge the target is 27 cumecs.

Existing outfall structures on two KSD side streams (Cossington Right Rhyne and Chilton Right Rhyne) will be modified, with concrete headwalls made higher and sheet piles driven into raised embankments, to match the increased capacity of the KSD and provide the same relative level of flood defence as before. Six other KSD outfall structures are under investigation.

The main works are due to begin in August 2021, to comply with environmental necessities such as not disturbing nesting and breeding birds.

To reflect the Scheme's new timings and some alterations made through the continuing refinements of recent months, an addendum to the Environmental Statement was published on 3 July 2021 for public consultation.

The Sowy-KSD project team has also continued to work on SRA-funded plans for smoothing at Dunball, where King's Sedgemoor Drain joins the River Parrett through Dunball Sluice. Following on from the removal of troublesome masonry under Dunball Old Bridge in 2016, the aim is to remove more obsolescent obstructions which reduce the capacity of the river channel – and cause problems with turbulence – along the approach to the Sluice. This work would help to increase the maximum flow of water that can be discharged from the KSD to the Parrett estuary, and so reduce flood risks to homes, land and roads.

Further phases of the full River Sowy-KSD Enhancements Scheme will be designed and delivered when funding is available, with the aim of further increasing the system's capacity and thereby reducing flood risks for local communities.

Mitigation and compliance works at Egypt's Clyse, Moorlinch and Westmoor

A balance has to be struck between reducing flood risks and preserving the environment. In combination, the full River Sowy-King's Sedgemoor Drain Enhancements Scheme and the 2019 dredging of the River Parrett between Stathe and Burrowbridge have the potential to affect legally-protected wetlands of international ecological importance by making them less wet, through more water being kept in river channels. That potential has to be nullified.

The SRA has to ensure that habitats in the Somerset Levels and Moors Special Protection Area do not deteriorate as a result of SRA schemes. This is why in 2020-21 the SRA funded the refurbishment of around 100 water level control features at Egypt's Clyse, Moorlinch and Westmoor. The main purpose of all this work is to enable consistent management of water levels across valuable parts of the Somerset Levels & Moors that might otherwise be affected by the combined effects of SRA schemes.

Careful attention was paid to small details. For example, two tilting weirs were lowered because they were 20 centimetres too high and therefore simply did not work very well.

Together, all the improvements listed below will help SRA partners to better control local flood risks and they will benefit farmers and wildlife.

Moorlinch Raised Water Level Area refurbishment. This work was completed by contractors Land & Water in early July 2020. It included:

- checking and refurbishing 17 trench sheet dams with non-return valves
- checking and refurbishing four earth bunds with non-return valves
- new walkways to two tilting weirs
- clearing of four culverts that pass under the droves
- new fencing where required around each structure worked on.

Egypt's Clyse refurbishment. Egypt's Clyse is an important water control structure which sits at the confluence of Othery Rhyne and King's Sedgemoor Drain. Othery Rhyne connects Langacre Rhyne, which runs alongside the River Sowy as a flood relief channel for the River Parrett, and King's Sedgemoor Drain. Othery Rhyne is used by the Environment Agency to move water between the Langacre and King's Sedgemoor Drain, for flood (and drought) control and for agricultural and environmental benefits.

Works at Egypt's Clyse carried out by contractors Land & Water in October and November 2020, included:

- replacing the 1.5metre diameter discharge culvert, made of corrugated iron, mis-shapen and heavily rusted, with a new twin-walled plastic culvert of the same diameter.
- installing timber headwalls to protect the culvert inlet and outlet areas from cattle poaching and fluvial erosion.
- replacing temporary timber pin piles originally installed to reduce washing out around the concrete headwall, with more permanent steel trench sheets.
- replacing timber fencing around the structure.


Egypt's Clyse

Westmoor Raised Water Level Area refurbishment. Work began in October and was mostly completed by mid-November. Works at Westmoor included:

- removing six trench sheet dams with stop logs, replacing three with tilting weirs. (The other three trench sheet dams were no longer needed).
- removing and replacing of two trench sheet dams (without stop logs).
- checking and refurbishing eight earth bunds with non-return valves.
- installing a pipe and non-return valve on an existing earth bund.
- removing three earth bunds.
- Installing a new earth bund, widening an existing earth bund and raising a third earth bund located in the south-east corner to improve the hydrological performance of the Raised Water Level Area.
- jetting three siphons to make sure different Raised Water Level Area blocks are hydrologically connected.
- lowering two tilting weirs.
- replacing dilapidated fencing around all of the above structures and another 36 earth bund structures.

MAJOR PROJECTS

2. River Sowy/King's Sedgemoor Drain enchancements

Westmoor walkway

Westmoor tilting weir

To help Somerset Rivers Authority (SRA) and its partners streamline flood risk management projects on the Somerset Levels, Natural England is developing a Strategic Approach to Mitigation.

Mitigation means actions that must be taken – by law – to offset any unavoidably negative effects that projects will have, considered individually and in combination.

Numerous factors on the Somerset Levels interact in complex and changing ways. A delicate balance, that is difficult to achieve, has to be struck between 'too wet' and 'too dry'.

The objectives of Somerset's 20 Year Flood Action Plan, which is overseen by the SRA, also apply with particular historic force on the Somerset Levels and Moors. The SRA invests in activities such as dredging and Sowy-King's Sedgemoor Drain enhancements because having more water moving through river channels can – to quote the Flood Action Plan – "reduce the severity, duration and impact of flooding". Achieving greater capacity and reducing flooding can then help to "maintain access for communities and business" and "ensure strategic road and rail connectivity".

On the other hand, the Flood Action Plan is adamant that wetlands need to be wet – *up to a certain point and in the right places*. The Flood Action Plan requires the SRA to "make the most of the special characteristics of Somerset": its internationally important biodiversity and environment, its cultural heritage. The Somerset Levels are one of the most important places for wildlife in England (and Europe), especially for wintering and breeding waders and waterfowl. Tens of thousands of birds feed in parts of the Levels over the winter in 'shallow splash' conditions. So, for SRA projects to be legally compliant with habitat regulations, designated sites and wider wetlands (technically known as Functionally Linked Land) must be protected.

Another Flood Action Plan objective is to "promote business confidence and growth". This allows for many possibilities. For example, the government is planning to introduce new kinds of subsidies for farmers and landowners. The emphasis will be on paying for 'public goods', that is doing things which have popular and useful benefits, like choosing to make land available for the storage of flood water. As a pilot Environmental Land Management exercise for Defra, and in conjunction with the Adapting the Levels project (see page 59), the SRA is funding a water storage trial on selected parts of the Somerset Levels later in 2021.

Climate change is also predicted to intensify problems with flooding and drought on the Somerset Levels and Moors.

A Strategic Approach to Mitigation therefore aims to achieve five broad objectives. These are:

- reduce costs and risks
- enable projects to go ahead
- secure environmental benefits
- support local community, farming, business and tourism interests
- satisfy local and national policies

Simple definitions

'Shallow splash' describes wet grassland that attracts and supports wild creatures, including birds such as waders and waterfowl.

Designated sites are places given special status and extra legal protection because of their ecological or geological value. Sites can be of local, national or international importance. Nearly 6,400 hectares of the Somerset Levels & Moors are wetlands of international significance.

Functionally Linked Land means areas of land or sea outside the boundaries of designated sites but critical to the success of those sites.

Raised Water Level Areas are areas of land where water levels have been engineered to be held at a higher level than in surrounding areas. This is done to provide better breeding and wintering conditions for waders and wildfowl inhabiting the Somerset Levels and Moors.

2020-21 activity

During 2020-21 Natural England devised a two-year plan for developing and implementing a Strategic Approach to Mitigation, with four main interlocking strands:

1. Developing a protocol for monitoring the condition of the Somerset wetlands.

2. Developing a methodology for mapping wider wetland areas, especially Functionally Linked Land of critical importance to wintering birds.

The purpose of these two moves is to establish a baseline against which it will be easier to detect environmental changes. Several important benefits will result from this. For example, better information about sensitive locations will help the SRA and its partners to produce legally compliant schemes more quickly, at a lower cost. In addition, it will open up the possibility of fast-tracking critically important works, because with the right kinds of understanding, mitigation activities could be agreed more swiftly and done upfront.

3. Initiating the updating of Water Level Management Plans and establishing operational protocols including a set of Environmental Trigger points across Somerset.

4. Developing alternative solutions to the current suite of Raised Water Level Areas.

These two moves are also significant, both in themselves and because of the ways they connect with other initiatives. Success will require the building of a consensus about water level management on the Somerset Levels and Moors, and constructive engagement with the proposed payments for "public goods" that the Government wants to introduce for farmers and landowners. Those "public goods" look very likely to include storing floodwater and maintaining wildlife habitats.

Natural England stress that partnership working will be crucial to ensure that conditions remain suitable for wintering waterfowl, breeding waders, and other wetland wildlife, as is required by law, without affecting homes and infrastructure, while also sustaining appropriate farming practices and encouraging tourism and reducing flooding and drought and dealing with climate change.

In short, conversations will need to focus upon land being used for several functions and how this could be organised and paid for. The importance of Somerset Rivers Authority as a partnership, and of Somerset's 20 Year Flood Action Plan as a guiding vision, is that they have enabled those conversations to begin already and bear fruit. For example, over the last few years the SRA has supported the creation of Moor Associations, voluntary groupings of farmers and landowners who have banded together to enable more effective management of crucial areas such as Westmoor, Tealham and Tadham Moor and most recently Moorlinch (see page 59). New Moor Associations are in development on Aller Moor and on Sutton Hams near Moorlinch, so that landowners can join in the forthcoming floodwater storage Test and Trial for Defra's new Environmental Land Management Schemes system, which is being funded by Somerset Rivers Authority.

In March 2021, the SRA Board approved a bid from Natural England for two years' funding for developing and implementing this Strategic Approach to Mitigation for the SRA.

MAJOR PROJECTS
4. Bridgwater Tidal Barrier

Artist's impression of the Bridgwater Tidal Barrier

Bridgwater Tidal Barrier is a major project led by the Environment Agency and Sedgemoor District Council, with support from Somerset Rivers Authority (SRA). Its purpose is to reduce flood risks to more than 11,300 homes and 1,500 businesses. The project has three main elements: a tidal barrier on the River Parrett between Express Park and Chilton Trinity; 4.3 kilometres (2.67 miles) of new flood defence banks and 2.8 kilometres (1.74 miles) of raised banks downstream at Chilton Trinity, Combwich and Pawlett; and fish and eel passage improvements at 12 sites upstream of the barrier.

The SRA put £2million of Growth Deal money from the Heart of the South West Local Enterprise Partnership towards project costs, up to the application for the Transport and Works Act Order (TWAO) which is needed to build the Barrier. A TWAO application was submitted to the Department for Environment, Food and Rural Affairs (Defra) in December 2019.

Activities in 2020-21

During 2020, the TWAO bid successfully passed through a process of statutory consultation and written representations. On 8 January 2021 Defra said the TWAO had been passed to its Secretary of State for a decision, which is now expected soon.

The £100million project will be funded 80% by central government and 20% by local partnership funding. In March 2021 the SRA Board agreed to put £300,000 towards the local funding required, and to support the principle of providing further contributions in future years. It is hoped to start construction in 2022-23.

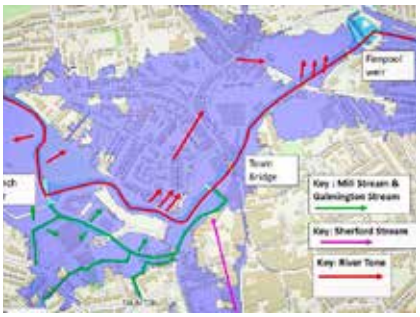
The main purpose of Taunton Strategic Flood Alleviation Improvements Scheme (TSFAIS) is to reduce flood risks from the River Tone and its complex network of tributaries, particularly the Galmington, Sherford and Mill streams.

The scheme is led by Somerset West and Taunton Council (SWTC) and the Environment Agency. It has been part-funded since 2016 by Somerset Rivers Authority (SRA).

In 2016-17, the SRA contributed Growth Deal funding from the Heart of the South West Local Enterprise Partnership.

Somerset West and Taunton Council (SWTC) estimates that a single major flood could cost Taunton's economy up to £50million. 1,031 properties in Taunton are currently at risk, including homes, health centres, emergency services, North Town Primary School, electricity substations, sports facilities and much more. By 2118, because of climate change, the number is expected to rise to 2,548.

Map of Taunton showing flooding extent in 2019



Map of Taunton showing flooding extent in 2119

Activities in 2020-21

The current TSFAIS priority is to improve Taunton's short and medium-term capacity to manage flooding. Two initial schemes have been progressing:

1. River Tone Left Bank Flood Defences – raising low spots from Frieze Hill to Town Bridge. This will benefit 508 homes, businesses and facilities such as the police station and council offices, BT exchange and French Weir surgery, plus the A3027 and A3088.

   The design, engineering and project management consultancy Atkins has been appointed to design the improved defences and secure the necessary consents and permissions.

2. Firepool Lock gates and bund. The plan is to raise Firepool Lock gates and the area around them, and create a 750-metre earth bund between the River Tone and the Bridgwater to Taunton Canal, from Firepool Lock to the A358 Obridge Viaduct. The aim is to prevent Tone floodwater from entering the Canal, because that will reduce the risks of floodwater overtopping into Maiden's Brook and then Allen's Brook in Bathpool, and that will benefit 219 properties (Priorswood and Crown Industrial Estates and Bathpool).

   This scheme is being led by SWTC with Environment Agency support. Discussions have been progressing with consultants about the delivery of a detailed scheme design, and some preliminary studies have been commissioned by WSP to support this design and the process of gaining necessary consents.

NORTH DRAIN PUMPING STATION

A second phase of repairs and improvements to North Drain Pumping Station was led by the Environment Agency and part-funded by the SRA. Works included replacing two penstocks used to help manage the inlet to the pumping station, straightening weedscreen bars, de-silting inlet bays, fitting three stop-log boards for controlling flows of water, and fixing stone gabions. The Environment Agency then installed new electric canister pumps, 'fish-friendly' and with a lower carbon dioxide (CO2) output than the station's old pumps, which were near the end of their life.

North Drain Pumping Station sits close to the confluence of North Drain and the River Brue about halfway between Westham and Burtle. This area tends to have too much water in winter – and too little in summer – so the pumping station needs to operate as effectively as possible all year round. Pumping water from the North Drain into the Brue, as and when required, helps to reduce the risks of flooding for 9,700 acres of land.

A video made for the 2020 Somerset Community Resilience event features aerial shots of the second phase of works at North Drain Pumping Station and an interview with the Environment Agency's project manager, from 3 minutes 18 seconds in: https://youtu.be/60JvYhaXn6E?t=198

A first phase of SRA-funded works took place in 2018, which included the replacement of the station's 50-year-old leaking and collapsing concrete roof with a lightweight modern roof.

Using Growth Deal funding from the Heart of the South West Local Enterprise Partnership, the SRA has helped the Environment Agency to introduce better ways of working and more flexible water management at North Drain Pumping Station.

