



Somerset
Rivers Authority

Annual Report
2019-20

Contents

At a Glance	3
Purpose of Somerset Rivers Authority	4
SRA Partners & Structure	5
SRA Funding & Legislation	6-7
W1: Dredging & River Management	8-29
Major Projects	9-24
Smaller Projects	25-29
W2: Land Management including Natural Flood Management (NFM)	30-45
Capital Grant Schemes	35-38
Triple C Match-Funded Schemes	39-40
Highways Referrals & Soil Visits	40-45
W3: Urban Water Management	46-49
W4: Resilient Infrastructure	50-56
W5: Building Local Resilience	57-64
Financial Summary	65-67
Progress on Key Elements of Somerset's 20 Year Flood Action Plan	68-71

ACKNOWLEDGEMENTS: Thanks to all Somerset Rivers Authority partners and contractors who contributed to this report. All images are copyright © 2020 by Somerset Rivers Authority and its constituent members and partners (specifically, for this report, the Environment Agency, Natural England, Somerset County Council, Somerset Drainage Boards Consortium and FWAG SW), except for ones used courtesy of Van Oord (p.10 top), Dr Andrew Pledger (p.12 lower), James Brigers (p.14 top), Wessex Water (p.25), Edenvale Young (p.29), Wild Trout Trust (p.35 middle two), National Trust (p.36-37 including top Holnicote landscape David Sellman, beaver Steve Haywood, p.64, p.72 Nick Upton), JBA Consulting (p.47), Yeovil Rivers Community Trust (p.48-9).

Front cover image: Dredging the River Parrett between Stathe and Burrowbridge, with Burrow Mump in the distance.

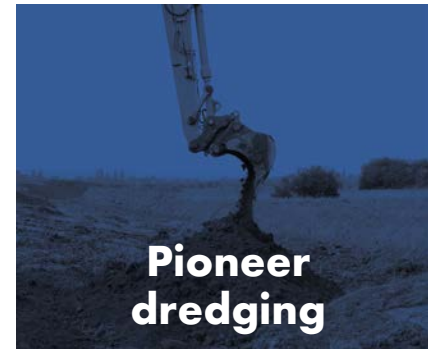
KEY POINTS FROM 2019-20

**£2.784m
EXTRA**

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



of places benefit across
Somerset



**Pioneer
dredging**

and maintenance dredging of
the River Parrett from Stathe
down towards the M5 uses
techniques old and new



Major projects reach key stages
backed by SRA – Bridgwater
Tidal Barrier and Taunton
Strategic Flood Alleviation
Improvements Scheme will
protect more than 15,000
homes and businesses



Private Members' Bill to
establish SRA as separate legal
body passes Second Reading
in House of Lords, but is then
withdrawn. Government still
pledges to support SRA



More than 200 different
activities and schemes, county-
wide, to Slow the Flow of
water through Natural Flood
Management

SuDS

Somerset-specific guidance on
Sustainable Drainage Systems
is being produced along
with a study in Yeovil. SuDS
inspections are carried out
county-wide, demonstration
sites planned in Taunton

around

14,418

highways structures given
extra cleaning to stop roads
flooding, roads raised and
drains upgraded in West
Somerset, major studies
completed in Cheddar and
Beckington near Frome

**BUILDING LOCAL
RESILIENCE TO
FLOODING AND
TO CLIMATE AND
ECONOMIC
CHANGE**

through supporting
community flood groups,
giving out grants, and
investing in very localised
improvements and adaptations

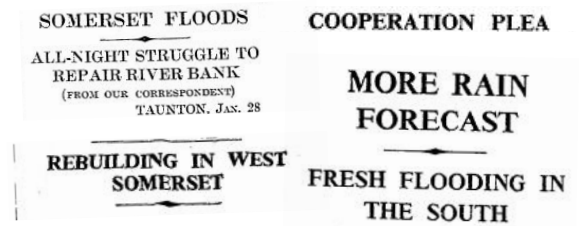
Purpose of Somerset Rivers Authority

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 and people's determination dwindles...

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 Sowey 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. Over the wet winter of 2019-20 there were heartening signs that the SRA's work is starting to pay off. This time round, people in other flood-hit parts of the UK asked why Somerset was faring better than other areas.

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 attack problems from different angles. 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.



Taunton, 1960



Beer Wall, built 1969-72



Beer Wall, 2016

SRA Partners & Structure

SOMERSET RIVERS AUTHORITY BOARD was made up of the following during 2019-20:



each represented | by **one member**



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 FWAG SW 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 every six months. 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 2019-20, 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.

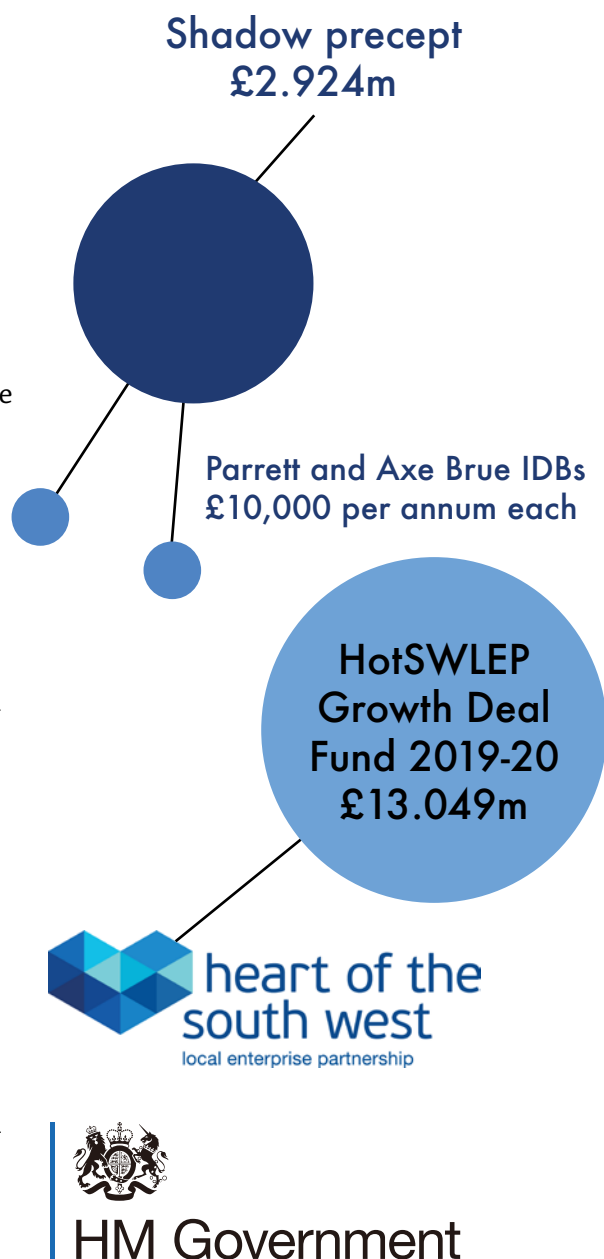
Funding from Heart of the South West Local Enterprise Partnership (HotSWLEP)

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 and the Bridgwater Tidal Barrier (see W1; pages 8-25).

Legislation

In February 2020, the SRA Chair and Vice-Chair met Taunton Deane MP Rebecca Pow, in her capacity as Parliamentary Under Secretary of State with responsibility for flooding at Defra. Ms Pow said that as Defra was taking forward two major Bills – the Agriculture Bill and the Environment Bill – there was currently no Government time available in Parliament for legislation that could put the SRA on a secure long-term footing and give it the power to raise its own share of council tax. However, Ms Pow expressed strong support for the SRA, and gave a clear undertaking on behalf of the Ministry of Communities, Housing and Local Government that the SRA's 'shadow precept' arrangements would remain in place, to enable the SRA's good work to continue.

Defra did draft a Rivers Authorities and Land Drainage Bill that was introduced to the House of Commons as a Private Members' Bill by the Somerton and Frome MP David Warburton in March 2018. With cross-party support this Bill passed through the Commons in March 2019 and moved up to the House of Lords.



SRA Funding & Legislation

The Bill had its 2nd Reading in the House of Lords on 16 May 2019. Speakers included the Somerset peers Lord Cameron of Dillington and Baroness Bakewell of Hardington Mandeville.

Transcripts of all debates can be read on Hansard: <https://services.parliament.uk/Bills/2017-19/riversauthoritiesandlanddrainage.html>

In both Houses, the Bill's ambitions attracted cross-party and cross-bench support. However, in June 2019 the Lords' Delegated Powers and Regulatory Reform Committee questioned whether a Private Members' Bill was, constitutionally, the best way of proceeding. After those arguments were backed by the Lords' Constitution Committee, Mr Warburton withdrew his Bill in July 2019. He said he was "extremely disappointed" but "we'll get there one way or another in the end".