From the top of the page down, the photos show an aerial view of North Drain Pumping Station, from the video referred to in the text above; SRA Board member Jeff Fear about to descend into an inlet bay; John Rowlands, then of the Environment Agency, addressing SRA Chair Cllr David Hall, project manager Mike Lake, Somerset High Sheriff 2020 Mary-Clare Rodwell, and Jeff Fear; and the station's new lightweight roof.

HIGHBRIDGE

Work was completed in autumn 2020 on a £1.8million Wessex Water scheme designed to protect 21 homes in Field Way, Highbridge from very unpleasant sewer flooding.

A new surface water pumping station was installed, along with new pipework.

Somerset Rivers Authority (SRA) part-funded this scheme, using £100k of its Growth Deal funding from the Heart of the South West Local Enterprise Partnership.

LANGPORT FLOW STATION

In 2019 the SRA Board approved an Environment Agency bid for funding for a permanent flow gauge in the River Parrett in Langport. In 2020, ground investigation works were completed and the flow station was designed. In 2021, it is due to be built.

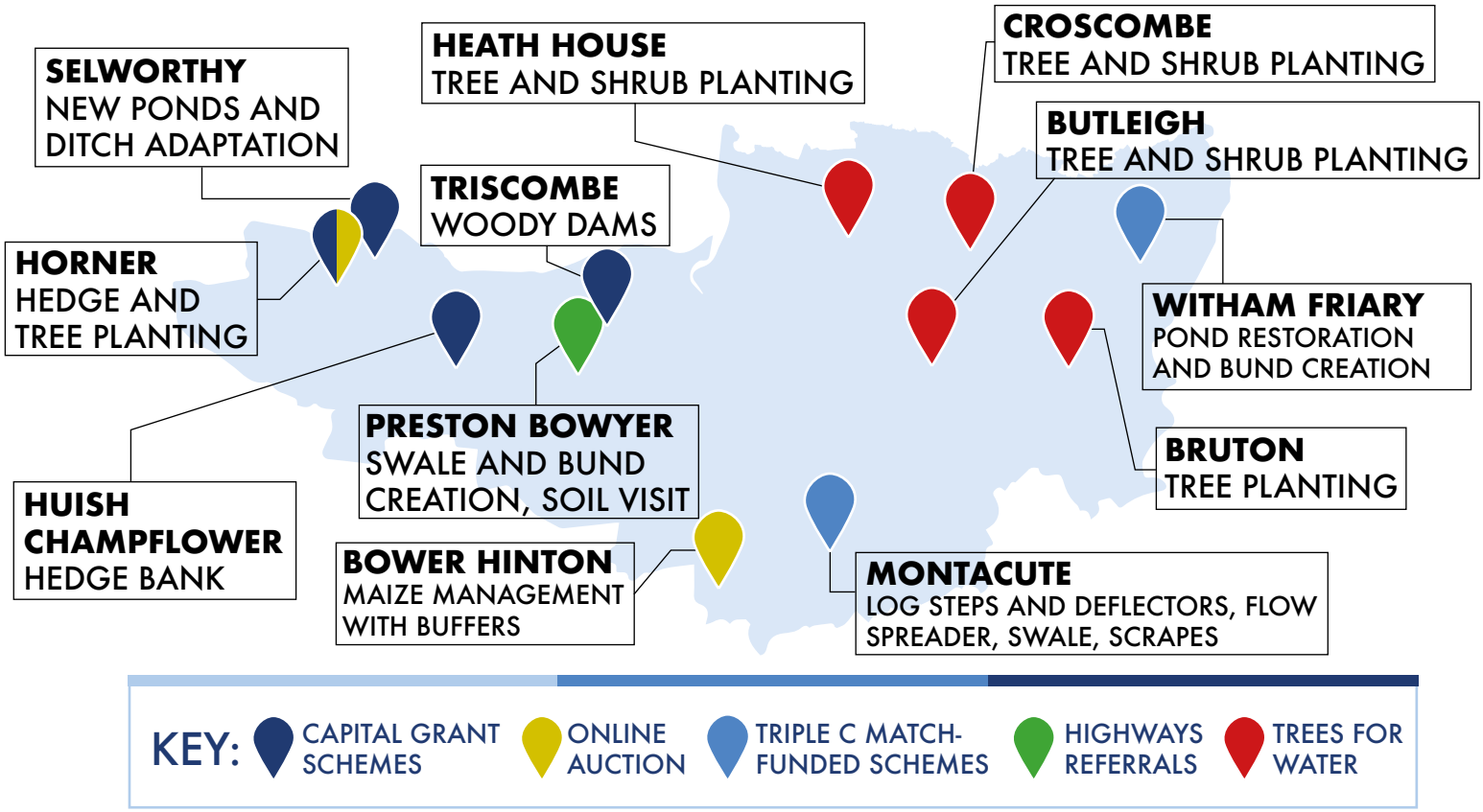
Used in combination with data from existing gauges at Chiselborough, Yeovil, Donyatt and Stathe, information from the new Langport flow station will benefit approximately 770 square kilometres (478 square miles), that is the catchment area above Langport for the Parrett, Isle and Yeo rivers and all of their tributaries.

Getting better information will allow for earlier and more flexible operation of key control structures on the River Parrett, River Sowy and King's Sedgemoor Drain. It will strengthen flood warning systems for local people and businesses, and help with the implementation of Water Level Management Plans. The Langport flow station will also complement the SRA's forthcoming moves to increase the capacity of the River Sowy and King's Sedgemoor Drain (see pages 12-13).

Artist's impression of flow station platform

W2 LAND MANAGEMENT INCLUDING NATURAL FLOOD MANAGEMENT (NFM)

2020-21 SUMMARY: 12 capital grant schemes, 6 Triple C schemes, 19 highways referrals, 3 soil visits, an online auction for natural flood management works which generated 119 successful bids, and 23 Trees for Water grant schemes. The map below shows a small selection of the various schemes undertaken.



Somerset Rivers Authority funds a huge range of natural flood management activities countywide. This workstream is led for the SRA by the Farming & Wildlife Advisory Group SouthWest. It is known for its sophistication, strong partnership working and dogged attention to local detail. Activities to Slow the Flow of water down through catchments generally go under the popular local branding of Hills to Levels. This makes it easier for partners to get involved and to contribute match-funding so that more can be achieved.

The SRA is one of several bodies that have funded Hills to Levels over the last five years, firstly using Growth Deal money from the Heart of the SW Local Enterprise Partnership and then money from council tax.

The three main strands of work are:

1. Capital grants given to farmers and landowners for Natural Flood Management projects that slow the flow of water and reduce flooding risks across the county.
2. 'Highways referrals' - that is, looking for answers to highway flooding problems in better management of land nearby.
3. Trees for Water grants given to landowners for small-scale localised planting schemes to reduce surface water run-off problems.

All this work aims to reduce the depth and duration of floods in Somerset; to diminish local flash flooding and flood risks; and to minimise sediment being washed from fields on to the banks of rivers. The benefits of this include less need for de-silting in lower catchments and less need for pumping to remove water on the Somerset Levels & Moors.

ONLINE NATURAL FLOOD MANAGEMENT (NFM) AUCTIONS

W2

In early 2020, Somerset farmers were invited to bid in an online auction for grants from Somerset Rivers Authority (SRA). Twenty farmers and landowners made 119 successful bids for works to help stop flooding. Works were carried out later in the year.

New for this year, farmers were offered a choice of up to seven different methods of natural flood management (NFM), following smaller online auction trials funded by the SRA and the Environment Agency in 2018 and 2019,

2020's choices included better maize management, grassland subsoiling and grassland slitting, and hedge planting. Better maize management was most popular.

The aim of all the measures is to help slow the flow of water, while delivering other benefits. For example, grassland subsoiling and slitting aerate the ground so that more rainwater can filter in. They also improve the soil.

The auctions are reverse auctions. In conventional auctions, bids go up until the highest one wins. In reverse auctions, the victors are those who submit lower bids.

To take part, farmers had to visit a website (www.naturebid.org.uk), choose one or more NFM methods, select areas of their land where they believed those methods would get the best flood prevention results, then bid for funding. The total available was £40,000.

After bids were checked by FWAG SW, grants from the SRA and Environment Agency were given to the best, most competitively-priced ideas. When works were completed, they were all inspected by FWAG SW advisers, to make sure they were done to a good standard.

The auction covered the length and breadth of Somerset, with two exceptions. As the main purpose of NFM activities in Somerset is to slow the flow of water down through the higher parts of river catchments, the website did not allow farmers to place bids for land in low-lying Internal Drainage Board areas, or in areas which drain out of the county.

NatureBid technology was developed by the Environment Agency with the Sylva Foundation at Oxford University. Following Somerset's initial trial in 2018, it is being increasingly used across the country.

Farmers say the system is quick and easy to use, with very little paperwork. Part of its appeal for all concerned is that it draws on farmers' and landowners' unrivalled knowledge of their own land.

2020-21 AUCTION ACTIVITIES

BETTER MAIZE MANAGEMENT

Water running off from compacted maize ground can contribute to localised flooding. Problems can be minimised by encouraging the infiltration of water through soil. Useful techniques include drilling and cultivating fields with a winter cereal or ryegrass, after maize has been harvested. Establishing green cover helps to intercept rainfall and protect the soil surface.

This year, to get the grants they bid for, farmers had to cut their maize before 1 October. This stipulation was introduced to allow for more time, after harvesting, for run-off reduction works to be carried out. If works are left too late, then the soil can simply become too wet for success.

Note that for ease of reading many separate auction bids have been amalgamated into total hectarages.

A couple of grand totals: grants were given for better maize management on 391.608 hectares (enough space to park just over 145,000 cars), and for grassland subsoiling and slitting on 123.356 hectares (enough space for about 45,700 cars).

Quantock Farm

Bower Hinton

Fiddington

Parrett catchment

Maize management: Quantock Farm, **North Petherton**, 36.319 hectares at Clavelshay, Petherton Stream and North Moor Main Drain; Finefarm Ltd, **Otterhampton**, 58.208 hectares, including fields at Beere Manor Farm (Fiddington Brook, Parrett), Wembdon (Cannington Brook and Parrett) and Bawdrip (King's Sedgemoor Drain – Henley Sluice to mouth); Haddon Farm, **Thurloxton**, 27.352 hectares, Petherton Stream.

Maize management and buffers on high risk crop: **Bower Hinton Farm**, 8.9 hectares of maize management, plus 0.39 hectares of buffers (four of 6 metres each) at the bottom of maize fields and a field used for growing potatoes, close to a watercourse in the Lopen Brook to River Isle catchment which feeds into the Parrett; Slough Court Farm, at several places including **Durston**, 40.68 hectares, Parrett catchment; **Stoke St Gregory**, 7.418 hectares, Parrett catchment; **Stathe**, 15.804 hectares, River Parrett, and **Huntham**, 3.757 hectares, plus a 0.196 hectare buffer at the bottom of a maize field here, along the watercourse (West Sedgemoor Main Drain).

Buffer strip on high-risk crop: Peadon Farm, **Fiddington**, 0.115 hectares, at the bottom of a maize field along a ditch that drains into Fiddington Brook, to slow run-off in the event of heavy winter rain.

ONLINE NATURAL FLOOD MANAGEMENT (NFM) AUCTIONS

Tone catchment

Maize management: Slough Court Farm, **Adsborough**, 24.342 hectares, River Tone downstream of Taunton; Woodram Farm, **Blagdon Hill**, 10.52 hectares, Sherford Stream; Quantock Farm, several locations: **Creech St Michael**, 22.523 hectares in fields south of Walford Cross, Tone downstream of Taunton; **West Monkton**, 16.878 hectares at Yalway, River Tone downstream of Taunton, Allen Brook (Maiden Brook); elsewhere in **West Monkton**, 22.71 hectares, Tone downstream of Taunton, Allen Brook (Maiden Brook).

Maize management and buffers on high-risk crop: Higher Chapel Leigh Farm **between Hoccombe and Chapel Leigh**, 13.261 hectares, Halse Water, and 0.139 hectares of buffer on the same farm; Cutliffe Farm, **Sherford and Orchard Portman**, 49.57 hectares, and 0.38 hectares of buffers, Sherford Stream and Broughton Brook.

Blagdon Hill

Frome catchment

Maize management: Sharpshaw Farm, **Nunney**, 29.595 hectares and 0.17 hectares of buffer on the same farm, Nunney Brook (source to confluence with Mells River).

Nunney

West Somerset streams

Maize management: **Crowcombe** estate near Lawford, Yeaw Farm, 3.771 hectares, Doniford Stream; **Old Cleeve Farm, Old Cleeve**, 43.494 hectares, including several fields close to the Washford to Bilbrook main road, Pill watercourse.

GRASSLAND SLITTING AND SUBSOILING

Grassland slitting: East Lydeard Farm, 48.504 hectares at **Bishops Lydeard and Cothelstone**, Back Stream and tributary of Back Stream, Tone catchment; Slough Court, 6.878 hectares at **Huntham and Stoke St Gregory**, West Sedgemoor Main Drain and River Parrett; Smokey Farm, 22.986 hectares near **Kingston St Mary**, tributary of Back Stream, Tone catchment; Prokters Farm, **West Monkton and Langaller**, 26.24 hectares, to alleviate shallow compaction, in turn improving water infiltration to increase water-holding capacity of soil and reduce run-off, River Tone downstream of Taunton.

East Lydeard Farm

Grassland subsoiling: Lower Cothay Farm, **between Greenham and Langford Budville**, 12.538 hectares, upper Tone catchment; Knights Farm, land near **Lydeard St Lawrence**, 6.21 hectares, Back Stream, Tone catchment.

ONLINE NATURAL FLOOD MANAGEMENT (NFM) AUCTIONS

Horner

HEDGE PLANTING

Hedges planted across slopes can interrupt flow pathways by acting as physical barriers to run-off. They can improve infiltration and uptake of water and reduce soil erosion as their roots help to bind soil. Earth banks provide even more of a physical barrier.

Hedge planting: Horner Farm, **Horner**, 446 metres in two fields with extra fencing for protection from deer and rabbits, catchment of River Aller.

Holywell Lake

Hedge planting on earth bank: Pinksmoor Farm, **Holywell Lake**, 84.6 metres in the corner of a field just outside Holywell Lake, complementing a previous hedge and bank installed with SRA funding from 2018's online auction. Both have helped to reduce road flooding. Upper Tone catchment.

CAPITAL GRANT SCHEMES BEGUN OR COMPLETED IN 2020-21

CAPITAL GRANT SCHEMES

Schemes begun or completed in 2020-21

There can often be a time-lag between grants for schemes being approved by the SRA and work being done at sites by contractors. The first scheme in this section is a good example of an endeavour which took some time to co-ordinate. All sorts of factors can generally affect timings, such as ground conditions (too wet, too dry…) or the availability of contractors. In 2020-21, coronavirus pandemic restrictions had an additional impact.

South Somerset

Curry Rivel, Northwing Nursery, River Yeo to West Sedgemoor Drain, catchment of River Parrett. A scheme to help reduce flood risks at Curry Rivel Primary School, which is situated just below the tellingly-named Water Street. During periods of heavy rain, run-off from an area of hardstanding at Northwing Nursery flowed down to Water Street through the nursery's gateway. Water from surrounding fields also soaked into boundary ditches which discharged into drains on Water Street. When too much of this run-off and ditch water reached the primary school, it could flood.