What they said in debates:



David Warburton, Somerton & Frome (Conservative):

"The devastating floods that hit my constituency and those of other Members during the winters of 2013 and 2014 will forever be ingrained in my mind... events really were shattering for Somerset... From adversity comes opportunity, though, and neighbours and communities in Somerset came together. Members of those communities wanted to take action to reduce the chances of such flooding happening again and properly to manage the risk. The people of Somerset were keen to take ownership and proposed the creation of a new locally funded public body known as the Somerset Rivers Authority... The Bill is the final piece in incorporating that authority formally and ensuring that it has a secure future."

Peter Heaton-Jones, North Devon (Conservative): "I look upon Somerset with envious eyes... The SRA has done extraordinarily valuable work... my hon. Friend's Bill... seeks to hark back to a time when we rightly had rivers authorities, which were doing work that is best done by local experts, local people—those who know the environment."

Luke Pollard (Plymouth, Sutton and Devonport) (Lab/Co-op): "I thank the hon. Member for Somerton and Frome for introducing the Bill... The Opposition welcome and support this good Bill, because changes to flood protections for communities are long overdue..."



Lord Cameron of Dillington (Cross Bench): "... in the aftermath of the floods [of 2014] the Somerset Rivers Authority was born to reunify the management [of river catchments] and ensure that such a disaster could never happen again—and so far, so good."

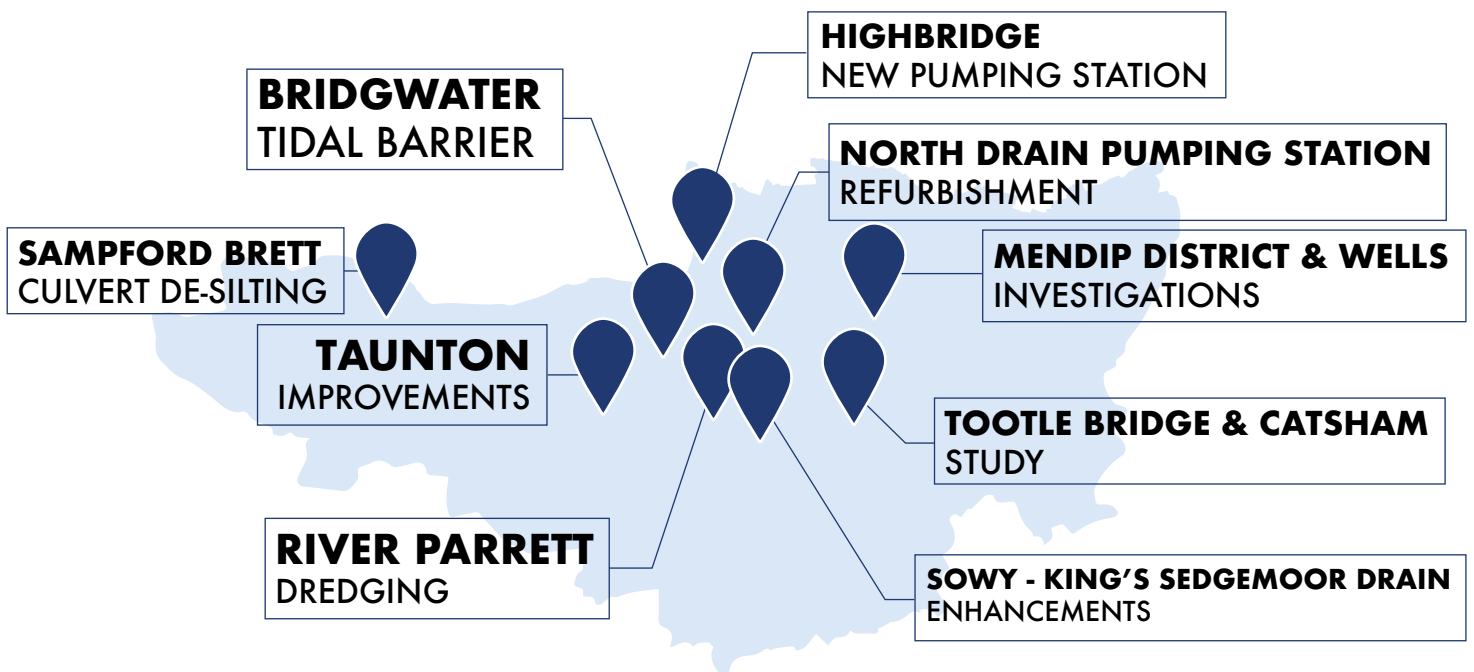
Baroness Bakewell of Hardington Mandeville (Liberal Democrat): "While no one particularly wants to introduce a new tax-raising body in communities, for those who have suffered the devastation that regular flooding brings, a tax to mitigate this is welcome. Like Flood Re, it would provide comfort and spread the risk and expense among the whole population of the area, as it is targeted at local priorities."



Viscount Younger of Leckie (Conservative):

"The Government fully understand how important this is for the people of Somerset and support the work of the Somerset Rivers Authority."

2019-20 SUMMARY: Work has included pioneer dredging along the River Parrett between Stathe and Burrowbridge and a trial between Northmoor and the M5, maintenance dredging from Burrowbridge down past Northmoor Pumping Station, the development of plans for enhancing the River Sowy and King’s Sedgemoor Drain in 2020, financial support for the Bridgwater Tidal Barrier, Taunton improvements and a flood protection scheme for homes in Highbridge, a study of options for Tootle Bridge and Catsham south-east of Glastonbury, and culvert cleaning at Sampford Brett near Williton.



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

Extra maintenance, repairs and improvements figure strongly across the county. 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.

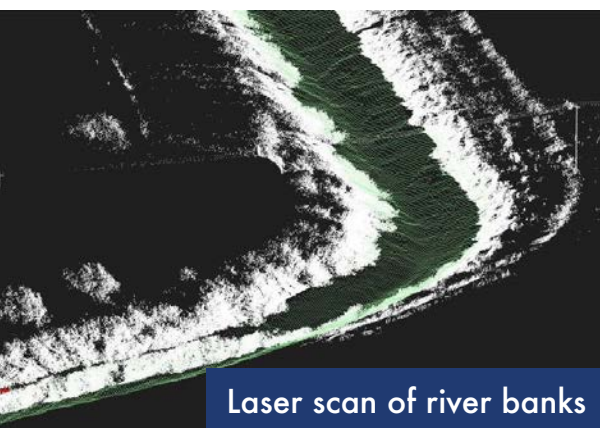
1. Maintenance dredging and silt monitoring



2016 dredging



2016 dredging



Laser scan of river banks



Background

After the devastating floods of 2013-14, the Environment Agency spent £6million on pioneer-dredging 8km (5 miles) of the Rivers Parrett and Tone. In 2016, Somerset Rivers Authority (SRA) funded a further pioneer dredge of 750 metres of the Parrett downstream of Northmoor Pumping Station. Pioneer dredging is the name given to the dredging of areas that have not been dredged for several years, where banks need to be re-profiled.

The pioneer dredges of 2014 and 2015 removed 248,500m³ of silt. They put the two 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 Soway was created (see page 16). The 2014-2015 dredges - combined with Environment Agency investment in temporary pumps and pumping facilities - significantly reduced flood risks to people, properties, roads and land.

To preserve this achievement, since 2015 the SRA has funded annual programmes of maintenance dredging and silt monitoring. Without targeted maintenance dredging, silt would re-accumulate, flood risks would increase, and expensive pioneer dredging would eventually have to be done again. Silt monitoring shows precisely where silt is accumulating and enables dredging to be targeted most effectively.

Maintenance dredging and silt monitoring on the Parrett are delivered for Somerset Rivers Authority (SRA) by the Parrett Internal Drainage Board (IDB). The 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.

Maintenance dredging in the winter of 2015-16 used conventional techniques, with excavators working from river banks and a floating pontoon. In autumn 2016 the SRA funded a trial of water injection dredging (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 was again effective. In late November 2018 a five-year contract for maintenance dredging along the River Parrett was let to Van Oord and more work was carried out soon after in December.

1. Maintenance dredging and silt monitoring

How water injection dredging works on the River Parrett

The photo to the right shows Van Oord's water injection dredging vessel Borr in demonstration mode. The injection bar at the back, spraying water, is raised so that it can be seen.