This scheme was therefore designed to reduce the amount of surface water reaching Water Street, and to slow the flow of water into Water Street's drains. It was not an easy scheme to put together, because of local drainage complexities.

Its completion for the SRA is the result of careful and determined co-operation between FWAG SW, farmers, landowners, Northwing Nursery, Curry Rivel Parish Council, Curry Rivel Primary School, local people and members of Somerset County Council's Highways Department and Flood Risk Management team.

A bunded floodwater attenuation area has been created to take excess rainfall running off from land uphill of the nursery, via a cleared ditch with new headwall and culvert, as well as run-off from the nursery's hardstanding area, which is diverted via a cross drain and a low embankment skirting the car park.

The floodwater attenuation area has two outlets plus a spillway. The lowest outlet is a gate valve which can be opened and closed as required. The secondary outlet sits higher and discharges water at a restricted rate when the bund is almost full. If the bund is inundated, the spillway directs excess flow back to the ditch.

Work was done to a very high standard by contractors from Ilminster. The SRA used Growth Deal money from the Heart of the South West Local Enterprise Partnership.

See also the Curry Woods Conservation Trust scheme on page 40.

CAPITAL GRANT SCHEMES BEGUN OR COMPLETED IN 2020-21

Misterton, Look Wood, headwaters of the River Parrett and Broad River. New woodland (0.18 hectares) has been planted close to Look Wood above Misterton, on the slopes of Knowle Hill. Look Wood sits at the start of a flow path that feeds into the headwaters of Broad River, which joins the Parrett near West Chinnock. After heavy rainfall a large amount of water runs down the road which borders Look Wood before entering a stream. Increased uptake of water from the soil through tree roots will help to slow the flow. New woodland will also help to reduce soil erosion by creating a rougher ground surface. Species chosen for planting were based on ones already present and self-seeding locally.

Queen Camel

Queen Camel, Camel Hill Farm, River Cary catchment. During the winter, several springs have long risen out of Pepper Hill Copse and run down through a field. Large uncontrolled flows of water have eroded soil and carried silt and nutrients into a ditch, which eventually feeds into the River Cary. The aim of this scheme was to help control this runoff. A low bund and swale have been created across the slope of the field, to divert water to a new bunded attenuation area, from where it can be released slowly in a more controlled way. Moves by the farmer to take the upper area of the field out of arable production, and grass it over, will further help to encourage infiltration and slow the flow.

Stoney Stoke

Stoney Stoke, Stokeford Farm, upper catchment of River Brue. Somerset Rivers Authority part-funded the planting of 11,035 trees, 4,800 shrubs and 1,795 metres of hedgerow, which will help to reduce runoff from this heavy clay farm down to the lane that goes from Stoney Stoke to Barrow and Charlton Musgrove, the B3081 Bruton to Wincanton road and the Bruton area. Other funding came from the Environment Agency, and the Woodland Trust donated a further 1210 trees and 5805 shrubs.

Tintinhull to Montacute Road (before)

Tatworth: A scheme led by Tatworth & Forton Parish Council to reduce run-off onto School Lane (home to Tatworth Primary School) from a very wet part of Jubilee Field. Jubilee Field is a 6.32 acre community amenity area designed for the use and enjoyment of local residents. Shallow swales with gently-sloping sides were created to help slow the flow of water into the watercourse that runs around part of the edge of the field, and three leaky woody dams were built in the watercourse.

Tintinhull to Montacute Road (after)

Tintinhull to Montacute Road, Mill Stream, Wellhams Brook, tributary of River Parrett. This scheme began life as a highways referral, because seasonal flooding led to vehicles getting stuck in deep water and the road being closed. FWAG SW, Somerset County Council's Highways Department, landowner James Pullen and Martock's flood warden co-ordinator Gordon Swindells have all been involved in the improvements now made. These consist chiefly of a new 48m^2 field gateway entrance designed to integrate better with the road's drainage system and reduce silty runoff from the field, two new slipways and two new headwalls.

CAPITAL GRANT SCHEMES BEGUN OR COMPLETED IN 2020-21

Somerset West and Taunton

Elworthy, Higher Vexford Farm, flow pathway at Hartrow Brake for small headwater stream for Halse Water. Two new hedge banks were created as a physical barrier to slow the flow of water. The banks were planted with native species and fenced for protection against rabbits. The hedges will help to enhance water uptake and improve infiltration. This scheme was part-funded by the SRA, with other money coming from the Environment Agency as part of the Two Valleys Natural Flood Management (NFM) project run around the Doniford and Monksilver streams near Williton in West Somerset by the Wildfowl & Wetlands Trust.

Selworthy before

Selworthy after

Horner, Horner Farm, 450 aspens and 450 willows planted between Horner and the popular Burrowhayes Farm Caravan and Camping site, to help reduce the amount of water reaching Horner Water in a catchment where water levels can rise quickly in response to heavy rain. Somerset Rivers Authority part-funded this scheme in support of the National Trust's major Porlock Vale Riverlands initiative on the 12,000-acre Holnicote estate in West Somerset. The other main funders were the National Trust and the EU's Interreg 2 Seas programme through a tie-in with Somerset's Co-Adapt programme (see page 56).

Huish Champflower, Scotts Hill Farm, upper Tone. A 55-metre hedge bank was created and planted with two staggered rows of native hedge plants. This new physical barrier slows the flow of water down a sloping field which is just above part of the upper River Tone. The hedge increases water uptake and improves infiltration.

Selworthy before

Selworthy after

Selworthy, National Trust's Holnicote estate, River Aller catchment. Ponds have been created to interrupt flow pathways and store water, and a ditch has been adapted to help develop a multi-channel flow, to allow for greater infiltration of water across a longer sward of grass. These works help to reduce run-off down slopes from Selworthy to the A39 and to slow the flow of water down through the catchment of the River Aller to places such as Allerford and Bossington. Natural flood management activities funded by Somerset Rivers Authority as part of the National Trust's major Riverlands project in Porlock Vale are also helping to create better habitats for wildlife.

CAPITAL GRANT SCHEMES BEGUN OR COMPLETED IN 2020-21

Thorne St Margaret, Rewe Farm, Upper Tone catchment. A 205-metre cross-slope hedge has been planted along a fenced boundary to reduce the risks of run-off down the slope from a neighbouring arable field.

Three sites near **Triscombe**, parish of West Bagborough: the Quantock Hills Area of Outstanding Natural Beauty (AONB) Service led work at three sites to slow the flow of run-off, reduce soil erosion, and trap sediment. This scheme complements earlier SRA-funded activities on the Quantocks, and helps to reduce flood risks lower down at West Bagborough.

1. At Aisholt Common, five woody dams were repaired and strengthened. Larger timber stakes were installed and larger tree limbs were placed in the dams to better slow the flow from overland run-off. These dams were originally among 15 funded by the SRA in 2017 using Growth Deal money from the Heart of the South West Local Enterprise Partnership. They were partly a reaction to three unusually intense, localised storms that raged near to West Bagborough, and over Aisholt Common and Great Wood, in May 2016. Around 1,200 tonnes of soil and gravel were washed down gullies, blocking roads and culverts which it then took weeks to clear.

2. At Black Hill, three new woody dams were installed along a ditch. Very sturdy, they make water back up behind them and so slow the flow.

3. In Rock Lane, four woody dams were created using local silver birch to reduce the flow of runoff and trap sediment.

TRIPLE C MATCH-FUNDED SCHEMES

The EU's Interreg 2 Seas programme has so far part-funded 34 Hills to Levels schemes through the Triple C initiative, which began in autumn 2017. Triple C was due to finish in December 2020 but has been extended until December 2021 because of the coronavirus pandemic. The three Cs stand for Climate resilient, Community-based and Catchment planning and management. The funding split has generally been EU 60%, Somerset Rivers Authority 40%. A video made in the summer of 2020, much of it in torrential rain, shows some Triple C highlights: see Hills to Levels – Triple C flood works in Somerset on YouTube (https://youtu.be/hA3N3O5XLdE)

Mendip

Witham Friary, Witham Park Farm, near Frome, Somerset Frome catchment. A pond has been restored, to provide a significant amount of winter water storage and so help slow the flow in a flashy catchment. A large amount of silt was taken out (at least one metre in depth) and 10 years' growth of scrub removed. The pond was not storing any water, because its bund had also been breached. A new, much more substantial bund (four or five metres wide) has been created and a leaky outlet installed for the gradual release of water. The bottom right photo was taken the day after heavy rain. They show the pond doing its job.

TRIPLE C MATCH-FUNDED SCHEMES BEGUN OR COMPLETED IN 2020-21

Somerset West and Taunton

Black Hill and Cothelstone Hill, Quantocks: A two-pronged scheme designed to reduce run-off along tracks classified as public footpaths. On Black Hill, water running off towards Crowcombe Combe Road was eroding the track as it travelled down, then depositing debris on the road below. Two stone grips were installed to direct water away from the track into adjacent fields, and to help reduce soil erosion along the track. Previously eroded parts of the track were infilled.

From the Cothelstone Hill track, water was running straight onto Cothelstone Road, again eroding the track, then causing road problems. Five stone grips were installed along the track to divert water into soakaways in a field, thereby reducing track erosion and lessening highway problems. Monitoring has shown the grips work well during downpours. All grips were constructed with local stone.

Meare Green: At one site a 200m^2 pond was restored, at another a ditch was cleared and 160 metres of stock-proof fencing installed. Monitoring has shown the pond now captures a substantial amount of water, and the fence prevents bank erosion by livestock, thereby helping to reduce the amount of sediment getting into the watercourse.

Thorne St Margaret, Rewe Farm, upper Tone catchment. A pond was created to temporarily store water from a nearby stream, which rises rapidly and makes downstream Bughole Lane prone to flooding. There are two levels in the pond. A small but deep central part was lined with puddling clay to create a more permanent area of water for wildlife: above that part, up to 70 centimetres of floodwater can be held. The local soil is Crediton Series Wetness Class 1, so freely draining, which means that water seeps in and out of the pond through infiltration. It is fenced to limit poaching by livestock.

South Somerset

Montacute, A sophisticated scheme along Mill Stream and on part of its floodplain, designed by FWAG SW in partnership with the National Trust, on land owned by the National Trust between Montacute House and the A3088 near Yeovil. Its main purpose is to help slow the flow of water down through part of the Wellhams Brook catchment, which feeds into the River Parrett, by re-naturalising the stream in several different ways, and storing more water for longer on its floodplain while also creating new habitats for wildlife. New features include:

- Shallower bank-side slopes with berms designed to help slow the flow of water, and create new marginal habitats
- Log deflectors made by hingeing trees into the watercourse and securing them with wooden stakes, to reduce bankside erosion and trap and accumulate sediment that would otherwise flow down towards Wellhams Brook
- Leaky woody dams to help slow the flow of water and trap and accumulate sediment
- Log steps made by fixing small logs up against the river bank, so that scour pools are created by overtopping water, and more water is stored upstream because of backing-up (a 'backwater effect' like a traffic jam caused by a hold-up)
- A flow spreader that stretches out from the stream onto the floodplain to encourage water to spill out from the channel
- An inlet swale (ditch) leading from the flow spreader to two big scrapes (ponds)
- Two scrapes in the floodplain with a surface area of 1,400m^2, linked by a swale so that one scrape fills after the other, both swales with shelved sides graded down to a depth of 1.2m.

TRIPLE C MATCH-FUNDED SCHEMES BEGUN OR COMPLETED IN 2020-21

New Montacute pond

Water flows back down to Mill Stream across the grass via a re-profiled shallower bankside slope.

The swales and top edges of the scrapes were covered in coir matting and re-seeded with a wetland wildflower mix, and fences were put up to protect against grazing livestock.

Special areas for wildlife include a backwater created as a place for spawning frogs, and as a refuge for fish during times of fast river flows.

Some trees were felled along the banks of the stream to allow for more light to help plants and creatures such as dragonflies.

Logs and brash from these trees, as well as earth excavated from the ponds and scrapes, were used to create two very large hiberniculas, to serve as shelters for reptiles, amphibians, birds, bees, small animals and insects.

In short, this site is a kind of compendium of natural flood management activities in Somerset.

Odcombe: During periods of heavy rain, water was overtopping the bund of a pond used for water storage in the Wellhams Brook catchment, and causing a bank to slump into a stream. An overflow pipe was therefore installed to divert excess water straight from the pond into the stream, to protect the bank from collapse and stop completely uncontrolled outward flows. Coir matting was also laid to further protect the bank.

Mendip

Chewton Mendip: Reports of slurry and muck spreading during heavy rain causing flooding and damage to highways, and run-off from maize ground. FWAG SW to visit.

Sedgemoor

Spaxton: Two FWAG SW advisers are investigating how silt and aggregates wash down from the upper catchment.

Somerset West and Taunton

A358 at Combe Florey: FWAG SW and Somerset County Council's Highways Department have been working together to find ways of fixing problems with flooding along this stretch of busy road. One big factor is the surface water run-off from nearby steep fields, which fills the road's drainage system with silt and then floods the road. In December 2020 a bank alongside the road got washed out. In the past, FWAG SW have visited the landowner and helped to set up a Countryside Stewardship agreement for planting grass and wildflowers which – when established – will help to stabilise the top soil and prevent some soil erosion. In 2021, the land management plans being discussed with the landowner are for a swale with silt traps at low points to slow the flow, with some water being away via cross-drains. In the SRA's Enhanced Programme of works for 2021-22, Somerset County Council's Highways Department also won funding for major road drainage improvements.

Carhampton: Following reports from residents to Somerset County Council's Flood Risk Management team of problems being caused by run-off from fields, a FWAG SW adviser made a soil husbandry visit to Court Place Farm, where possible mitigation options will be discussed.

Corfe: Somerset County Council's Flood Risk Management team asked FWAG SW to assess reports of excessive volumes of water running off from a field close to the centre of the village. No evidence of soil erosion or gullying was found, but as residents say they have to put out sandbags regularly, and photos show notable amounts of water on the road, a follow-up site visit is planned with a Highways officer.

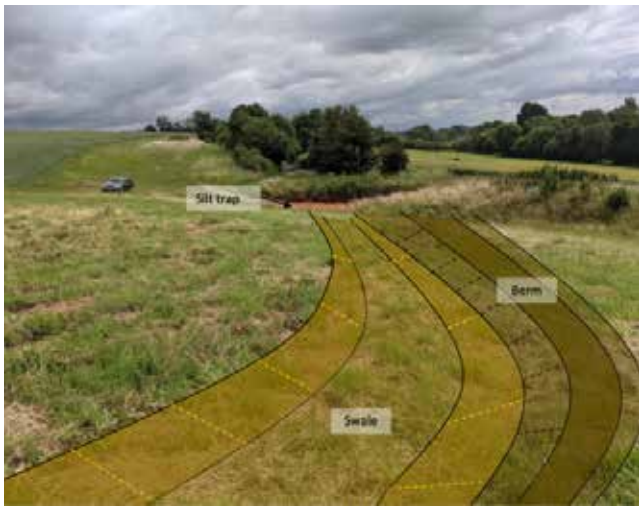
Kingston St Mary, Lodes Lane: Over the last 15 years, properties in Kingston St Mary have flooded at least 37 times because the drainage system coming down Lodes Lane could not cope with the volumes of water coming down from the Quantocks. The SRA's 2020-21 Enhanced Programme of works gave Somerset County Council's Highways Department funding for drainage improvements. The SRA also asked for field run-off to be looked at. Representatives from FWAG SW and the Highways Department duly walked Lodes Lane and found three areas showing obvious signs of field run-off. The aim is to reduce this.