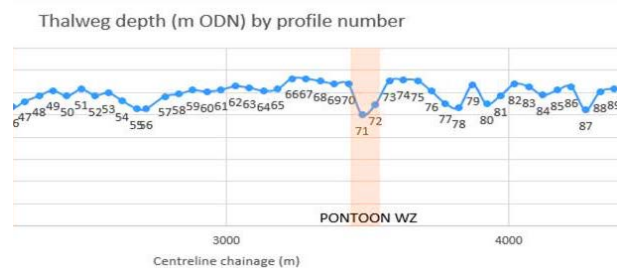
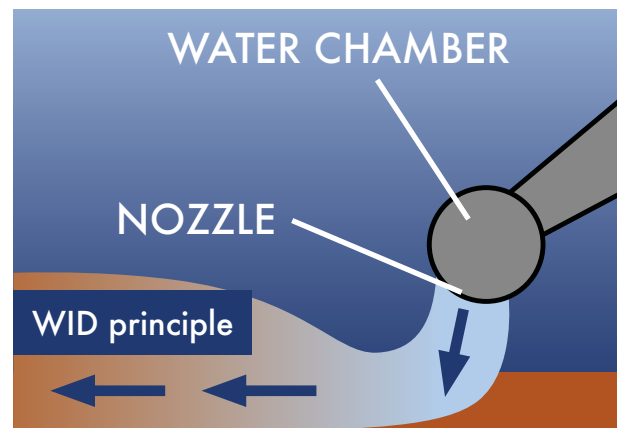
When actually dredging the Parrett, the bar is lowered to a position just above the river bed and river water is pumped out through nozzles along the bar.

The bed of the Parrett is characterised by fine sediments including sands, silts and clays. The injection of water separates and mobilises these particles so they can be washed away in what Van Oord call a 'density current' in the lower third of the water column. The 'density current' travels downriver on an outgoing tide and disperses through natural processes, usually wave action. This disruptive force breaks the bonds in the 'density current' and releases sediments from suspension.

The process can shift 700m³ of silt an hour. There is roughly a 4-hour operating window for water injection dredging on each outgoing tide. A combination of outgoing tide and river flow is needed to make sure that sediments are carried away effectively. Sessions can be extended if the Parrett is in high flow. There are two outgoing tides a day and both are used, so a lot of work is done during winter's long hours of darkness.

Hence the value of preparation and expertise. The Borr's crew know where to aim jets of water because the results of regular silt monitoring are used by the Parrett IDB to create precise river profiles and to specify what changes they want dredging to make. Design co-ordinates are loaded onto the Borr's computers – then as dredging is done, they are updated in near real-time. As the vessel passes through a section of river, it re-measures it. On board, in the cabin, screens show the relative positions of riverbed and injection bar. This means it is possible to see what effect work is having, and to raise and lower the bar, and vary the pressure and volume of water, according to what is being achieved – and to what the SRA wants to achieve. The goal is always to operate in the most effective ways possible in the time available. So, for example, if sediment half a metre deep needs to be removed from one section, the Borr's crew will use their skill and judgement, and not just blast away, but take a surgical approach. Control and caution are essential so as not to compromise riverbanks' function as flood defences in their own right.

Through such painstaking measures, water injection dredging is made successful.



1. Maintenance dredging and silt monitoring



Borr visit by (from left) Cllr Simon Coles, Chair SRA Joint Scrutiny Panel & SRA Board Members Cllrs Mike Stanton & Matt Martin, with Rob Kidson (far right, Parrett IDB)

ACTIVITY IN 2019-20

In previous years, water injection dredging has been done before Christmas, but this time round it was done over two weeks in January 2020. This was to avoid clashing with pioneer dredging between Stathe and Burrowbridge in late 2019.

Big tides and heavy rain meant that water levels in the Parrett were high, and conditions for water injection dredging were very good. In total, around 25,500m³ of sands, silts and clays were removed from the bed of the Parrett and dispersed through natural processes, from Burrowbridge down past Northmoor Pumping Station. That is 4,500 m³ more than got shifted over four months in the winter of 2015-16 using conventional methods. (In 2015-16, there were up to six excavators working from the banks, and an excavator worked for four weeks on a floating pontoon with a tug boat and hopper barges).

SILT MONITORING

Silt monitoring is carried out every spring and autumn along the Rivers Parrett and Tone to inform the SRA's maintenance dredging programme. Works 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.

Some very advanced technology is used. For example, flux monitoring equipment at New Bridge on the River Tone and at Oath Lock and Somerset Bridge on the River Parrett can measure silt movement in rivers in near real-time.

The SRA's short-term aim is to identify places where sediment builds up – how sediment builds up – and what type of sediment it is – so that maintenance work can be accurately targeted and dredging activities optimised.

The SRA's longer-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 academics leading scientific studies of water injection dredging on the River Parrett.

1. Maintenance dredging and silt monitoring

Scientific study

Last year's annual SRA report outlined some of the fascinating work being done by scientists to assess the effects of water injection dredging works on the River Parrett. We promised that when full studies were published, their findings would be summarised for Somerset readers. Here is the first.

In March 2020, the *Journal of Environmental Management* published a 15-page article titled 'Characterising the geomorphological and physicochemical effects of water injection dredging on estuarine systems'. 'Geomorphological' refers to the channel's physical features (e.g. depth, width, sediment characteristics), 'physicochemical' to water quality.

The paper's authors are Andrew Pledger of Loughborough University, Matthew Johnson of the University of Nottingham, Phil Brewin of Somerset Drainage Boards Consortium in Highbridge, John Phillips of the Environment Agency in Bridgwater, and Sarah Martin and Dapeng Yu of Loughborough University. The team studied the effects of two water injection dredging trials carried out for Somerset Rivers Authority by the Parrett Internal Drainage Board in October-December 2016 and December 2017. The trials focused on the reach between Burrowbridge and the M5, and the paper describes the different methods used to collect data during the trials. For example, a Beckman-Coulter LS230 laser particle size analyser was used to perform grain size analyses on sediment samples collected before and after dredging.

The three main aims of the research were – put simply – 1) to measure what influence water injection dredging would have on the Parrett's channel and flow; 2) to see how long the effects would last; and 3) to assess the impacts of mobilised sediment on places downstream.

The short answers are: 1) can be more effective than traditional methods of maintenance, potentially better for the environment and cheaper; 2) around 10 to 12 months, but it varies, so regular work may be required to maintain channel shape; 3) negligible.

Some more detail. A key finding for the SRA is this: water injection dredging (WID) "has the *potential* to deliver maintenance outcomes in a more environmentally sustainable manner and it is more cost effective compared to bankside excavation and land disposal. Costs can be further reduced through recognition that natural fluvial scour can in some years be more effective in channel maintenance than dredging – thus to reduce costs as much as possible, dredging programmes should be evidence-based and adapt to inter-annual variation in accretion rates. Another advantage of WID over extraction methods is that dredged sediment remains within the system."



Phil Brewin



Field Assistant William Cooper (left) and Andrew Pledger

1. Maintenance dredging and silt monitoring

Water injection dredging in the Parrett is focused on the central six metres of the deepest part of the channel, called the thalweg zone. Working in this zone to maintain the river's capacity is better than using excavators to extract silt from riverbanks because it avoids disturbing bankside habitats of significant ecological importance. The article says: "Findings demonstrate that the WID method was effective in removing the required volume of sediment from the ecologically-poor thalweg without directly impacting the relatively ecologically rich inter-tidal bank face, which is a significant disadvantage of some extraction methods. Some localised loss of inter-tidal bank material and bank slumping was noted following both WID trials where the toe of the bank had effectively been over-steepened by the deeper thalweg zone created by WID. *This was an anticipated outcome and supports one of the aims of the WID trials – that is, the required loss of bank volume is achieved through enhanced fluvial scour processes rather than a more damaging direct impact on habitat and species through physical excavation* [SRA emphasis]."

Put another way, it makes sense for the SRA to preserve important bankside habitats and target the relatively ecologically poor thalweg zone, minimising the ecological impact of dredging. Further, by working with not against natural processes, we can produce the results wanted, while accepting that such efforts may need to be ongoing. The effects of the first trial lasted for less than ten months, the second for over 12 months. The article states this was "almost certainly caused by differences in fluvial flows and marine sediment delivery". Higher flows of water in the months following the second trial meant that less silt was deposited and more was eroded from the bed.

Dr Pledger and his team expect the future to intensify challenges. A warmer climate could reduce summer river flows so more fine sediment accumulates, reducing the channel's ability to carry water. Fewer, heavier, more intense bursts of rainfall could increase flood risks. Sea level rises could also push normal tidal limits upstream, impacting flows and increasing rates of sediment deposition there. The article states: "In the context of the River Parrett estuary it is reasonable to assume river base levels may be raised, decreasing stream power in the lower reaches and so, increasing sedimentation there and penetration of tidal flows upstream." What effects the building of the Bridgwater Tidal Barrier could have on this process are being separately investigated by the Barrier team.

Long-term management strategies will be needed to deal with any changes in rainfall, sedimentation and river flows. "Furthermore, cost-effective and environmentally sustainable catchment-wide approaches to land management are required to increase field soil-water retention and, reduce fluvial sediment loadings in rivers where this represents a significant source of fine-grained sediment."