Lower Holway: Two FWAG SW advisers walked along part of the Broughton Brook and a drainage ditch, following reports of flooding problems, and looked at some nearby fields. No land management problems were observed in the fields. However, it was recommended that the ditch should be cleared to ease the flow of water, that the Stoke Lane culvert junction should be de-silted and that an earth bank around a resident's garden, and driveway sandbags, would hold water back.

Stogursey: Problems with field run-off referred by the parish council are being followed up by FWAG SW.

HIGHWAYS REFERRALS

B3227 Wiveliscombe Road, Preston Bowyer: After the B3227 was blocked by a landslide caused by field run-off following heavy thunderstorms, a FWAG SW adviser visited Joyces Farm to assess possible land management changes. To help slow run-off and stabilise the bank at the side of the road, the farmer planted a hedge, at his own expense. Working to a FWAG SW design, the farmer also installed a swale to help direct more water to an existing silt-trap. Over the winter, FWAG SW made a soil husbandry visit and discussions about soil management are ongoing.



West Bagborough: Continuing issues with run-off from steep tracks. FWAG SW held discussions with Somerset County Council's Rights of Way section about one lane, along another track an adviser recommended surface-consolidation, cambering, flow spreaders and grips, and nearby cross-slope hedge bank creation.

Winsford, Furzehill Lane: The drainage system in this sunken lane was blocked with stones and soil, and FWAG SW were asked by Somerset County Council's Highways Department to assess a partially-collapsed bank and the field above. An adviser found no problems with the soil-structure in the field, but did observe a spring filling a pond, which can overflow across the field towards the collapsed bank. FWAG SW recommended natural flood management works to buffer excess water and thereby reduce its velocity, also clearing the road drains.

South Somerset

Compton Dundon: FWAG SW visited a site where two agricultural buildings were being constructed, following reports of water running off from land onto a road, and farm vehicles pushing in ditches. FWAG SW wrote to the landholder about the requirement to install soakaways (a condition of getting planning permission for the buildings). The landholder agreed to re-surface a track so that it could be scraped to reduce the amount of mud getting onto the road. FWAG SW will revisit when it is raining.

Curry Rivel, Northwing Nursery: A natural flood management scheme was completed in summer 2020, after a painstaking process of investigation and collaboration that began with concerns expressed by a Curry Rivel parish councillor about heavy flows from fields down through Northwing Nursery and along Water Street down to Curry Rivel Primary School. For more information, see page 28.

Maperton, North Cheriton Road: Following reports of run-off causing problems on North Cheriton Road, FWAG SW advised alleviating severely compacted soil in the headland of a large arable field. The landowner responded promptly with subsoiling and mole ploughing (a kind of field-draining technique). FWAG SW also suggested to Somerset County Council's South Somerset Area Highways Office that they should undertake roadside ditch clearance and cut grips in the verge to reduce the volumes of road surface water running down lane. Highways officers agreed.

HIGHWAYS REFERRALS

Middle Chinnock, Poop Hill: At the request of Somerset County Council's Highways Department, a FWAG SW adviser looked at different kinds of land use to see if any obvious factors could be spotted that might be contributing to run-off down Poop Hill and surface flooding in Middle Chinnock. Steeply sloping grassland was noted, along with a field that had recently been deeply ploughed and inverted close to hedges and trees. It was judged that this turning-over should improve the infiltration of water into the soil, although the Highways Department was advised that it would be worth keeping an eye out for possible problems with sediment.

Milborne Port, Oborne Road and Three Arch Bridge: FWAG SW to investigate whether land management changes could help to resolve a track flooding problem, referred by Network Rail via Somerset County Council's Highways Department.

Misterton, Cathole Bridge Rd: Reports from Misterton Parish Council via Somerset County Council's Highways Department of severe run-off from a field. The Highways Department has jetted drains, but the road still floods. A FWAG SW adviser met a local highways officer on site, and together they found that soil was dense and compacted, although it had recently been cultivated and drilled. It was agreed that subsoiling should be suggested to the farmer, along with the creation of a scrape and bund in the corner of the field where water flows out.

Misterton, Station Road: Somerset County Council's Highways Department was concerned about field run-off causing road and property flooding. One local resident, in particular, was affected, as their home is on a flow pathway. A FWAG SW adviser met this resident and had helpful discussions with the local farmer. The resident has now dug out a blind ditch with a small earth bank on the garden-field boundary.

Tintinhull to Montacute Road: Surface water runoff from fields was contributing to localised flooding. FWAG SW worked with local flood wardens co-ordinator Gordon Swindells, Somerset County Council's Highways department, and the landowner and designed a scheme completed in March 2021. It including resurfacing the gateway entrance, and installing concrete slipways and headwalls to help protect underground culvert pipes and reduce the volumes of run-off reaching the road. For more information, see page 29.

SOIL VISITS

Better soil husbandry helps to reduce the run-off of surface water. Keeping soil in good health also brings obvious benefits to farmers.

The coronavirus pandemic limited opportunities for soil visits in 2020-21. Three were made, two as part of highways referrals – see Carhampton on page 35 and the B3227 Preston Bowyer landslip on page 36. Also:

Glebe Farm, Cheddon Fitzpaine: Blocked drains mean that a relief pipe is having to take all of the surface water from fields to the north of the village. This pipe cannot cope, causing flooding. The fields have been drilled with species-rich grassland, but a FWAG SW adviser found run-off was persisting down one headland. A series of swales and leaky ponds has been suggested as a way of reducing flood risks. Options are being considered.

TREES FOR WATER

TREES FOR WATER

An action fund designed to help communities reduce flooding problems caused by surface water run-off. The project is run by Reimagining the Levels in collaboration with the Farming & Wildlife Advisory Group SouthWest (FWAG SW). It is funded by the SRA, and was backed by the Woodland Trust in 2020-21 with 12,000 free trees and shrubs. Despite the challenges of the coronavirus pandemic, the project had a successful year. Enthusiastic volunteers regularly turned out for socially-distanced planting sessions, at 23 places. In total they dug in 3,645 trees and 2,638 shrubs.

Trees for Water is particularly designed to suit strategically important sites not large enough for Countryside Stewardship grants and not special enough in conservation terms to concern Natural England. It is meant to be flexible, bespoke and un-bureaucratic.

In March 2021 the SRA Board approved more funding to enable the project to continue. In 2020-21 Trees for Water mostly targeted Mendip and South Somerset district council areas. In 2021-22 it is planned to include more sites in Somerset West and Taunton, and Sedgemoor.

Mendip

Butleigh, Wyld Lea, 194 trees and 106 shrubs planted at the top of a sloping field on the outskirts of Butleigh, combined with 40 metres of cross-slope hedge planting, to help slow the flow of water into a stream that feeds into the River Brue, and to help restore structure and health to damaged soil, and to provide wildlife habitat.

Croscombe, 122 trees, 178 shrubs, planted in an acre of steep land near Hillview Cottage, with 75m of fencing, to extend some existing woodland along the hillside. The site is above an area that regularly floods in the centre of Croscombe, so the aim is to help reduce run-off down to the village and the River Sheppey.


Croscombe


North Wootton

North Wootton, Folly Lodge, 56 trees, 64 shrubs, to slow the flow of water down from farmland onto Pilton Hill Road, which is susceptible to localised flooding, and also down into the rhynes and ditches east of Glastonbury, which join the River Brue.

Wanstrow, 83 trees, 62 shrubs, planted in a field with compressed clayey soil that was, until recently, regularly sown with Italian rye grass using heavy machinery, so the level of surface water run-off was described by the parish council as “very high”. The aim of two new woodland areas is to reduce the flow of water into a stream which flows through Wanstrow, where restrictions at two small bridges cause flooding after heavy rain, and then goes onto Nunney, identified by Mendip District Council as an area needing natural flood management activities to reduce flood risks.

Sedgemoor

Heath House hamlet near Wedmore, 170 trees, 100 shrubs, planted in a field which slopes quite steeply down to Landsend Fishery on the edge of Tealham and Tadham Moors, to help slow the flow of water down to a complex system of drains and rhynes feeding into the River Brue a mile south.

Huckham, 90 trees, 60 shrubs, 110 metres of fencing, along the contours of a steep slope that drops down to Butleigh Moor, to help reduce run-off into Sutton Rhyne and other ditches and rhynes, that eventually feed into the River Cary.

Somerset West and Taunton

Between Knapp and Ham, Knapp Lane, 30 trees, 30 shrubs, 30m of hedge planting, with 110m of stock proof fencing, to help slow the flow of water into a watercourse which joins the River Tone near Ham Weir, and to help reduce the risks of local road flooding.

Haymoor, 730 trees, 390 shrubs, 630m of stock proof fencing, on 3.5 steeply sloping acres of the North Curry ridge, right above Haymoor, which is part of the floodplain of the River Tone a few fields to the north. Woodland on ridges separating moors is a characteristic feature of the Somerset Levels and Moors.

Newport, land near Withy Cottage, 29 trees, 29 shrubs, 36m of fencing, to help reduce run-off along the road to North Curry, and into two watercourses which feed into West Sedgemoor and the River Parrett at Stathe.

Newport Hill, The Farmhouse, 20 trees, 30 shrubs, 90m of hedge planting, to help reduce run-off from a large field into the stream which becomes Sedgemoor Old Rhyne and eventually flows into the River Parrett. The A378 main road from North Curry to Langport is susceptible to flooding where this stream goes under the road at Newport, and further down near St Giles Kennels.

South Somerset

Barrow Hill, near Milborne Wick, 175 trees, 185 shrubs, planted in five different areas with 330 metres of fencing, on both sides of the main Exeter to London railway line, which goes south-west – north-east through the middle of the land on a high embankment. The River Gascoigne runs along the south/south-west boundary of the land, under the railway line and on to its confluence with the River Yeo near Sherborne Lake. At Barrow Hill the Gascoigne rises fast during periods of heavy rain as water flows down from several places, including Stout Hill, Charlton Horethorne and the spring at Bradley Head. Planting trees and shrubs here was the first phase of a two-stage plan to reduce local flood risks in this catchment, improve water quality, and benefit wildlife.

Bruton, Coombe Farm, 35 trees, 80 shrubs, planted in a valley on the northern outskirts of the town, to help slow the flow of water into Coombe Brooke which joins the River Brue, and to diversify and extend existing woodland sadly prone to ash dieback.

TREES FOR WATER

Bruton, Tolbury Lane, 45 trees, 35 shrubs, planted in a three-acre field on the north-west outskirts of the town to help reduce run-off into Coombe Brook, which joins the River Brue in the centre of Bruton, and also to help alleviate a local road flooding problem.

Chaffcombe, 50 trees, 50 shrubs, planted in a small basin-shaped valley sloping westwards below Windwhistle ridge, to help reduce run-off down towards Chaffcombe, where roads flood, and into a tributary of the River Isle and then the River Parrett.

Compton Dundon, Bartletts Farm, 70 trees, 50 shrubs, 30m of hedge planting with four hedgerow trees, 250m of stock proof fencing, to increase infiltration and help reduce run-off from the lower slopes of Lollover Hill, on the edge of Compton Dundon and King's Sedgemoor.

Curry Rivel, 268 trees, 132 shrubs, planted on land owned by the charitable Curry Woods Conservation Trust at the highest point of Curry Rivel parish, known locally as the 'continental divide' of South Somerset, because water runs off in two directions. To the south, into the Water Street catchment: to the north, into West Sedgemoor. The Water Street area of Curry Rivel once had a series of medieval ponds. These have been drained. It now has various buildings including a primary school. In the last decade, the school has flooded twice, with repairs costing more than £20,000 each time.

Curry Rivel Primary School children visit Curry Woods

The Curry Woods Conservation Trust was launched in 2019 to buy land at the top of the Water Street catchment, partly so that moves could be taken to slow the flow of water from its source. More planting is expected in an area of former arable land after this year's start through Trees for Water.

Curry Rivel Parish Council also worked with FWAG SW on the Water Street scheme described on page 28. This scheme has reduced – but not removed – flood risks.

Huish Episcopi, sloping land off the B3153 on the eastern outskirts of the village, 116 trees, 64 shrubs, 0.6 acres of planting to help slow the flow of water down to two properties and to Wagg Rhyne and then Long Sutton Catchwater and the River Parrett.

TREES FOR WATER

Long Sutton, Landmoor Lane

Long Sutton, Landmoor Lane, 627 trees, 348 shrubs, planted in two parts of a long field on Land Moor quite close to the River Yeo, to slow the flow of water into Long Sutton Catchwater and then the River Parrett at Langport.

Long Sutton, Twelve Acre Farm, 150 trees, 115 shrubs, contoured across the centre of two sloping fields, and 125m of hedge, along the lower edge of a field, to help slow the flow of water into a stream which joins Mill Stream at Knole, thence King's Moor Drain, the River Yeo and finally the River Parrett. The planting is helping to reduce run-off onto roads, and the woodland strip also serves as a shelter belt for crops.

Martock Recreation Ground, 160 trees, 140 shrubs, planted in land owned by Martock Parish Council, to reduce run-off into Western Brook, then Hurst Brook, in the catchment of the River Parrett, and lessen flood risks locally and further downstream.

Pitney, Glebe Farm, a total of 130 trees, 70 shrubs, 54m of hedge, 200m of stock proof fencing, at two sites, one near Westerngate Road to reduce run-off and soil erosion into ditches and to the road, the other across the middle of a field nearer the farm buildings, to reduce run-off and soil erosion.

Pitney, near Park Lane, 450 trees, 250 shrubs, 220m of stock proof fencing, in a strip curved along a slope below some ancient woodland, to help reduce the amount of water flowing down the hill to Park Lane which periodically floods, and down towards the rhynes and ditches that feed into the River Cary half a mile away.

Sparkford, 145 trees, 70 shrubs, planted as linear woodland to help slow the flow of rainwater down from land that slopes south-east towards the River Camel upstream of Queen Camel, which has a history of flooding.

W3 URBAN WATER MANAGEMENT

2020-21 SUMMARY: Work continued on the production of Somerset-specific guidance for high quality Sustainable Drainage Systems (SuDS), following the earlier publication of a major SRA review of SuDS across Somerset. Also drawing on lessons from the SuDS review, SuDS have been inspected while sites are being built. Tree pits were installed at Coal Orchard in Taunton. Flood risk reduction works began in Rode.

The main aims of Somerset Rivers Authority's Urban Water Management workstream are to reduce local flood risks, and to make places better to live and work. The focus is largely on Sustainable Drainage Systems, known as SuDS.