Water injection dredging technology was developed in the Netherlands in the mid-1980s, partly in response to the rising costs of silt disposal. Until now, it has been little studied. However, Dr Pledger and his team intend to publish four more scientific papers. So the SRA's work on the Parrett is the basis for what will soon (to our knowledge) be the best body of research into water injection dredging in the world.



CONTACT DR PLEDGER BY EMAIL IF YOU
HAVE ANY QUESTIONS ABOUT HIS
TEAM'S STUDIES: GYAGP@LBORO.AC.UK

In July 2017 the Board of the SRA approved the dredging of the River Parrett between Oath and Burrowbridge, as soon as a legally compliant and affordable scheme could be found. Planning began in late 2017 and continued throughout 2018-19. Two rounds of statutory public consultation took place in spring and summer 2019, and in mid-September 2019 two local archaeologists monitored site preparation activities on the northern bank of the River Parrett. Remains were uncovered from the lost 16th century hamlet of Tappingweir, mostly fragments of substandard pottery suggesting the inhabitants' low economic status. A more detailed account of this Prospect Archaeology study and its findings can be read in the News section of the Somerset Rivers Authority website.



Tappingweir wall

Pioneer dredging started in late September. It focused on the 2.2km (1.4mile) stretch of the river between Beazley's Spillway at Stathe and the confluence with the River Tone at Burrowbridge because that is where modelling showed the biggest benefits would be obtained. Ongoing work in 2020 includes final bank restoration and re-seeding and mitigation activities such as the planting of old varieties of apple tree.



The scheme is being led for Somerset Rivers Authority (SRA) by the Parrett Internal Drainage Board (IDB), working closely with the Environment Agency, Natural England, contractors WM Longreach and local specialist sub-contractors. The SRA is using Growth Deal funding from the Heart of the South West Local Enterprise Partnership.

This work is important because it supplements all other dredges of the Parrett and Tone since 2014. It also ties in with other projects, particularly existing and forthcoming enhancements of the River Soway (a.k.a. the Parrett Flood Relief Channel) and King's Sedgemoor Drain. It will help the SRA to reduce flood risks across a large part of the Somerset Levels and Moors that were badly affected in winter 2013-14 and summer 2012, particularly Aller Moor, King's Sedgemoor, Moorlinch, Muchelney, Huish Level, Wet Moor, King's Moor, and Witcombe Bottom. In total, it could potentially reduce flooding to around 65km² and benefit around 200 homes.



Iain Sturdy (Parrett IDB)

Between Stathe and Burrowbridge, around 22,000m³ of sediment was removed using conventional methods with long-reach excavators on the banks. Sediment was used to widen banks and strengthen the Southlake reservoir dam wall.

In some areas, two-stage channels with marginal berms and areas of shallow water were created. These improvements could benefit water voles, otters, fish, birds and macroinvertebrates (aquatic bugs). Special attention has been paid throughout to the need to protect rare hairy click beetles.

2. Pioneer dredging: Northmoor to M5 trial

Northmoor to M5 trial

Following a successful trial of water injection dredging techniques along a short stretch of the River Parrett on the northern edge of the village of Moorland, plans are being made to increase the capacity of the River Parrett between Northmoor and the M5. Some matters need to be refined and carefully assessed, because there is a potential flipside to creating more space in this section of the Parrett. More flood water could get down to the sea – but silt-laden tidal flows from the sea could also get up into higher reaches of the river. The target date for action is early 2021. Progress has been hampered by coronavirus pandemic restrictions, but the SRA's determination is to continue to reduce local flood risks. The works proposed would complement numerous activities carried out since the floods of 2013-14, including pioneer dredging in 2014 and 2016, maintenance dredging in 2015, 2016, 2017, 2018 and January 2020, and regular silt monitoring. The project is being managed for the SRA by the Parrett IDB, working closely with the Environment Agency. Somerset Rivers Authority is using funding from local partners and Growth Deal funding from the Heart of the South West Local Enterprise Partnership.



Dredging trial, Northmoor to M5



Dredging trial, Northmoor to M5

River Sowy/King's Sedgemoor Drain (KSD) enhancements

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 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 the latest wet winter of 2019-20, the Sowy 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 A372 at Beer Wall along with tilting weirs, the installation of a new water level control gate near Chedzoy, the removal of obstructive masonry from under Dunball Old Bridge, which carries A38 traffic southbound, and de-silting of bridges 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.



Curry Moor, 1960



Creation of Sowy, 1969-72



Aller Drove Bridge, 1969-72

3. River Sowy/King's Sedgemoor Drain enhancements

2019-20 activities

Designers have been fine-tuning plans for increasing the capacity of key parts of the Sowy and KSD through work in these rivers' channels and on their banks. Works on a first phase of channel improvements are now planned for the second half of 2020.



In early 2020, discussions were held with individual landowners who will be affected, for example because access to their land will be required.

Three drop-in sessions for the public were held in mid-February, in Westonzoyland, Othery and Aller village halls. Dozens of people attended, including the Chair of the Environment Agency Emma Howard Boyd. Ms Howard Boyd met Somerset Rivers Authority (SRA) Chair Cllr David Hall and SRA Vice-Chair Tony Bradford (*pictured, left to right*).

Sowy-KSD works are being delivered for the SRA by the Environment Agency, working closely with partners including Natural England and Somerset Drainage Boards Consortium. The SRA is using Growth Deal funding from the Heart of the South West Local Enterprise Partnership and money put specially aside from local council tax.



Westmoor membranes



The Sowy and KSD run through environmentally sensitive areas protected by law. It is essential to make sure that no damage occurs to the designated sites of the Somerset Levels & Moors Special Protection Area and Somerset Levels & Moors Ramsar. It is also vital to mitigate any detrimental impacts that works might have on nearby areas that are valuable for wildlife, particularly birds feeding in splashy conditions over the winter. A very fine balance has to be achieved between keeping more water in river channels and keeping wetlands at the right level of wetness. More about what partners intend to do over the next two years can be read in this report's next section on the SRA's Strategic Approach to Mitigation. One action is that dozens of water level control structures are to be replaced or refurbished across the Moorlinch and Westmoor Raised Water Level Areas and at Egypt's Clyse. In March 2020, membranes were fitted near 39 of these structures so as – temporarily – to stop vegetation growing and deter water voles. It is against the law to harm water voles, so it is vital to keep them out of harm's way until works have been completed later in the year.

The sensitive nature of the area means that Sowy-KSD works will be undertaken in stages, so that impacts can be checked and water level management practices amended as need be to maintain environmental features.

Further works on the Sowy-KSD system are being designed by the Environment Agency for the SRA, for example channel smoothing at Dunball. This is a difficult site to access and work at safely. The team's aim is to overcome various complex problems and find a scheme that is deliverable and affordable.



Work on this project began in November 2017 and is continuing. Its three main aims are to:

- reduce costs and risks
- enable flood risk management schemes in the county to go ahead
- secure a wide range of environmental benefits

The project is being led for the SRA by Natural England, which has successfully been involved with more than 40 other similar approaches to mitigation across the country.

Mitigation means works that must be done – by law – to offset any unavoidably negative effects of projects. In Somerset’s case, there is an extra factor. One of the objectives of Somerset’s 20 Year Flood Action Plan is to make the most of the county’s special characteristics: its biodiversity, its environment, its cultural heritage. The wetlands of the Somerset Levels are one feature of international importance. So it is doubly vital to seek the best possible ways of reducing flood risks and protecting the environment. It is also best, wherever possible, to streamline ways of doing this.

In 2019-20, Natural England has been focusing on assessing the impacts of dredging and Sowys-KSD enhancements on local wetlands. On the one hand, these activities will result in less water for less time on floodplains. Part of their purpose is to enable pumps to be started earlier so that floodwater can be more quickly removed from moors. On the other hand, wetlands are supposed to be wet. In particular, winter bird populations need to feed 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.

Simple definitions

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

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.

Natural England's aim is to get the balance right. It has identified four initial Strategic Mitigation actions that must be funded and implemented over the next two years (2020-22). Briefly, these are:

1. Development of a robust, long-term monitoring programme, to ensure compliance with environmental legislation and the necessary maintenance of designated areas.
2. Review and update of all Water Level Management Plans (WLMPs), to ensure that required conditions are being met without adverse effects on homes and infrastructure. A review of each moor is required, looking at future management options, to see, for example, if it is possible to use fewer structures to reduce costs and work more with natural processes.
3. Introduction of Operational Protocols, linked to WLMPs. This involves agreeing upon Environmental Trigger Points and clear procedures after winter and summer floods. The aim is to ensure that wetland conditions remain suitable for wintering and breeding waterfowl without affecting homes and infrastructure and while also sustaining appropriate farming practices.
4. Identification and mapping of areas outside of designated sites, to show areas that are critical to wintering bird populations and areas with potential for mitigation activities. Natural England has started work on this improved environmental mapping. Areas that do not need to be considered as Functionally Linked Land will also be indicated.