When it rains, SuDS help to control the run-off of water from hard surfaces like roads, roofs and pavements. SuDS use techniques inspired by nature – such as permeable paving and plants and ponds – to absorb water and hold it back. SuDS can make places greener and more attractive, healthier for people and better for wildlife, with less pollution.

Somerset Rivers Authority (SRA) wants to see more high-quality SuDS created on new developments and retro-fitted where possible at existing sites. Methods used include encouragement, inspection and demonstration.

SOMERSET AND SUSTAINABLE DRAINAGE SYSTEMS (SuDS)

*Across Somerset, attenuation basins and underground storage facilities (*pictured above and left*) are often used to hold water, but local SuDS could do much more. Well-designed SuDS should look, feel and operate like natural features within a landscape, and they should be easy and safe to maintain. A lot could be improved if people considered – and committed themselves to – integrating SuDS from the very earliest stages of site design. New SRA-funded SuDS guidance will help people to create well-designed schemes by outlining clear local requirements, promoting early engagement, and emphasising the multi-functional benefits that can be achieved.*

ACTIVITIES IN 2020-21

SuDS GUIDANCE

Somerset-specific guidance on Sustainable Drainage Systems (SuDS) has been produced to encourage the creation of high quality, multi-benefit, integrated SuDS at new sites across the county. This project was led for Somerset Rivers Authority by Somerset County Council using contractors JBA Consulting. Work in 2020-21 centred on the preparation of draft Somerset Local Standards for new housing developments, commercial properties and community facilities. New developments must not increase flood risks. They must also prepare for future climate change.

The Somerset Local Standards draw upon problems identified and lessons learned through the SRA-funded Somerset SuDS Review. Between 2016 and 2018, 20 recently-built sites were inspected for the SRA by the county council, working closely with SRA partners and contractors JBA Consulting. Sites included big housing estates, retirement apartments, industrial units and offices, an arts centre, and a hotel and pub. In total, 438 elements of 113 SuDS features were inspected.

The Somerset SuDS Review found that developers focus predominantly on matters concerning amounts of water, that is on water quantity. There was little evidence of developers actively considering water quality, biodiversity and amenity in their designs. Amenity means features such as paths for walking around SuDS or play areas making imaginative use of rainwater. Some sites had missed opportunities.

More could be done across Somerset to use SuDS to their full potential. The new Somerset Local Standards cover six main issues. These are:

- water quantity
- water quality
- biodiversity
- climate change
- amenity, health and safety
- maintenance and construction

The Standards set out key principles and specify requirements. A technical example: the Lead Local Flood Authority (Somerset County Council) will “strongly resist” the use of deep bore soakaways as opposed to shallow infiltration SuDS techniques such as swales, basins, raingardens, shallow soakaways and permeable paving. This is because “deep bore soakaways are not an acceptable infiltration SuDS technique. They do not represent a natural drainage process and do not deliver the multiple benefits of SuDS”.

A long-term example: the question of who maintains SuDS has long concerned the SRA Board and the public. The Somerset Local Standards call for the production of a full maintenance and operation management plan for the entire life of a development. They state that records of all maintenance activities, including repairs and replacements, should be retained for as long as a development exists, because such records may help with statutory Flood Investigations. Developers should also explain how the operation and maintenance of SuDS will be affected by climate change over the lifetime of a development and how any impacts will be minimised. Wherever possible, SuDS should contribute to the aims and objectives for climate change mitigation and adaptation set out in the Somerset Climate Strategy Framework.

A community example: the Standards say that SuDS should be integrated as part of local landscapes and made accessible to people. Residents should be able to meet each other, play, exercise and enjoy nature. In practice this means creating more imaginative public spaces such as car parks and recreation areas. It means offering people chances to boost their health and wellbeing through features such as paths for walking around SuDS and play areas that make use of rainwater.

The Somerset Local Standards are due to be published by autumn 2021. As local government in Somerset may be reorganised, with one or two unitary councils being created, instead of the current county council and four district councils, the Standards' formal adoption as supplementary planning guidance will be postponed until matters become more settled. The SRA and its partners also want to allow some time for people to work with the Standards as a kind of final prototype, to see if any elements could usefully be refined.

A comprehensive Somerset SuDS website is being created. Four main groups of users are envisaged: property developers, scheme designers, council planners and local communities. Subjects covered include different elements of SuDS; a detailed guide to the planning process for different kinds of developments, including the important pre-application stage; design standards, design challenges, and local design considerations (with special attention paid to Internal Drainage Boards, different districts, and Exmoor National Park Authority); plus case studies, construction, inspection, operation and maintenance. A section for residents describes how homeowners can play a role a role in bringing SuDS to Somerset, by, for example, replacing paved surfaces with ones which allow water to soak through.

Also following on from the Somerset SuDS Review, which noted some inadequate site management practices and site defects, an SRA-funded **SuDS Inspections** service has allowed local councils to check developments while they are being built. This service is led for the SRA by Somerset County Council's Flood Risk Management team, working closely with district council planners and experts seconded from the county council's Highways Department.

Very few formal SuDS inspection processes are in place across England: Somerset is at the forefront.

Sites are inspected at various points, either through proactive engagement with developers, or by following up notifications from local planning authorities. The aim is to ensure that SuDS are built and work as they were designed and approved through the planning process. Local planning authorities have the power to enforce changes to constructed SuDS schemes, if need be. SuDS inspectors check schemes for compliance against 16 different criteria. Scores are generally best for water quantity, design requirements, health and safety, and system blockages. They are more middling for water quality and structural components, and they are lower for biodiversity, materials, vegetation and future maintenance arrangements.

Developments recently inspected have been in the Taunton area, Beckington, Crewkerne, Ilton and North Petherton.

Between 2016 and 2020, the SRA part-funded Somerset County Council's involvement in the EU-backed Interreg 2 Seas **Somerset Sponge 2020** project. The county council was one of nine project partners based across the UK, the Netherlands and Belgium. Another was Westcountry Rivers Trust. The council and the Rivers Trust focused on Taunton.

URBAN WATER MANAGEMENT ACTIVITIES FOR 2020-21

Tree pits

The aim of Sponge2020 was to encourage 'innovative participatory adaptation solutions to reduce the risks of and damage from urban flooding... at considerably lower costs'. Given Taunton's designation as a Garden Town, the county council collaborated with Somerset West and Taunton Council on the design and construction of additional SuDS at the Coal Orchard riverside redevelopment site. In 2020, GreenBlue Urban tree pits were installed to bring water storage and water quality benefits. Tree pits protect trees' roots and help them to become established and grow. Good quality mature trees will be put into the pits as late as possible to minimise the risks of them suffering any damage from nearby building works. The trees will enhance the regeneration of this high-profile town centre site.

Eastwick Road in Taunton is being considered for a **Highway SuDS Retrofit Trial**. The planted chicanes or the grassed area at the bottom of the hill could show how some simple SUDS can deal with surface water and deliver more benefits than traditional drainage schemes. The project is being led for the SRA by the County Council's Flood Risk Management Team working in partnership with the Highways Department. Design is scheduled for 2021-22, construction 2022-23.

In March 2020, the SRA Board approved funding for a package of **flood risk reduction works in Rode** near Frome. This project came out of an earlier SRA-funded programme of investigations into sub-catchments across Mendip that would benefit from Enhanced Maintenance. A first burst of activities in 2020-21 included extensive surveys of the drainage network, including jetting of the system to remove blockages, sediment and built-up limescale from culverts. Partnership working meant that while roads were closed for this work, five manhole covers were replaced by Wessex Water, four on the High Street and one at the bottom of Church Street.

The parish council wrote to thank Mendip's Flood Risk Consultants Calm Engineering and contractors Dando: "The work itself was very well organised, with excellent communication to residents, and frequent, helpful updates."

The full project is expected to reduce flood risks to more than 25 properties and nine roads in Rode. It will also enhance parts of the local environment, through techniques of natural flood management, with the potential to provide outdoor educational opportunities at the village school.

W4 RESILIENT INFRASTRUCTURE

2020-21 SUMMARY: Extra maintenance works across Somerset to reduce flood risks to roads and nearby properties, including drain jetting and de-silting of structures, and upgrades in Bruton, Kingston St Mary and North Petherton. New silt traps at Barrington. Ongoing study of the catchment around the A38 Blackbird Bends near Wellington. Progress with schemes at Carhampton and Chadmead.

Two of the six main objectives in Somerset's 20 Year Flood Action Plan relate directly to making Somerset's infrastructure more resilient. One is to 'Maintain access for communities and business', another is to 'Ensure strategic road and rail connectivity, both within Somerset and through the county to the South West peninsula'.

Both these targets stem from the frustrations of 2013-14, when floods closed 81 roads, often for long periods. Countless people suffered difficulties. Businesses lost time and money. 86% of Somerset businesses were badly hit, costing the local economy up to £15 million.

As it oversees the Flood Action Plan, Somerset Rivers Authority therefore deals with highways as well as waterways. Many places susceptible to local road flooding benefit from extra maintenance works funded by the SRA, and drainage upgrades that make a difference locally. Bigger projects tackle long-running problems, for example on the A39 through Carhampton.

SRA studies provide new insights into flooding problems, for example in the catchment upstream of Blackbird Bends on the A38 near Wellington. This is one of the busiest roads in Somerset and one prone to flooding.

ACTIVITIES IN 2020-21

ENHANCED MAINTENANCE OF HIGHWAYS AND STRUCTURES

Drain jetting: 209 places benefitted in 2020-21; 45 in Mendip, 47 in Sedgemoor, 62 in Somerset West and Taunton, and 55 in South Somerset. Under existing budgets, Somerset County Council's Highways Department can only afford to jet drains when a bad blockage has occurred. SRA funding allows for earlier preventative maintenance at locations known to suffer problems with flooding. Final selections of drains for jetting are made using local knowledge and professional judgement.

Asset upgrades at frequently jetted sites: Works were carried out in 2020-21 at two locations, both in Dropping Lane, Bruton (the B3081), a busy road because of the popular Hauser & Wirth Somerset art gallery. Since 2016, SRA funding has allowed for extra pro-active drain jetting at many places, as outlined in the previous paragraph (209 places in 2020-21). Some drains have had to be jetted many times, which indicates intrinsic problems that it makes sense to fix. Hence SRA-funded asset upgrades.

RESILIENT INFRASTRUCTURE ACTIVITIES FOR 2020-21

De-silting of structures: Works were carried out in 2020-21 at seven locations.

Mendip: **Croscombe**, where the River Sheppey goes under the Back Lane-A371 junction, near the primary school; **Laverley**, where a watercourse goes under Mead Lane near the Apple Tree Inn's car park, just off the A361 between West Pennard and Pilton; **Stoke Bottom**, where Mells Stream goes under Limekiln Lane, down the hill from Fairy Cave Quarry.

Sedgemoor: **Cheddar**, work began on a culverted watercourse which goes under Labourham Way off the A371; **Chilton Trinity**, where Reedmoor Rhyne goes under Saltlands Lane, between the A39 and the sewage works.

Somerset West and Taunton: **Bishops Lydeard**, where Back Stream goes under the Mount Street crossroads near the entrances to the Quantock Vale Surgery, and the Village Hall and Recreation Ground; **Stringston**, where a tributary of Bayley's Brook rises near Stringston Farm.

NEW SILT TRAPS

Barrington: A new silt trap has been installed in Barrington, as part of a series of moves by Somerset Rivers Authority to reduce flood risks in the village. Around 25 properties and many local road users will benefit.

The silt trap is towards the bottom of Bonnings Lane. It captures sediments which could otherwise clog the local highways drainage system. Somerset County Council's Highways Department delivered this scheme for the SRA.

The silt trap complements other measures part-funded by the SRA to slow the flow of water down from fields above Bonnings Lane. In recent years 300 trees and 318 metres of hedge have been planted, in three schemes put together for the SRA by the Farming & Wildlife Advisory Group SouthWest and the landowner. The SRA paid 75% of the costs of these three schemes, the landowner 25%.

Crimchard, Chard: Two silt traps were installed along Catchgate Lane and one in Laurel Gardens. Around 60 properties and local road users will benefit. This scheme began life as a highways referral, following reports of considerable amounts of surface water and debris running off from farmland.

At both Barrington and Crimchard, the case for improvements was bolstered by service requests on Somerset County Council's highways maintenance system, and local knowledge from town and parish councillors and the county council's area highways office. The county council's Highways Department has stressed to the SRA the importance of town and parish councils, and residents, going through the proper procedures for reporting road flooding problems. See https://www.somerset.gov.uk/waste-planning-and-land/flooding-information/

RESILIENT INFRASTRUCTURE ACTIVITIES FOR 2020-21

BRIEF UPDATES

Culvert inspections and remedial works in Internal Drainage Board (IDB) areas: The main aims of this ongoing project are to improve the conveyance of water and to help prevent disruption to residents and road users. Designs for the replacement of two culverts have been prepared, one at Puriton Road in West Huntspill, the other at Northwick Road in Mark.

These works were put on hold in 2020-21 because of uncertainties about coronavirus pandemic restrictions. Both jobs required roads to be closed. It was judged unwise to proceed, because if pandemic restrictions were suddenly intensified or the contractor's workforce became infected with coronavirus, there was a risk of the culvert works not being completed and problems ensuing.

Both schemes are now expected to go ahead in 2021-22.

Carhampton: In March 2020, the SRA Board approved funding for a two-year, two-phase scheme to reduce flood risks at the A39 Carhampton Cross and down along Eastbury Road.

The A39 through Carhampton is the main route in and out of West Somerset but it floods regularly to a depth that can make it impassable. Eastbury Road in Carhampton is part of the secondary route for people travelling between places such as Bridgwater, Taunton and Williton and Dunster, Minehead and Exmoor. Eastbury Road floods along with the A39, because water running off private land overwhelms existing drainage systems. Several properties are also affected by flooding.

Eastbury Road

In 2020-21, phase one, Somerset County Council's Highways Department completed a topographical survey and CCTV drainage surveys of the A39, Hill Lane, Vicarage Road and Eastbury Road. This information has been used by Milestone (formerly Skanska) to help draw up detailed designs for improvements. Phase two, delivery, is currently expected to begin in mid-October 2021.

In 2020-21, the county council's highways department also organised a CCTV survey of Meadowside in Carhampton, on behalf of Somerset West and Taunton Council, which has a different but now interlinked SRA grant for drainage improvements in the village.

As part of the SRA's remit to encourage and enable partnership working, the Highways Department has also been collaborating with Somerset County Council's Flood Risk Management team about the issue of run-off from farmland (see page 35), as this could be affected by the main Carhampton scheme.

RESILIENT INFRASTRUCTURE ACTIVITIES FOR 2020-21

Chadmead: Somerset County Council's Rights of Way Department asked the SRA for a one-off grant for fixing an unstable section of the bank of Bankland Stream, where it runs alongside part of the track that connects Northmoor Corner and Kitches Lane in Chadmead. The SRA approved this request, because although the track is classified as a public footpath, it has previously been used, and may be used in future, as a vehicular access route to and from Chadmead in times of flood. The owners of adjoining land have been consulted, a scheme specification has been prepared, and it is hoped to complete works by the end of August 2021.

Kingston St Mary: In March 2020, the SRA Board agreed to fund the bulk of the cost of drainage improvements down Lodes Lane in Kingston St Mary. In recent years, properties in the village have flooded many times because the Lodes Lane drainage system could not cope with the large amounts of water coming down from the Quantocks. In 2020-21, Somerset County Council's Highways Department made – and paid for – the necessary preparations, including clearance, jetting, and CCTV surveying of the lane's drainage system; identification of buried services; detailed design and specification; pre-works licences and temporary road closure orders. Drainage improvements then took place in April 2021. See also the W2 Highways Referrals section, page 35.

Martock: For the SRA, Somerset County Council's Highways Department has been working on the development of a flood detection and warning system for Stoke Road in Martock. Stoke Road is vulnerable to flooding between Martock and the A303. A sign displaying real-time alerts to road users would promote safety, particularly at night.

Posts and a source of power are needed to support the flood detection and warning system. A suitable site is being sought. Matters are complicated because in the best spots the verge is already congested with other infrastructure and underground utilities. The Highways Department has been working with Martock Parish Council to find an answer.

North Petherton: Where the Petherton Stream runs alongside part of Watery Lane, Sedgemoor District Council used SRA funding to replace two concrete bank plinths abutting a shallow silt trap. The edges of the silt trap were also replaced. Because the old plinths were undermined, they were putting at risk the foundations of two walls. The short wall between the stream and the road was partly rebuilt.

West Camel: In March 2020, the SRA Board approved funding for a Somerset County Council Highways Department proposal for drainage improvements in the Urgashay Road area of West Camel. Seven properties there have been affected by surface water flooding. Drain jetting and a CCTV survey have been carried out, and a scheme largely designed, but it has not yet been decided whether to incorporate West Camel Parish Council's suggestion of an additional ditch outfall to the River Cam. At the time of writing, the results of investigations into this possibility are awaited.

STUDIES AND INVESTIGATIONS

A38 Blackbird Bends flood alleviation study

The Blackbird Bends section of the A38 is about half a mile north-east of Chelston, between Wellington and Taunton. Flooding in this area has centred around the Hockholler Bridge. It has fairly often closed one lane of the A38, sometimes both. As the A38 is a busy road, and is used for diverted traffic if the M5 is closed, it is important to keep the road open.

On behalf of the SRA, in 2019 Somerset County Council's Highways commissioners engaged WSP as consultants to investigate ways of reducing flood risks. It was originally suspected that the infrastructure in place for taking water under the road – the main Hockholler Bridge and two secondary culverts – would prove to be inadequate. In fact the problem has turned out to be less straightforward.

Hockholler Bridge is immediately downstream of the confluence of Haywards Water and Hockholler Stream. WSP collected data about these watercourses and the local area from the Environment Agency, Wessex Water, Skanska and Somerset County Council's historic flood records, CCTV surveys and Ordnance Survey mapping.

In May 2020 a site visit was made to survey local structures, and new modelling was produced. The modelling showed that there should be enough capacity in the system to prevent the kind of annual flooding that has been occurring. But the survey also found that in practice the system's capacity was restricted, predominantly by silting-up in Haywards Water and at the downstream side of the bridge. It was deduced that silting-up was the main reason why, during periods of heavy rain, a significant amount of water had not been going under the A38 but overtopping it instead and causing flooding.

What was then less straightforward was trying to establish the cause of the silting-up. The silting-up observed was surprising because the system had recently been cleaned out. Subsequent investigations found that silt was building up and not being washed away because of slow channel flow rates. These slow rates of flow could in their turn have several different interlinked causes and possible solutions.

Next steps are now being considered by the SRA and partners.

RESILIENT INFRASTRUCTURE ACTIVITIES FOR 2020-21

STUDIES IN BRIEF

Beckington: Extensive investigations were carried out in 2019-20 into flooding problems in the historic village of Beckington near Frome. Investigations were led for the SRA by Mendip District Council working in collaboration with Wessex Water, Somerset County Council's Highways Department and the Farming & Wildlife Advisory Group SouthWest (FWAG SW). As described in last year's SRA annual report, partners and contractors surveyed land, watercourses, roads and drainage systems.

In 2020-21 Mendip's Flood Risk Consultant and her team prepared a bid to the SRA Board for funding for a two-phase follow-up scheme. Phase one, design of high-priority improvements. Phase two, delivery and implementation. This bid was approved in March 2021. Its aim is to give Beckington improved resilience to surface water flooding, through works including:

- repairs to parts of the culverted system
- improved access for maintenance
- some upstream measures to reduce sediment-loaded run-off and debris entering the culverted system
- fixing foul sewer misconnections (funded by Wessex Water)

A campaign is also planned to make villagers more aware of their riparian responsibilities for future maintenance.

Cheddar: A study of flood risks in and around Cheddar was produced for Somerset Rivers Authority by Somerset County Council and contractors JBA Consulting (and described in last year's annual report). In 2020-21, it was planned to hold a big public event in Cheddar Village Hall to discuss the study's findings and to outline possible next steps. Coronavirus pandemic restrictions meant that such an event could not be held; the aim now is to hold one at a safe and suitable point later in 2021-22.

Rimpton and Marston Magna: Somerset County Council's Highways Department commissioned WSP to survey the catchment of the Mill Stream which flows west through Rimpton, and then alongside and under the A359 in Marston Magna, near the church and village hall. The SRA Board approved funding for this work in March 2020. The survey's purpose is to identify improvements and strategies that will reduce flood risks to people's homes and local roads.

W5 BUILDING LOCAL RESILIENCE

2020-21 SUMMARY: Somerset Community Resilience events held online with videos and free training sessions; Adapting the Levels' report Adapting to Climate Change on the Somerset Levels showcased local people's ideas; Adapting the Levels worked on a mobile app called Somerset Trails and a web-based app for exploring Adaptation Pathways; new Moor Association formed on Moorlinch, many improvements made to Moorlinch droves; wetland biomass case study completed.

Coronavirus pandemic restrictions made it difficult for Somerset Rivers Authority's community engagement team to get out as they normally would and work with people on local projects. Both the SRA's Community Engagement Officer (Emma Giffard) and Community Engagement Support Officer (Dawn James) therefore spent some time redeployed. Dawn James looked after Covid-19 patients in a Somerset County Council pop-up care home in Yeovil. Emma Giffard helped Somerset Waste Partnership re-open Highbridge Recycling Centre, and also temporarily joined Somerset's contact tracing team. Both were funded by Somerset County Council while redeployed, and not the SRA, as the SRA's share of council tax is ringfenced for the SRA.

However, while many plans for the year had to be changed, determined efforts were still made to build local resilience.

ONLINE COMMUNITY RESILIENCE EVENT

In summer 2020, Emma Giffard became Joint Chair of Somerset Prepared, alongside an Environment Agency representative. Somerset Prepared is a partnership between local emergency services and organisations that help to enhance local resilience. The partnership works closely with communities and gives advice, support and training.

Every October, Somerset Prepared usually hosts a popular Somerset Community Resilience Day with talks, demonstrations, mini-exhibitions and workshops. This event is supported and partly funded by the SRA.

Coronavirus pandemic restrictions meant that people could not gather as usual last October, so an online event was held instead. Over the summer, when fewer restrictions were in force, the SRA's community engagement team filmed a series of socially-distanced interviews, about people's experiences of planning for and responding to emergencies. Videos then premiered on YouTube included flood group case studies, resilience equipment grant testimonials, and stories of organisational pandemic adaptation. Featured communities included Ham, Holcombe, Langport, Martock, Misterton, Moorland, Taunton and Westbury-Sub-Mendip.

The Environment Agency also produced a series of videos. Subjects included the Flood Online Reporting Tool (FORT); Dunball Sluice between King's Sedgemoor Drain and the River Parrett and future plans for its refurbishment; and Environment Agency field teams, featuring Bradney Depot, watercourses near the Foal Mead Viaduct west of Langport, and repairs and improvements at North Drain Pumping Station part-funded by the SRA. The field teams video has some eye-catching drone footage of the viaduct and the pumping station.

Communities Prepared and Mind in Somerset offered free training, including sessions on Flood Volunteers, Co-ordinating Emergency Volunteers, Looking After Your Wellbeing and Supporting Others, and Crisis Recovery.

All videos can now be found on the Somerset Prepared website at https://www.somersetprepared.org.uk/somerset-prepared-2020-events/

A selection is also on the SRA website.

Dawn James interviews Ham Village Flood Committee

Sally Gray and Phil Clifton of Misterton Emergency & Resilience Team

COMMUNITY GRANTS

The SRA funds a small number of grants for equipment and training given to Somerset communities by Somerset Prepared. One grant was given in 2020-21:

Rotary International, for Personal Protective Equipment (PPE), flood bags and aqua sacks, for distribution by volunteer Rotarians to Somerset communities.

"GREATER RESILIENCE TO CLIMATE AND ECONOMIC CHANGE"

One of the aims of Somerset's 20 Year Flood Action Plan is to facilitate "better management of the most vulnerable and challenging parts of the Somerset Levels, with the consent of owners and occupiers, with the intent of helping them to remain profitable and build greater resilience to climate and economic change." This ambition has fed into many different parts of the SRA's work, particularly into studies of possibilities for Wetland Biomass and into Adapting the Levels.

WETLAND BIOMASS

Background

'Biomass' means natural material that can be used as fuel. In the specific context of the Somerset Levels & Moors and Somerset's 20 Year Flood Action Plan, it means wetland products such as reeds and rushes harvested from hard-to-farm areas of high environmental value. Early versions of the Flood Action Plan envisaged the creation of an 'Ecological Enterprise Zone' and called for the increased use of wetland biomass to be explored, for two main reasons. Firstly, to create an economic incentive for wetlands to remain wet, as a buffer against flooding. Secondly, to preserve and possibly enhance and expand environments for wildlife.

In 2015-2016, the SRA and RSPB funded an initial study into the possibilities of establishing a wetland biomass-to-bioenergy scheme on the Somerset Levels, based primarily in the Brue catchment, but also potentially around West Sedgemoor, Aller Moor and King's Sedgemoor.

The resulting documents outlined ideas for "creating a new limited company to purchase and run a medium sized anaerobic digester (AD) and by using the heat and power generated to run a separate plant operated by a local community group producing fuel briquettes." Estimated cost of building plant and digester: nearly £2 million. The RSPB described "conservation biomass to bioenergy" as "a great new initiative that can provide a direct link, and foster a personal connection, between communities and their local wildlife, sites and the landscape, and also highlights how that landscape is benefiting them".

In March 2019, to see whether using local wetland biomass as fuel could be a realistic commercial proposition, the SRA Board agreed to fund a real-life case study. This centred on the possible installation of a boiler using wetland biomass in Somerset County Council's highways depot at Dunball north of Bridgwater, which is run by Milestone (known before April 2021 as Skanska).

Activities in 2020-21

A feasibility study was completed by Skanska in December 2020. Skanska assessed the need for heating Dunball Depot's two buildings and found that it would be "possible to provide a biomass system which connects and meets the full seasonal load of both buildings".

Using wetland biomass for heating instead of natural gas would not be free of greenhouse gas impacts. Skanska noted that carbon dioxide emissions would be generated during the fuel's production, for example in powering machinery and during transportation, while actually burning the fuel would create CO2 and other emissions with greenhouse potential such as nitrous oxides.

However, as biomass fixes CO2 from the atmosphere during its growth, on balance Skanska estimated that its use "would reduce annual greenhouse gas emissions from the Dunball facility by between 25 and 30 tonnes of CO2 equivalent per year. Further to this the use of wetland biomass supports an important carbon sequestration habitat which could lead to much wider benefits."

But numerous challenges would need to be overcome. Wetland biomass meant to be used as fuel would need to be harvested, transported, processed, stored and burned as drily and densely – and as easily and cheaply – as possible. Skanska's study shows how a quest for maximum dryness and minimum bulk would affect all aspects of wetland biomass fuel production and consumption. Subjects covered include the kinds of machinery that could best be used for harvesting and pelleting, the practicalities of fuel delivery, and the problems that can be caused by higher ash levels from biomass.

Skanska made six recommendations for further SRA-funded tests and investigations, but SRA Technical Group members agreed that any further moves at Dunball should be decided upon independently of the SRA by Skanska and Somerset County Council. As for wetlands and biomass, all of the studies funded by the SRA since 2015 are now available on the SRA website. They contain a large amount of information and expert analysis, which will be useful to individuals, groups or organisations who are thinking about developing wetland biomass projects, or to anyone who is interested in learning more about the complexities of seeking to reduce carbon emissions.

The studies' sharp focus on new ecological and economic possibilities in wet low-lying areas of Somerset is also relevant to Defra's newly-published England Peat Action Plan. Defra is keen to invest in new schemes "that reward farmers and land managers for producing public goods" such as natural flood management and drought resilience. The studies commissioned by the SRA are expected to help in the development of proposals as the Peat Action Plan progresses.

ADAPTING THE LEVELS AND CO-ADAPT

Background

Somerset Rivers Authority and the EU's Interreg 2 Seas European Regional Development Fund are funding a major project on the Somerset Levels and Moors called Adapting the Levels. The EU's funding has not been affected by Brexit: the project runs until March 2023.

The aim of Adapting the Levels is to get local people and organisations co-operating and adapting to the water-related effects of climate change (flooding and drought).

Out on the ground, the project is being led by the Farming & Wildlife Advisory Group SouthWest (FWAG SW), Somerset Wildlife Trust and Somerset County Council, with support from the SRA's Community Engagement team.

Emma Giffard (standing) leads discussion

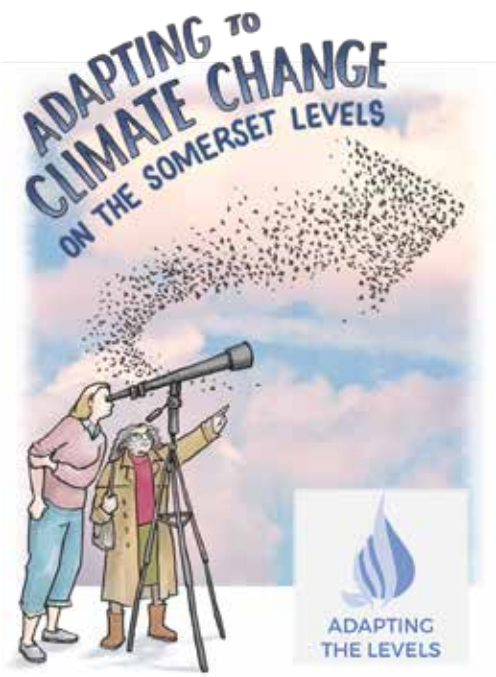
Grants are being offered to farmers and landowners on the Somerset Levels & Moors for measures which will help them become more resilient to flooding and drought. Community-led nature-based solutions in towns and villages such as Langport and Wedmore are also eligible.

Adapting the Levels is part of a larger €7.347 million EU Climate Adaptation project called Co-Adapt. Co-Adapt is short for Climate Adaptation through Co-Creation. It involves 12 partners in four countries: Britain, France, the Netherlands and Belgium. Lessons learned are being shared between different countries.