Key partners and stakeholders in the development of this approach are Natural England, the Environment Agency, Somerset County Council, Sedgemoor District Council, Somerset Drainage Boards Consortium, National Farmers Union, Country Land and Business Association (CLA), Farming & Wildlife Advisory Group SouthWest, the Royal Society for the Protection of Birds and Somerset Wildlife Trust.

Other longer-term proposals are due to be presented to the SRA Board in 2020-21.



Artist's impression of the Bridgwater Tidal Barrier

Few other places in the UK are as vulnerable to tidal surges as Bridgwater, and climate change is predicted to increase the dangers. The town needs extra flood protection. Bridgwater Tidal Barrier will reduce flood risks to at least 11,300 homes and 1,500 businesses.

2019-20 was a big year for the Barrier project, which is led by the Environment Agency and Sedgemoor District Council working as partners.

Key events included major on-site ground investigations; the submission to Defra of the application for the Transport and Works Act Order (TWAO) required to build the Barrier; eight weeks of public consultation on the TWAO; and the allocation by the Government of £114million towards the building of the Barrier by 2024.

One of the big targets of Somerset's 20 Year Flood Action Plan, which was drawn up during the devastating floods of 2013-14 and is now overseen by the SRA, was to 'accelerate the construction of a Barrier or Sluice at Bridgwater, with the objective of achieving delivery by 2024'. The date previously identified in the Parrett Estuary Flood Risk Management Strategy was between 2030 and 2050, ideally 2046.

The SRA has helped the Environment Agency and Sedgemoor District Council to go faster by putting £2million of Growth Deal money from the Heart of the South West Local Enterprise Partnership towards project costs, up to the submission of the TWAO.

Bridgwater Tidal Barrier will be located between Express Park and Chilton Trinity village. The scheme also includes improvements to existing downstream primary flood defences along the River Parrett together with new secondary defences in the flood plain.

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.



Activities during 2019-20

The area surrounding the proposed Bridgwater Tidal Barrier site has previously served various purposes. Examples include the brick and tile works at Chilton Trinity, the Saltlands landfill site and a 'free tip' at Pawlett where waste dumped by local traders was used to build up the embankment. These days – to avoid possible problems with issues such as contamination – it is important to know what one is getting into. Two phases of ground investigation work have therefore been carried out. The first was in December 2016-February 2017. The second was in October 2019-December 2019.



Most prominent in the second phase was a jack-up barge on the Parrett (*pictured left*). Through changing tides, this vessel's long support legs could be raised or lowered, keeping its platform and crew above water. Other rigs drilled into land. The main aims were to investigate local layers of soil and rock, assess groundwater levels, and carry out checks for historic contamination.

Information gathered during this second phase is now being used to help select the best techniques for building a Barrier. For instance, results showed higher levels of bed rock than previously identified. This discovery could be beneficial for the design of the Barrier's foundations, potentially making building quicker and cheaper.



Just before Christmas an application was submitted to Defra for the Transport and Works Act Order (TWAO) required to build the Barrier plus secondary flood defences and mitigation measures such as fish and eel passes. Eight weeks were then allowed for any interested parties to make Formal Representations. An initial deadline of 13 February was extended to 27 April. Representations received by Defra included letters of support for the project (including one from the SRA), objections to particular aspects, and neutral representations about points to be considered as the project progresses.

The project team has been working hard to resolve issues raised by individuals and stakeholders, including those classed as 'statutory objectors' under Transport and Works Act legislation, such as landowners and utility service providers. An extension has been granted until 31 July to allow more time for work on outstanding concerns. A decision by the Secretary of State will be made following either a Public Inquiry or a formal process of Written Representations. A decision is anticipated in late 2020 or early 2021.

Sedgemoor District Council has appointed the Wildfowl & Wetlands Trust to help get funding for the delivery of wider enhancements to complement the Barrier scheme.

All of the documents submitted for the TWAO can be downloaded as a single zip file (1.35GB) or as more than 160 separate PDFs from Sedgemoor District Council's website at <https://www.sedgemoor.gov.uk/bridgwaterbarriertwao>. They represent a vast amount of work and are full of local interest.



6. Taunton Strategic Flood Alleviation Improvements Scheme (TSFAIS)



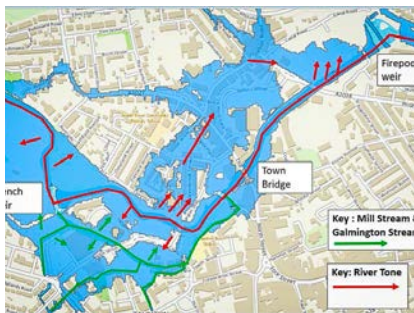
Taunton, 1960

TAUNTON STRATEGIC FLOOD ALLEVIATION IMPROVEMENTS SCHEME (TSFAIS)

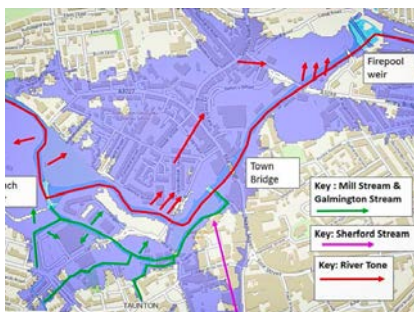
Background

Somerset West and Taunton Council estimates that a single major flood could cost Taunton's economy up to £50million. 1031 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 2548.

Taunton has flooded badly before. In 1960, more than 360 homes, shops and business premises were flooded. In response, the River Tone through the town was re-modelled and defences were reinforced in the 1980s. Taunton did not flood in 2013-14 but it came very close to flooding in 2000 and 2012.



Map of Taunton showing flooding extent in 2019



Map of Taunton showing flooding extent in 2119

Taunton Strategic Flood Alleviation Improvements Scheme (TSFAIS) is an important part of Somerset's 20 Year Flood Action Plan. Since 2014, when the Flood Action Plan was drawn up, the council and the Environment Agency have been studying how to reduce flood risks from the River Tone and its complex network of tributaries, particularly the Galmington, Sherford and Mill streams. Somerset Rivers Authority has part-funded the Scheme's progress for the last five years, in 2016-17 using Growth Deal funding from the Heart of the South West Local Enterprise Partnership.

Phase 1 of TSFAIS highlighted the need for a combination of two main options. Firstly, improved flood defence walls in the town. Secondly, an area for storing up to 1.8 million cubic metres of water at Bradford on Tone, to provide extra protective capacity for the next 100 years.

Phase 2 of TSFAIS then included surveys, ground investigations, initial engagement with landowners, computer modelling, initial environmental surveys and concept designs. In August 2018, the SRA Board was told that the estimated cost of the two main options would be around £50million. A new flood storage area and dam would also require an on-going commitment to maintenance. The council had put aside £6million of its own money for TSFAIS but all parties accepted that the total sum required was unlikely to be found in the short term. A revised Project Delivery Plan was therefore agreed.

Activities during 2019-20

Somerset West and Taunton Council and the Environment Agency have continued to work in partnership, part-funded by the SRA. This year's focus was on 11 smaller options for improvements identified during Phase 2 of TSFAIS studies. The aim is to give Taunton a useful short and medium-term increase in its capacity to manage flooding, pending the longer-term delivery of the two main TSFAIS options. A key target for this year was to feed into Taunton Garden Town ambitions for a better environment and better waterways.

At the end of January 2020, the SRA Board confirmed its ongoing support for TSFAIS and its wider objectives, subject to the condition that any interventions made as part of the Scheme must have no significant impact downstream of Taunton.

In February 2020, a Full Council meeting of Somerset West and Taunton agreed to prioritise three initial local interventions. These are:

1. Optimising flood water storage at Longrun Meadow through building 1500 metres of raised embankments up to 1.8 metres high. This will benefit 687 properties.
2. Raising low spots in the River Tone's flood defences 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.
3. Raising Firepool Lock gates to prevent River Tone floodwater entering the Bridgwater and Taunton Canal at Firepool, which reduces the risks of overtopping into Maiden's Brook and then Allen's Brook in Bathpool, and also raising 750 metres of River Tone defences between Firepool Lock and the A358 Obridge Viaduct. This will benefit 219 properties.

Somerset West and Taunton Council will use £6million previously put aside for building projects 1 and 2. Further funding for project 3, and other TSFAIS elements, is being sought.

In March 2020, as part of the SRA's budget and Enhanced Programme of works for 2020-21, the SRA Board agreed to put £300,000 towards the detailed design and delivery of the three interventions listed above.



EXTRA REPAIRS, IMPROVEMENTS, MAINTENANCE AND STUDIES



New Highbridge pumping station

In February 2020, work began 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 is being installed, along with new pipework. The SRA is part-funding this scheme, using £100k of its Growth Deal funding from the Heart of the South West Local Enterprise Partnership. Work is due to finish in autumn 2020.

North Drain Pumping Station

In June 2019, the SRA Board agreed to put £156k towards a second phase of refurbishment works at **North Drain Pumping Station**, which sits close to the confluence of North Drain and the River Brue about halfway between Westham and Burtle. As this area tends to have too much water in winter – and too little in summer – this 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.



In a first phase of works in 2018, the Environment Agency used SRA funding and contractors AMCO to remove the station's 50-year-old leaking and collapsing concrete roof. It was replaced with a lightweight modern roof. Walls were re-pointed, cracks stitched together using steel rods and crumbling bricks replaced.



In 2019-20, plans were finalised for a second phase of repairs and improvements to the pumping station. Work began on the design and fabrication of three stop-log boards for controlling the flow of water, and two replacement penstocks for the inlet to the pumping station. The advent of the coronavirus pandemic caused some unavoidable delays. However, work on a dozen different jobs around the station – such as de-silting inlet bays, straightening weedscreen bars and fixing stone gabions – is expected to be completed by autumn 2020.

The Environment Agency will then install new electric canister pumps. These will be 'fish-friendly' and have a lower carbon dioxide (CO₂) output than the station's existing pumps, which are nearing the end of their life. Works paid for by the SRA in 2018 will allow the crane inside the station to lift out the old pumps. The project team say that SRA funding has "massively helped" to unlock possibilities for structural improvements and better ways of working. Overall, the refurbished North Drain Pumping Station will allow for more flexible water management.

Installing ultra-high volume pumps for taking water from North Drain into the River Brue

Sampford Brett, near Williton

The 1992 Sampford Brett Flood Alleviation Culvert has been cleaned out for Somerset Rivers Authority by Somerset West and Taunton Council. This long culvert goes through the centre of the village, under the main road, past the church and village hall and down to the Doniford Stream. It takes excess water from the small but fast-flowing stream which also runs through Sampford Brett.

The culvert was built in response to numerous cases of flooding and successfully reduced flood risks. However, several recent incidents raised concerns about its maintenance and capacity. Unfortunately – for some unknown reason – the culvert was never formally adopted by any responsible body and no maintenance records could be found. These facts did not emerge until shortly before West Somerset Council ceased to exist. The council did not have the money, resources or expertise to de-silt the culvert, which is around 325 metres long. So as part of its remit to sort out difficult flooding problems, and deliver additional maintenance for important assets, the SRA agreed to fund a one-off cleansing as part of a package of measures to get things back up to scratch.

Further activities are to be undertaken in the area around the culvert's outfall pipe into the Doniford Stream, where there are problems with silting-up, backflow and erosion. Questions about riparian responsibilities will also be explored with residents, particularly as regards ownership and maintenance of the small fast-flowing stream that runs through the village. The SRA funds a part-time Riparian Responsibilities Officer, who has been talking to Michele Boobyer of Somerset West and Taunton Council about engaging with villagers. Ms Boobyer is leading this project.

Woolston Moor, near Sampford Brett

Tied in with work at Sampford Brett, a CCTV inspection was made of a large 160-metre long culvert to the east of Woolston Moor. The area used to flood often, so a system of culverts was built to take excess surface water off hills away from houses.

Water flows into the main culvert from two other culverts. Out of it, water then goes down to a large open pond which feeds into the Doniford Stream above Sampford Brett.

There were concerns that there might be blockages within the culvert, but inspection found no significant problems.



Michele Boobyer, Somerset West and Taunton Council

Enhanced Mendip flood risk management & maintenance

This meticulous and productive project has two strands. One is focused on culverts which are a) not included in Mendip District Council's annual maintenance programme, because they are not owned by the district council or Somerset County Council's Highways Department and b) which need repair and improvement. The other is focused on watercourses in Mendip which are not main rivers like the Frome, which are not included in the district council's annual maintenance programme, and which would benefit from improvements.

The project's main aims are to reduce flood risks to properties, roads and land across the Mendip district and to increase the area's resilience. Particular attention is being paid to problems with flash flooding, and to debris and silt travelling downstream to clog culverts.



Caroline Murray (left) and Jane Moon

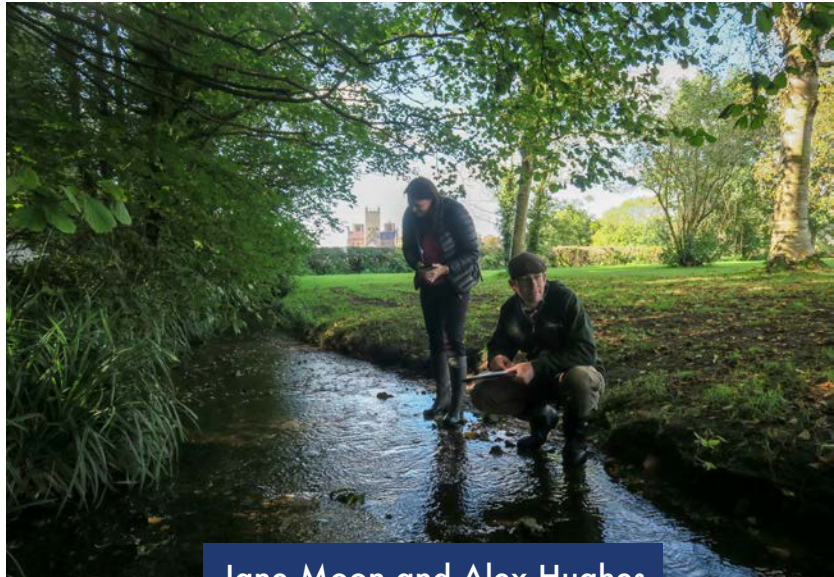
Mendip's Flood Risk Consultant Caroline Murray, of Calm Engineering, is leading this project. Ms Murray and specialist contractor Jane Moon of Hydromorph began by identifying 83 sub-catchments across Mendip. They analysed these in relation to reported incidents of flooding and other relevant information and data, such as flood risk maps. The 23 highest priority sites were then further investigated. Visits to the village of Rode, for example, looked in detail at features such as watercourses, fields, ponds, pipes and culverts, and a flood alleviation plan was drawn up. In March 2020 the SRA Board agreed to fund this Rode plan as part of the SRA's Enhanced Programme of Works for 2020-21.

Plans for other high-priority sites are being developed through this ongoing project. Some works will be delivered through existing Mendip District Council highway programmes, funding for others is being sought elsewhere. A bid is being prepared to the SRA for a Mendip-wide programme of natural flood management measures.

Wells: Knapp Hill catchment feasibility study

A study of problems around Knapp Hill on the eastern side of Wells, out along Bath Road which floods regularly during periods of heavy rain. Several options for improvements have been identified. Further investigations have also been suggested because Wells – as its ancient name suggests – has a complex pattern of springs and underground flows.

This project was organised for the SRA by Mendip District Council's Flood Risk Consultants CALM Engineering and carried out by contractor Alex Hughes of Ghyston Engineering (*pictured, right*) under the supervision of Hydromorph. The team focused on three watercourses. St Andrews Stream (1) rises north-east of Knapp Hill at Haydon Drove and flows down through Biddle Combe and Beryl Wood before crossing Bath Road. The stream then runs south through Wells Golf Club where it meets another tributary (2). Next it goes west through the semi-urban Tor Hill area. After being joined by the Woodbury Brook (3) it carries on down towards the Bishop's Palace in Wells city centre.



Jane Moon and Alex Hughes upstream of Wells Cathedral

Possible improvements identified include:

- Additional attenuation ponds in Beryl Wood and Tor Hill park
- Footpath moving and raising in Beryl Wood
- Additional road gullies on Bath Road to capture road run-off water better
- Cattle grid and pipe to attenuation feature at South Horrington
- Grips and swale cut on south side of Old Frome Road



Further investigations could cover:

- Existing ineffective attenuation pond and drainage system at South Horrington. Work would include flow monitoring.
- Whether potential sources of groundwater emergence are contributing to flooding in the Tor Hill area of Wells. This could form part of the Water Resources project being led by the Environment Agency within the wider Brue Catchment.
- CCTV surveys and analysis of existing culverts, 1) under Bath Road, 2) in South Horrington, 3) along Woodbury Brook from Paray Drive to the south of Bath Road, and 4) along St Andrews Stream through the back gardens of Bekynton Avenue.

Next steps will be to review all options with SRA partners such as Somerset County Council's Flood Risk Management Team and Highways Department and the Farming & Wildlife Advisory Group SouthWest. Discussions will help to determine which activities would produce the best results and how works could be funded, possibly by the SRA.