The other two Co-Adapt projects in Britain are both local. They are: Connecting the Culm, which is led by the Blackdown Hills AONB (Area of Outstanding Natural Beauty) team and covers parts of Somerset and Devon; and Porlock Vale Streams, which is led by the National Trust in West Somerset, and is interwoven with the Trust's Riverlands initiative. Through Hills to Levels, the SRA has approved funding (all or part) for 12 Riverlands schemes. For a recent example, see page 30.

Activities in 2020-21

Successful workshops and public drop-ins were held in Langport and Wedmore in early 2020, and the team's intention was to hold follow-up events which would explore the ideas and local information gathered. The coronavirus pandemic made big get-togethers impossible, and so the partnership instead commissioned local artist Liz Snook to help turn a mass of data into a nicely illustrated report featuring local faces and places. In December 2020, this 44-page report was published online at www.adaptingthelevels.com/feedback and summary leaflets detailing the findings were printed and distributed.



The possibility of making more use of natural solutions to flooding and drought is one subject covered in the report. 93% of respondents (58 people out of 62 sampled) agreed or strongly agreed that, in future, "natural process solutions, which protect and restore the natural functions of river catchments, floodplains and coastlines" needed to play "a major part" in "the management of water and flood defence on the Somerset Levels" along with "infrastructure such as embankments, dredging and pumping".

Lots of ideas were suggested for different places. These included:

- Ponds, trees and water butts for gardens
- Mass tree planting, dew ponds and leaky dams for the hills
- Temporary floodwater storage for farmland or amenity land used for more leisurely purposes

Many people agreed that farmers should be offered the chance to earn new kinds of subsidies, for public goods such as storing floodwater on their land, locking-up carbon and improving wildlife habitats.

Leadership and collaboration were called for. One participant's comment was: "Working together has to be the way forward. This is the biggest challenge we all face."

'ADAPTATION PATHWAYS' AND SOMERSET TRAILS

Two applications of the information in the Adapting to Climate Change on the Somerset Levels report were partly developed during 2020-21.

The first is a web-based app at www.adaptingthelevels.com that helps people turn ideas into plans called Adaptation Pathways. Various possible courses of action are displayed as different steps into the future, to help stir thoughts. People can explore the pros and cons of different choices and see how any single move has multiple inter-linked effects. Comments can be added, and people are encouraged to save and share pathways they are happy with. The more people take part, the more a collective vision will take shape, for further discussion and decision-making.

A lot of work also went into a mobile app called Somerset Trails. The app's aim is to encourage people to walk around the Levels as they are now, but again with an eye to the future. Videos feature local people and experts linking parts of the landscape to the water-related risks of climate change. Subjects covered include farmers working together, natural flood management, Sustainable Drainage Systems (SuDS), and the dangers of drought. Through interactive features, users can identify opportunities to help their communities adapt to climate change. The app will be available on Android and iPhone from summer 2021, with a first pilot trail near Wedmore. Further trails are planned for Langport and the National Trust's Holnicote estate in West Somerset (to tie in with the Co-Adapt Porlock Vale Streams project).

MOOR ASSOCIATIONS

Moor Associations were encouraged by the SRA in earlier strands of Flood Action Plan work now absorbed into Adapting the Levels. The forerunner in 2018 was the West Moor Futures Group, followed by Tealham and Tadham Moor, and most recently Moorlinch.

The SRA's goal is to promote flood-resilient farming and good environmental outcomes in flood-prone areas, through greater collaboration between different sectors, chiefly farming, conservation and water management.

Moor Associations make it easier for people to co-operate and get things done. They are set up and run by local farmers and landowners who have agreed to work together for their mutual benefit. Local experience has shown that in areas with fragmented land use, greater collaboration between farmers and a single management structure enables greater collective buying power, more machinery sharing, better grazing arrangements and improved farmland infrastructure.

A Moor Associations Co-ordinator is employed on the Adapting the Levels project through FWAG SW, along with a Farm Liaison Officer and a part-time Water Management Adviser.

Moorlinch Moor Association members

Improved drove

Activities in 2020-21

Coronavirus pandemic restrictions made site visits and other face-to-face meetings more difficult, but through phone calls, emails and careful adherence to social distancing, progress was made.

A Moor Association was formed on Moorlinch and improvements costing almost £30,000 were then completed, in partnership with Natural England. Works focused on the droves – the network of tracks and gateways that enables farmers to get where they need to go and do what they need to do. For example, jobs such as moving animals around are easier if gateways are not thick soups of mud and tracks are not so bumpy they could damage vehicles. Being able to move around efficiently also makes it easier for farmers to work with Natural England to maintain wetland areas in ways that better suit wildlife, with such endeavours often being funded through Countryside Stewardship agreements.

In return for Adapting the Levels paying for Moorlinch drove improvements, to improve resilience to flooding and climate change, the new Moor Association's members agreed to set up an innovative infrastructure maintenance fund. All association members were called upon to make a proportionate annual contribution, equating to less than £2 a week. This will generate enough money to pay the estimated costs of drove maintenance. As all derive benefits from proper upkeep, this co-operative funding mechanism is expected to continue far beyond the initial five-year agreement. It will also be introduced to other Moors, following its enthusiastic uptake on Moorlinch.

New Moor Associations are in development at Curry Moor, Aller Moor (Beer Wall to Aller Drove) and on Sutton Hams near Moorlinch, allowing landowners to participate in this year's Test and Trial programme for Defra's new Environmental Land Management Scheme (known as ELMS). This trial will focus on the delivery of "public goods for public money". It is expected to help unlock new ways of managing water on the Somerset Levels and Moors. Nationally, ELMS is due to be Defra's main land management funding scheme by 2024.

Several partners in the SRA – Somerset County Council, Mendip District Council, Sedgemoor District Council, Somerset West and Taunton Council and South Somerset District Council – have all declared climate emergencies and pledged to take action.

In March 2021, the SRA Board agreed that SRA policies should include "Addressing the Climate Emergency – to encourage projects which directly support Somerset's response to climate change by increasing resilience and encouraging adaptation to the effects of climate change."

So the SRA's support for Adapting the Levels is part of a much wider effort to increase public understanding of the water-related impacts of climate change, and to get people thinking about how Somerset should plan for a healthy and productive future.

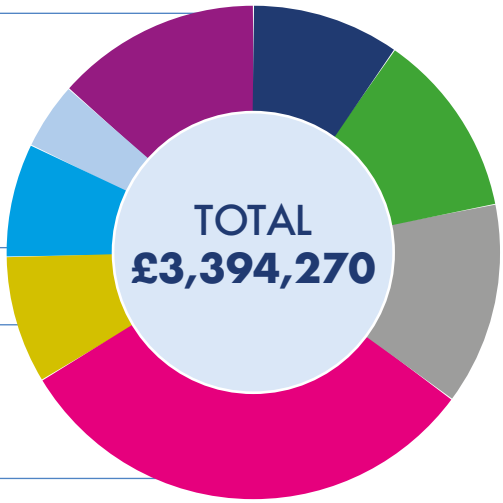
Financial Summary

2020-21 LOCAL PARTNER FUNDS

Somerset Rivers Authority (SRA) receives annual funding from two sources. Firstly, council tax. Somerset's local authorities raise money for the SRA through a 'shadow precept' (*see below). Secondly, the Parrett and Axe Brue Internal Drainage Boards (IDBs) make contributions. In 2020-21, the SRA received Local Partner Funding from these two sources totalling £2,943,639 (£2,923.639 through the 'shadow precept', £20,000 from the two IDBs – £10,000 each).

Using the 2020-21 'shadow precept' and including £451,000 of contingency funds carried forward from the previous year, the SRA Board set a budget for 2020-21 of £3,394,270, with funding for four main strands. Firstly, for an Enhanced Programme of works containing 23 schemes and activities, all designed to advance Somerset's 20 Year Flood Action Plan. Secondly, for SRA staffing, administration, and overheads. Thirdly, for SRA Development Activities, associated with the future development of the SRA, for example the renewal of the Flood Action Plan, planning for becoming a precepting authority and opportunity-mapping for future SRA projects. Fourthly, for contingency.

2020-21 BUDGET BY WORKSTREAM	TOTAL £	%
Dredging and River Management	325,000	9.6
Land Management	410,000	12.1
Urban Water Management	451,000	13.3
Resilient Infrastructure	1,070,000	31.5
Building Local Resilience	285,270	8.4
SUB TOTAL	2,541,270	
Staffing, administration, overheads	252,000	7.4%
SRA Development Activities	150,000	4.4%
Contingency	451,000	13.3%
TOTAL	**3,394,270**	



SPENDING OF LOCAL PARTNER FUNDING DURING 2020-21

Since its launch in January 2015, the SRA has received Local Partner Funding of just over £17 million. So far the Board has approved spending of this Local Partner Funding on 182 schemes, actions and initiatives, combining in total many hundreds of different elements. Most activities are generally delivered within the same financial year. Some require longer-term research, design, planning and implementation, so take longer to complete.

** The shadow precept raised for Somerset Rivers Authority (SRA) by Somerset County Council and Somerset's four district councils is set at 1.25% of 2016-17 council tax rates. It is enabled through an Alternative Notional Amount mechanism approved by a resolution of the House of Commons in February 2016. The SRA's shadow precept can only be used for funding the work of the SRA. The level of the charge has not increased since 2016-17. It has been part of the council tax base since 2016-17. For more information see page 6.*

It is important to note that the SRA does not commission works directly. Instead, SRA partners deliver the SRA's Enhanced Programme of works on behalf of the SRA. Once works are complete, amounts spent are then claimed back from the SRA. The SRA employs a small team to manage the partnership and work on activities related to the ongoing development of the SRA, such as preparing a new Flood Action Plan or improving the grant applications and assessment process. Amounts claimed back by partners plus SRA staffing and SRA development costs represent the SRA's total spend.

Coronavirus pandemic restrictions affected partners' delivery of works across the whole of the SRA's Enhanced Programme in 2020-21, resulting in less being spent during the year than was originally expected. No money was spent on SRA development, as work so far has been done by the SRA team. Work in future will require some specialist support and expenditure on external resources.

The summary below shows all of the Local Partner Funding held by the SRA at the beginning, and then at the end, of the 2020-21 financial year. The figure for funds allocated at the start of the 2020-21 financial year includes the new budget set using 2020-21 funds (£3,394,270) and SRA Local Partner funds carried forward from 2019-20 for ongoing activities and further contingency (£5,160,730).

LOCAL PARTNER FUNDING 2020-21 FINANCIAL SUMMARY	ALLOCATED FUNDS AT START OF 2020-21 FINANCIAL YEAR £	SPEND IN 2020-21 £	ALLOCATED FUNDS CARRIED FORWARD TO 2021-22 ONWARDS £
TOTAL	**8,555,000**	**1,172,000**	**7,383,000**

Heart of the South West Local Enterprise Partnership

Following the Somerset floods of 2012 and 2013-14, to help with key parts of Somerset's 20 Year Flood Action Plan, the Government put £13,049,000 through the Heart of the South West Local Enterprise Partnership (HotSWLEP) Growth Deal Fund towards a project known as Somerset Flooding.

Specifically, the aim of this funding – channelled since the SRA's launch in January 2015 through the SRA – was to enable the delivery of larger capital schemes up to March 2021. In October 2020, HotSWLEP agreed to extend the SRA's funding agreement up to March 2022.

The overarching purpose of the Somerset Flooding project is to reduce the duration, depth, and frequency of flooding.

In practice, this means safeguarding houses, commercial premises, communities, and infrastructure, increasing business confidence and protecting agricultural land. The project has five main elements which are listed in the table on the next page.

Financial Summary

To complement HotSWLEP's Growth Deal funding, the Somerset Flooding project has also had to secure significant local match-funding. The project's total budget is now £42,405,738. Other money has come from SRA Local Partner Funds, Flood Defence Grant in Aid, Triple C, the Environment Agency, Sedgemoor District Council, New Homes Bonus, Community Infrastructure Levy, Wessex Water and the Department for Environment, Food & Rural Affairs (Defra). The Growth Deal money channelled through the SRA has been a crucial component in a complex mosaic of HotSWLEP agreements.

Total spending on the Somerset Flooding project during the 2020-21 financial year was £4,215,819.

Of this total, £2,172,248 came from the SRA's allocation of HotSWLEP Growth Deal funding.

SOMERSET FLOODING 2020-21 SUMMARY (£)	HotSWLEP FUNDING ALLOCATION	MATCH FUNDING TOTAL	SRA GROWTH DEAL FUNDING SPENT DURING 2020-21	TOTAL SPENT DURING 2020-21	TOTAL SPENT FROM 2014 TO END 2021
Pioneer Dredging River Parrett (and Brue Catchment works)	2,222,179	8,286,112	458,389	1,353,796	10,294,441
River Sowy/King's Sedgemoor Drain Enhancement Scheme	8,211,821	4,328,452	1,700,148	1,721,119	7,472,967
Bridgwater Tidal Barrier *(contribution)*	2,000,000	7,653,758	-	1,093,608	8,335,758
Land Management Capital Grant Schemes	550,000	1,285,234	13,711	17,368	1,835,234
Taunton Strategic Flood Alleviation Improvements Scheme *(contribution)*	65,000	7,803,182	-	30,000	843,182
TOTAL	**13,049,000**	**29,356,738**	**2,172,248**	**4,215,891**	**28,781,582**

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FINANCIAL STATEMENT

During 2020-21 the SRA spent £1,172,000 of its Local Partner Funding and £2,172,248 of its HotSWLEP Growth Deal funding, making a total for the year of £3.344 million, as shown below.

W1 Dredging and River Management £2,303,605
W2 Land Management including Natural Flood Management £320,419
W3 Urban Water Management £233,188
W4 Resilient Infrastructure £316,745
W5 Building Local Resilience £108,683
SRA Staffing & Administration £174,954

SRA Enabling Additional Funds

To maximise the benefits of its funding for the people of Somerset, the SRA helps to pull in money from external sources for schemes which advance Flood Action Plan ambitions. The table below shows how SRA match funding has been used to lever extra money into Somerset.

ADDITIONAL FUNDING SOURCE	PROJECT	EXTERNAL FUNDS	SRA CONTRIBUTION
Hills to Levels Multi Benefits through Environment Agency (EA) Water Environment Improvement Scheme	Natural Flood Management (NFM)	£363,000	£91,000
EA Riparian Tree Planting Fund	Trees for Water	£95,000	£55,000
Interreg 2 Seas European Regional Development Fund (ERDF), Co-Adapt	Adapting the Levels	€1,025,196	£297,940
Interreg 2 Seas ERDF, Sponge EU	Somerset Sponge	€408,000	£80,000
Interreg 2 Seas ERDF, Triple C	NFM	€358,000	£46,440
Interreg 2 Seas ERDF, Co-Adapt National Trust Porlock Vale Riverlands Project	River Aller Floodplain Reconnection	£150,000	£50,000
Department for Environment Food and Rural Affairs (DEFRA)	Environmental Land Management (ELM) Tests and Trials	£59,000	£60,000

Growth Deal funding

PROJECT SUMMARY

Heart of the South West Local Enterprise Partnership funding 2014-2021

The award of £13.049 million of Heart of the South West Local Enterprise Partnership (LEP) Growth Deal funding to the Somerset Levels & Moors Flood Action Plan was announced on a visit to Somerset on 3 June 2014 by Owen Paterson, who was then Secretary of State at the Department for Environment, Food & Rural Affairs (Defra).