Tootle Bridge

Tootle Bridge and Catsham

An initial review has been completed of options to reduce flood risks for properties in the hamlets of Tootle Bridge and Catsham, about 6 miles south-east of Glastonbury. On behalf of the SRA, Somerset Drainage Boards Consortium hired consultants Edenvale Young to re-assess a report into possible solutions that was prepared for the Environment Agency in 2007. Various factors have changed since then. For example, in their initial review, the consultants note that Environment Agency guidance about hydrological analysis has been updated, new hydraulic models of the Brue and Parrett have been produced, and construction costs have increased. IDB engineers are now working with the same consultants on recommendations for the SRA.

Chadmead ring bank

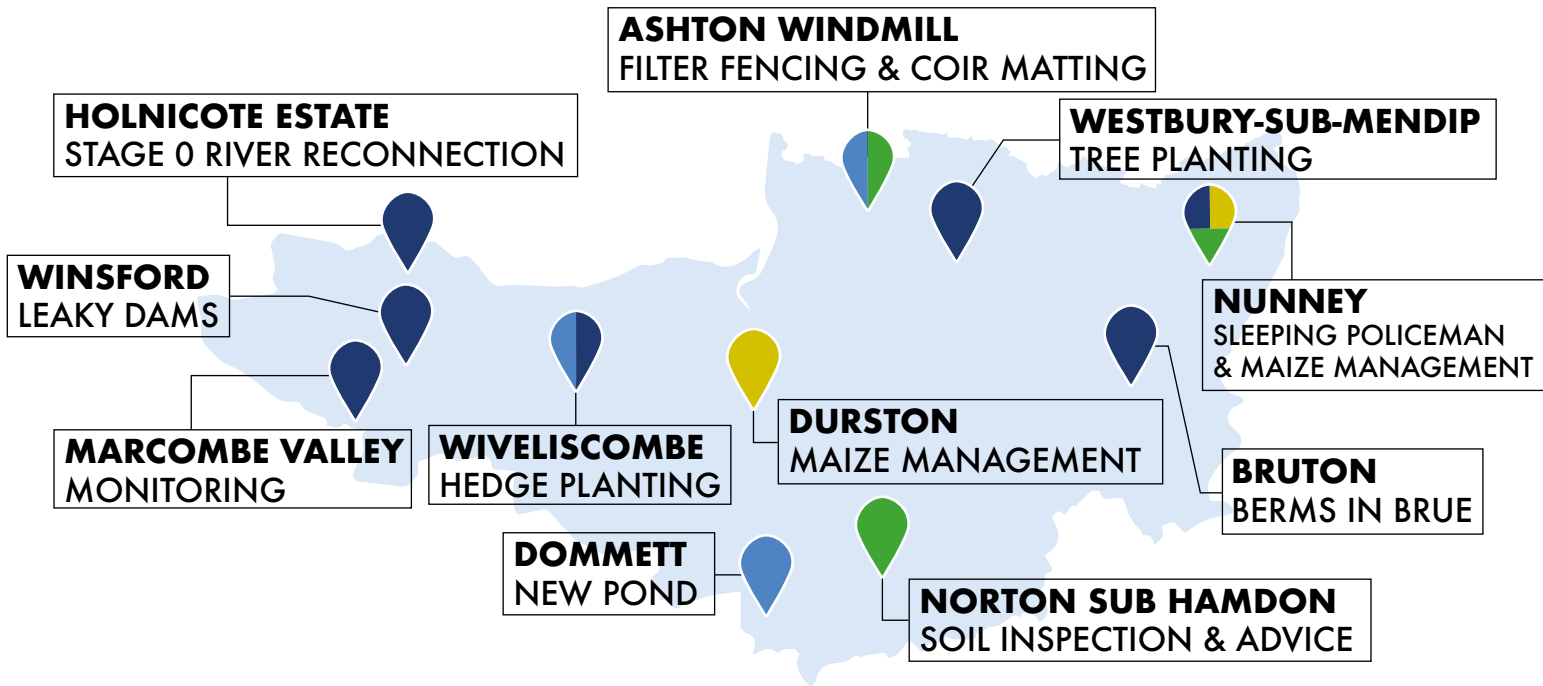
In October 2019, Somerset Rivers Authority updated residents of Chadmead and Northmoor Corner on the idea of building a ring bank around their properties to keep floodwater at bay. Ring banks featured in the 20 Year Somerset Flood Action Plan drawn up in 2014.

The SRA's letter to residents explained why – following a long round of public consultation and investigation and surveying and draft designing – a ring bank was no longer judged to be the panacea initially envisaged.

There were three main reasons. Firstly, size. To be successful, a ring bank would need to be much longer and higher than first thought. Secondly, cost, at least £900,000, not including land acquisition or compensation. Thirdly, research indicated that if flooding like that of 2014 were to re-occur, no homes would be flooded in the Chadmead area. This is because of the benefits of other moves taken locally, such as dredging, works at Beer Wall and the provision of additional pumping capacity.

The letter invited feedback: none was received. In March 2020, work on this project was therefore wrapped up when the SRA Board moved its small remaining technical support budget (£2,933) into contingency.

2019-20 SUMMARY: 16 capital grant schemes (including 7 on the National Trust’s Holnicote estate in West Somerset), 4 Triple C schemes, 26 highways referrals, 18 soil visits, and an online auction for natural flood management works which generated 147 successful bids. The map shows a small selection of the various schemes undertaken.



KEY:

- CAPITAL GRANT SCHEMES
- ONLINE AUCTION
- TRIPLE C MATCH-FUNDED SCHEMES
- HIGHWAYS REFERRALS

Somerset Rivers Authority funds the biggest range of natural flood management activities in the UK. This workstream has won three national and international awards, the latest in April 2019 (1st Prize in the Interreg 2 Seas Project Video Awards). It is known for its sophistication, strong partnership working and dogged attention to local detail. Innovations backed include the country’s first online auctions for natural flood management (NFM) works, and pilot projects with beavers and ‘Stage 0’ processes of river restoration. This workstream is led for the SRA by the Farming & Wildlife Advisory Group SW. Activities 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. Also – as Somerset has some famous hills and valleys and

floodplains – people just get the idea of trying to slow the flow of water from Hills to Levels.

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

The three main strands of work are:

1. Capital grants offered 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. Soil husbandry, reducing surface water run-off.



NFM monitoring

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.

FWAG SW is monitoring the effectiveness of natural flood management in different parts of Somerset. Methods include loggers to record changes in flows, fixed-point photography and channel form measurements. SRA-funded schemes under review in collaboration with a PhD student from Bristol University include a floodplain water retention initiative near Halse in the Halse Water catchment, north west of Taunton, and 20 interventions in the Marcombe Valley in the Upper Tone catchment near Ashbrittle. Another PhD student from Oxford University is monitoring a series of woody dams recently installed near Chesterblade, north east of Evercrech, in the catchment of the River Alham (see page 39). In December 2019, FWAG SW installed loggers near Cothelstone, in the Back Stream catchment above Taunton, where the SRA has also funded work (see page 40). Monitoring like this will increase understanding of the effectiveness and the benefits of natural flood management, and help to improve the design of future schemes and structures.



Meanwhile, FWAG SW and the SRA are always heartened to hear anecdotal evidence of schemes' effectiveness. Binegar Parish Council, for example, wrote in November 2019 to say that a leaky pond, scrape and bund created in 2018 at Binegar Bottom "worked really well, last week in particular through the heavy downpours. Several villagers have commented on how well it ran down the combe and through the pipe in the bund... the water gathered and drained perfectly."



Binegar

In early 2019, Somerset farmers were invited to bid in an online auction for grants from Somerset Rivers Authority. 147 bids were successful across 26 different farm holdings. Works were carried out later in 2019, although some activities had to be postponed because the weather was too wet.

In Somerset's online NFM auctions, farmers are given a choice of natural flood management measures to bid for.

In 2019, these were:

- planting crops that stop soil being washed off fields during the winter, after maize has been harvested
- planting hedges to slow the flow of water
- aerating soil to increase the amount of rain that can filter into the ground

Somerset Rivers Authority provides the money for the grants to carry out these works.

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.

In Somerset – indeed the UK – the first online auction for NFM works was held in summer 2018, in the Somerset catchments of the River Parrett and River Tone. Sixty-four bids were successful.

The online auction held in early 2019 was expanded to cover the whole of Somerset, excepting only the lowest-lying areas where there is less point trying to slow the flow of water. (It makes more sense to slow the flow down to the Levels). In this second auction, 26 farmers and landowners made 147 successful bids for a share of £35,000.

All bids were assessed by FWAG SW to make sure they were feasible and cost-effective. FWAG SW advisers later inspected all works to make sure they were carried out to a good standard.

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. Using maps inside the online auction system, participants can pick out bits of their land where they believe that NFM activities will produce the best flood prevention results for them and for local communities.