The move was welcomed by Cllr John Osman, then Leader of Somerset County Council and Chair of the Leaders Implementation Group spearheading work on the Flood Action Plan. "This is great news," said Cllr Osman. "Without the money we cannot make the Plan a reality and this considerable sum will allow many things to move forward."

With Somerset Rivers Authority (SRA) being launched on 31 January 2015, the Flood Action Plan was expanded across Somerset, and the SRA inherited the £13.049m Growth Deal funding.

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Dredging

The Flood Action Plan said that "dredging of the Rivers Parrett and Tone has been identified locally as a key element in reducing future flood risk". After the Environment Agency dredged 5 miles (8km) of the Parrett and Tone in 2014, the SRA used Growth Deal funding to help pay for more pioneer dredging in 2016, 2019 and 2021. For more details see pages 7-10 of this report.

LEP Growth Deal funding also paid for an important study from consultants HR Wallingford into *Future Dredging Opportunities in Somerset*. It was this report that prompted the SRA to invest LEP money into trials of water injection dredging techniques in 2016. This was the first time these methods were used on a UK tidal river in conjunction with a sophisticated silt-monitoring programme. The trials' success led to water injection dredging becoming the SRA's preferred choice for the crucial job of maintenance dredging. It is quicker, cheaper, has less environmental impact and is less disruptive for local people than traditional methods of excavation.

Dredging works have been delivered for the SRA by the Parrett Internal Drainage Board (IDB), working closely with the Environment Agency and Natural England. They have helped to protect homes, businesses, land, roads, and infrastructure across a large part of the Somerset Levels and Moors that were badly affected in winter 2013-14 and summer 2012.

De-silting near Parchey Bridge

River Sowy - King's Sedgemoor Drain (KSD)

The Flood Action Plan proposed to improve the entire River Sowy-King's Sedgemoor Drain (KSD) system, while balancing a range of interests. The main aim was to increase the amount of water that could be evacuated through the Sowy-KSD, so as to relieve pressures on the River Parrett and the River Tone, and enable upstream and downstream pumping stations to be operated earlier. This would confer operational flexibility in times of flood and benefit places such as Langport, Muchelney, Thorney, Moorland and Fordgate.

Sowy-KSD works funded with LEP money have so far included infrastructure improvements at Beer Wall near Othery, Chedzoy Flap near Chedzoy, Egypt's Clyse near Greylake and dozens of sites around the Westmoor and Moorlinch Raised Water Level Areas, plus de-silting at Parchey and Dunball. For more details see pages 11-15.

All of these works have been delivered for the SRA by the Environment Agency, working closely with the Parrett IDB and Natural England.

Bridgwater Tidal Barrier

The Bridgwater Tidal Barrier project is led by the Environment Agency and Sedgemoor District Council. Giving them £2million of LEP Growth Deal money as a contribution towards project costs helped speed up progress to the submission in December 2019 of the Transport and Works Act Order (TWAO) that is required to build the Barrier. A decision on the TWAO is awaited from the Secretary of State at the Department for Environment, Food and Rural Affairs (Defra).

Few other places in the UK are as vulnerable to tidal surges as Bridgwater, and climate change is predicted to increase the dangers. The Barrier and downstream defences have been designed to protect Bridgwater and nearby communities for the next 100 years, against tides that have a 0.5% chance of occurring in any year. It is hoped to start construction in 2022-23. For more details, see pages 19 and 20 of this report.

Growth Deal funding

Taunton Strategic Flood Alleviation Improvements Scheme (TSFAIS)

In 2016-17 the SRA used Growth Deal funding from HotSWLEP to support the progress of the Taunton Strategic Flood Alleviation Improvements Scheme (TSFAIS). In four other years, the SRA has made contributions from its Local Partners Funding.

As well as the two initial short and medium term TSFAIS priorities discussed on page 20, a third project is awaiting the appointment of a project manager. This is Longrun Meadow flood attenuation improvements. The plan is to optimise floodwater storage at Longrun Meadow through building 1,500 metres of raised embankments up to 1.8 metres high, with an inlet and outlet system for greater flexibility in flood management and control. The aim is to reduce flood risks to 687 properties, in Taunton town centre and parts of North Town, Firepool, the Priorswood and Crown Industrial Estates, Bathpool and (because of the ways that tributaries interact) Tangier. This project is being led by Somerset West and Taunton Council (SWTC) with Environment Agency support. In total, the delivery of TSFAIS's first three initial priorities will reduce flood risks for 1414 properties.

Longer term, TSFAIS's aim is to create extra protective capacity by combining bigger and better flood defence walls in Taunton with a new area for storing up to 1.8 million cubic metres of water at Bradford on Tone.

As well as being a key part of the Flood Action Plan, TSFAIS is important to SWTC's programme for regenerating Taunton town centre, bolstering Taunton's Garden Town status and boosting Taunton Vision 2040.

River Brue Catchment

The SRA has used LEP Growth Deal money to part-fund two Brue Catchment projects: the refurbishment of North Drain Pumping Station and the installation of a new surface water pumping station in Field Way, Highbridge. Both of these projects are covered on pages 21-22 of this report.

Land Management

The Flood Action Plan stated: "Every farm and every stream has a part to play in water and flood management in Somerset."

It was originally envisaged that LEP funding would result in 40 schemes of Natural Flood Management (NFM). In reality, the money delivered 120 schemes, containing many more individual elements countywide, and many different kinds of NFM.

Works were done at the places listed on the following page, and some of them had several schemes. In Brompton Ralph, for example, one farmer was so pleased with the results that he persuaded his downhill neighbour to install some complementary measures.

List of places where NFM schemes were funded by HotSWLEP

- Aisholt Common, Aller
- Bishop's Lydeard, Bower Hinton, Brompton Ralph, Bruton, Brymore Academy
- Charlton Mackrell, Chilcompton, Chipley, Clayhanger, Combe Sydenham, Compton Durville, Cossington, Croford, Crowcombe, Curry Mallet, Curry Rivel
- Dillington, Dommett, Donyatt
- East Combe, East Nynehead
- Fitzhead
- Goathurst
- Halse, Ham Hill Country Park, Hestercombe, Hinton St George, Hoccombe,
- Houndsmoor, Hurcott
- Langford Heathfield Nature Reserve, Launcherley, Lufton (edge of Yeovil)
- Marcombe Valley, Meare Green, Merriott, Montacute, Milverton
- Nether Stowey, Northway, Norton sub Hamdon, Nynehead
- Oake, Over Compton (edge of Yeovil)
- Pitminster
- Queen Camel
- Roadwater
- Sandford Orcas, Shepton Beauchamp, Staple Fitzpaine, Staplegrove, Stoke St Gregory, South Petherton
- Tinker's Bubble, Tintinhull
- West Buckland, Wigborough, Wiveliscombe

The SRA's Land Management workstream is led by the Farming & Wildlife Advisory Group SouthWest (FWAG SW). Hundreds more activities have followed this initial LEP-backed burst, through initiatives such as the EU-backed Triple C project and the online auctions pioneered by the SRA, FWAG SW, and the Environment Agency.

LEP funding gave Natural Flood Management in Somerset great impetus. Nowhere else in the UK now has such a range, number and sophistication of NFM schemes.

Conclusion

At the end of March 2021, 91% of the HotSWLEP Growth Deal funding of £13.049m that was awarded in 2014 for Somerset Flooding projects had been spent.

The remaining 9% of LEP funding is scheduled to be spent in 2021 on Phase One of the River Sowy-King's Sedgemoor Drain Enhancements Scheme. Permission to carry this funding through into the 2021-22 financial year was granted by the LEP in October 2020 after a variation request was made.

As the LEP's £13.049 million has been combined with £25.7 million from other local and national sources, Somerset has benefitted since 2014 from a total investment of £38.7 million into the flood protection works described above.

Progress on Key Elements of Somerset's 20 Year Flood Action Plan

Moorland, 2014

The Somerset Levels & Moors Flood Action Plan was published in March 2014, at the end of that winter's devastating floods. When Somerset Rivers Authority was launched on 31 January 2015 the Flood Action Plan was widened to include the whole of Somerset.

The SRA oversees the Flood Action Plan. It has six main objectives, stretching over 20 years:

1. Reduce the frequency, depth and duration of flooding.
2. Maintain access for communities and businesses.
3. Increase resilience to flooding for families, agriculture, businesses, communities, and wildlife.
4. Make the most of the special characteristics of Somerset (with internationally important biodiversity, environment and cultural heritage).
5. Ensure strategic road and rail connectivity, both within Somerset and through the county to the South West peninsula.
6. Promote business confidence and growth.

All actions in the SRA's annual Enhanced Programmes are scored and ranked against these objectives.

Progress on key elements of Somerset's 20 Year Flood Action Plan

TARGETS

This section describes progress against key targets in Somerset's 20 Year Flood Action Plan, as set out in the Plan's Executive Summary.

Dredging

We must: Dredge the first 8km of the Rivers Tone and Parrett.

What we have achieved: 4km of the River Tone upstream of Burrowbridge, and 4km of the River Parrett downstream of Burrowbridge, were dredged back to their 1960s' river profiles in 2014 by the Environment Agency. Since 2014, the SRA has funded more dredging, combined with silt monitoring: see pages 8-10.

River Sowy/King's Sedgemoor drain enhancements

We must: Increase the capacity of the Sowy/King's Sedgemoor Drain (KSD) recognising that this solution will reduce the cost of pumping during future flooding events.

What we have achieved: Over the winter of 2013-14, the A372 at Beer Wall near Othery was flooded for weeks and then closed for expensive emergency pumping. Subsequently, Somerset County Council raised and repaired the road, and installed four massive culverts to allow more water to go underneath it. The Environment Agency, acting for the SRA, then created two new offshoot channels for the Sowy and Langacre to flow through the new culverts. Two tilting weirs were also installed, to enable more flexible use of the Sowy, and allow pumping stations to be operated earlier.

Other works have included the removal of obstructive masonry from beneath Dunball Old Bridge to improve the capacity and flow of water through the final stretch of the KSD, improvements to Chedzoy Flap to better protect farmland around Chedzoy and Andersea, and de-silting to increase channel capacity at Parchey and Dunball.

For details of 2020-21 works at Egypt's Clyse, Moorlinch and Westmoor, and of Sowy-KSD works due in 2021, see pages 11-15 of this report.

New river channel at Beer Wall

Progress on key elements of Somerset's 20 Year Flood Action Plan

Flood management and infrastructure solutions

We must: Invest in flood management and infrastructure solutions having developed a better understanding of their effectiveness.

What we have achieved: Somerset Rivers Authority has so far approved 182 actions across Somerset, many including a large number of different elements. In a summary such as this, one example from the last year may serve to show the SRA's approach: he use in January 2021 of water injection dredging techniques for the pioneer dredging of 2.2km (1.37miles) of the River Parrett down to the M5. Work out on the river took 10 days. But that was only possible because of the "better understanding" gained from more than four years of trials, monitoring and evaluation of previous water injection dredging operations along the Parrett.

Bridgwater Tidal Barrier

We must: Accelerate the construction of a Barrier or Sluice at Bridgwater, with the objective of achieving delivery by 2024.

What we have achieved: The delivery date previously lined up for a Bridgwater Tidal Barrier in the Parrett Estuary Flood Risk Management Strategy was between 2030 and 2050, ideally 2046. The SRA has accelerated the Barrier's progress, by using Growth Deal money from the Heart of the South West Local Enterprise Partnership to help the Environment Agency and Sedgemoor District Council reach the point of submitting an application for the Transport and Works Act Order (TWAO) that is required to build the Barrier. The TWAO application went in to the Department for Environment, Food & Rural Affairs (Defra) just before Christmas in 2019. A decision is awaited. For more details, see pages 19 and 61.

Somerset Rivers Authority

We must: Establish a Somerset Rivers Board that has greater control and responsibility for work to maintain and improve water management on the Levels.

What we have achieved: Somerset Rivers Authority was launched on 31 January 2015 as a partnership of Somerset's existing Flood Risk Management Authorities (FRMAs). The SRA covers the whole of Somerset, not just the Levels. Partners take on responsibilities for extra works, above and beyond their usual activities. Through the SRA, partners collaborate to maintain and improve water management across the county.

The Local Government Finance Settlement 2016-17 included the provision of alternative notional amounts for council tax levels so that pending the establishment through legislation of the SRA as a precepting body, Somerset County Council and all Somerset district councils could set a shadow precept of up to the equivalent of a 1.25% increase in council tax for the purpose of funding the SRA. While legislation is still pending, the SRA is hosted by Somerset County Council, and has no independent legal status.

Progress on key elements of Somerset's 20 Year Flood Action Plan

Catchment-sensitive farming / Natural Flood Management (NFM)

We must: Support farmers to maximise the benefits from catchment sensitive farming, especially regarding run-off in the upper catchment.

What we have achieved: Hundreds of farms have been visited as part of the Hills to Levels initiative, in which the SRA is a partner and major funder, hundreds of schemes have been delivered and hundreds of natural flood management structures created using funding from a range of sources. The SRA has also funded numerous investigations of flooding problems on roads and backed dozens of soil management initiatives. Benefits include reduced flood risks, reduced erosion, improved water quality, wider environmental enhancements and increased resilience on floodplains. This work has won three national and international awards.

Urban water management

We must: Manage urban run-off by ensuring best practice in planning and Sustainable Drainage Systems (SuDS) implementation.

What we have achieved: A major SRA review of SuDS at 20 recently-developed sites in Somerset looked in detail at planning and implementation issues. This unique piece of work was followed up with the production of Somerset-specific guidance for property developers on best practice. Activities such as SuDS inspections also aim to ensure that urban run-off is well managed. For more details, see pages 42-45 of this report.

Strong local leadership, engaging partners and communities

We must: Ensure strong local leadership with full engagement of local partners and communities.

What we have achieved: Somerset Rivers Authority is run by a Board of partners from Mendip District Council, Sedgemoor District Council, South Somerset District Council, Somerset County Council, Somerset West and Taunton Council, the Parrett and Axe Brue Internal Drainage Boards, the Environment Agency, Wessex Regional Flood & Coastal Committee and Natural England.

The SRA's Management Group and Technical Group engage with SRA partners and many other organisations and individuals as required, as seen throughout this report, from enthusiastic individuals to big bodies like the RSPB (1million+ members) and the National Trust (5million+ members).

SRA partners lead the delivery of Somerset's 20 Year Flood Action Plan.

A Joint SRA Scrutiny Panel has also been established, with members drawn from the county council, district councils and IDBs, to help ensure that the SRA is fulfilling its purpose. That is to give Somerset the greater flood protection and resilience that long experience has shown it needs.

Back cover image: Somerset Rivers Authority Chair Cllr David Hall in one of the inlet bays at North Drain Pumping Station. Board members visited in September 2020 to see SRA-funded repairs and improvements.

Somerset
Rivers Authority

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