The software used for the auctions was developed by the Environment Agency in partnership with FWAG SW, Natural England's Catchment Sensitive Farming initiative and the Sylva Foundation at Oxford University.

2019-20 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.

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



Parrett catchment

In the River Parrett catchment, grants were given for maize management on a total of just over 235 hectares. Some farmers have land dispersed in different places. 2019-20 places were:



Brympton D'Evercy and **Merriott**, Leaze Farm, Dodham Brook and Broad Stream, 23.27 hectares (ha); **Bower Hinton** Farm, near Martock, Wellhams Brook, 13.27 ha; **Seavington St Mary**, Hurcott Farm, Lopen Brook, 9.36 ha; **Fiddington**, Peadon Farm, Stogursey Brook and Fiddington Brook, 8.53 ha; **Huntham**, Meare Green Farm, West Sedgemoor Main Drain, 9.76 ha; **Otterhampton**, Beere Manor Farm, Fiddington Brook, 12.95 ha; **Bawdrip**, Beere Manor Farm, King's Sedgemoor Drain, 23.5 ha; **Cheddon Fitzpaine**, Pyrland Farm, Allen Brook (Maiden Brook), 2.55 ha; **Durston** (Slough Court), Tone catchment, 29.78 ha; **North Curry** (Slough Court), West Sedgemoor Main Drain, 21.21ha; **Huntham** (Slough Court), West Sedgemoor Main Drain, 17.19 ha; **Stoke St Gregory** (Slough Court), West Sedgemoor Main Drain, 4.06 ha; **Stathe** (Slough Court), River Parrett, 18.05 ha; **near North Petherton** (Quantock Farm), Petherton Stream, 12.37 ha; **Clavelshay** (Quantock Farm), Petherton Stream, 29.59 ha.



Tone catchment

In the River Tone catchment, grants were given for maize management on a total of nearly 76 hectares. Some farmers have land dispersed in different places. 2019-20 places were:



Blagdon Hill, Woodram Farm, Sherford stream, 9.595 ha; **Fulwood and Sweethay**, Canonsgrove Farm, Sherford Stream, 6.94 ha; between **Hoccombe and West Leigh**, Higher Chapel Leigh Farm, Halse Water, 13.7 ha; **Fitzhead** (Higher Vexford Farm), Halse Water, one field of 10.7 ha; **near West Monkton** (Quantock Farm) River Tone 14.9 ha; **near Creech St Michael** (Quantock Farm) River Tone 10.7 ha; **near West Monkton** (Quantock Farm), Allen Brook (Maiden Brook) 9.05 ha.



Tone and Parrett catchment

Walford Cross (Slough Court), River Tone downstream of Taunton and Parrett, 13.43 ha.

Frome catchment in Somerset

One place: **Nunney**, Sharpshaw Farm, Nunney Brook source to confluence with Mells River, 22.46 ha (a slightly smaller area than originally bid for because wet weather impeded operations).

West Somerset streams

Two places: **Dunster**, Lower Marsh Farm, between Sea Lane and the River Avill Flood Relief Channel, 7.29 ha; **Higher Vexford**, Higher Vexford Farm, Doniford Stream, 41.2 ha.

HEDGE PLANTING

Two places, both in Somerset West and Taunton, which were: **Horner**, Horner Farm – 550 metres of hedge planting, River Aller; **Skilgate**, Hendover Farm, near Haynes Down Plantation, Ben Brook, 450 metres of hedge planting.

GRASSLAND SUB-SOILING

Very wet weather made ground conditions unsuitable for grassland sub-soiling in autumn 2019, so all grants were carried over until autumn 2020. Places where work is now due to be carried out later this year are:

River Tone catchment

Lydeard St Lawrence (Courthills Farm), Back Stream, 10.06 ha; **between Cothay Manor and Langford Budville** (Lower Cothay Farm), Upper Tone; and also **between Nynehead and Milverton** (Lower Cothay Farm), Hillfarrance Brook, in total 38.66 ha.

Stour catchment

Near Wincanton, New Park Farm, Cale river, 53.718 ha.

West Somerset Streams catchment

Near Boarpath Wood between Lower Vexford and Lawford (Courthills Farm), Doniford Stream, 7.5 ha.



CAPITAL GRANT SCHEMES

Schemes begun or completed in 2019-20

Note that there is usually a time-lag between grants for schemes being approved by the SRA and work being done at sites by contractors. So although the SRA approved 48 grant applications in 2019-20, people have not always got going straightaway. Various factors can affect timings, such as the ground being too wet or too dry or the availability of contractors.

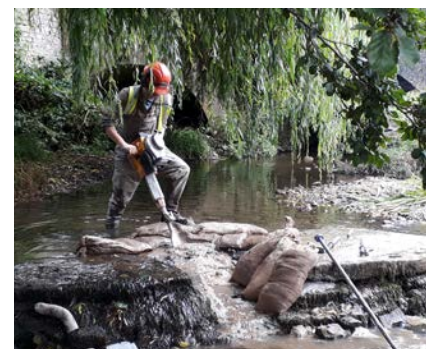
Barrington, Hill Farm, Westmoor Main Drain. A tree and hedge planting scheme to help reduce run-off from farmland into the troublesome Bonnings Lane area of Barrington. The SRA paid 75% of the costs of three elements, the landowner 25%. First, the planting of 50 metres of new hedge and 200 trees in a corner close to Barrington on a flow pathway across a small valley. Second, the planting of 268 metres of new hedge with 1400 hedge plants on a bank on the split between two fields, to prevent run-off across fields above Barrington. Third, increasing the density of trees in an area on a bank above Barrington where SRA-funded planting started in 2018-19, by adding 100 trees.



Bruton, River Brue. A team of 18 Brue Crew volunteers created stone berms in the Brue upstream of Church Bridge in Bruton town centre, using 30 tonnes of limestone donated by the nearby Emily Estate. The berms complement the v-notching of the stone weir downstream of the bridge in 2018, another job funded by the SRA, that was done with a pneumatic drill. The new features were designed in consultation with Somerset Wildlife Trust, the Wild Trout Trust and the Environment Agency. One purpose is to make the channel more sinuous and so help to 'slow the flow' in the upper reaches of the Brue, another is to help scour silt out from under part of the bridge, a third is to provide a new spawning habitat for wild trout.



Curry Mallet, Stud Farm, Fivehead River catchment. Improvements have been made to a large pond uphill from Curry Mallet previously funded by the SRA in 2016-17. Since its creation this pond has significantly reduced flooding problems in the village. It does this by capturing, diverting and storing run-off from a stream and arable fields. The eastern bank of the pond has been reinforced with rocky material. The pond's spillway has been widened and will also be reinforced to prevent scouring. The clay seal in the pond bed has also been improved to help store nearly 5,000 cubic metres of water.



HOLNICOTE ESTATE

Somerset Rivers Authority part-funded seven schemes in 2019-20 to support the National Trust's major Porlock Vale Riverlands initiative on its 12,000-acre Holnicote estate in West Somerset. The other main funder was the EU's Interreg 2 Seas programme through a tie-in with Somerset's Co-Adapt programme. Co-Adapt is aiming to increase local resilience to the water-related effects of climate change: flooding and droughts.

The seven schemes given grants this year follow on from two in 2018-19. They were hedgerow planting at Hurdledown, between Exford and Porlock, and the creation of riparian corridor and habitat through the fencing-off of key areas and the creation of swales and scrapes at Lower Selworthy Farm. The overarching aim of all these schemes is to slow the flow of water down through Horner and Aller catchments, to places such as Allerford and Bossington, by holding water back and by allowing greater infiltration of surface water into the ground. Another major benefit is the making of better habitats for wildlife. The Porlock Vale Riverlands initiative has attracted regional, national and international attention, for reasons including the introduction of beavers and the trial of 'Stage 0' techniques of river restoration.



2019-20 schemes part-funded by the SRA are:

Horner catchment

Dunkery Hill: The road descending from Dunkery Beacon car park to Webber's Post car park had 30 poorly-functioning cross-drains so, during heavy rain, water was not adequately diverted. Instead it poured straight down the hill towards Horner Water, which runs close to businesses such as tea-rooms and a popular caravan and camping site. This scheme, therefore, re-opened the most important drains and ditches. Then three swales and berms were created to catch water running off the road, hold it back, and release it slowly. These three areas also now serve as wet heath and bog habitat. The National Trust describe this as a 'little and often' approach to working with natural processes. SRA funding 40%, Interreg 2 Seas 60%.





Horner Farm, Horner, catchment of Horner Water. Pond created to slow the flow and improve the habitat for local wildlife.

Banked hedge created to increase infiltration and transpiration to reduce the surface flow of water across the farm. In January 2018 Horner Farm was let by the National Trust to new tenants whose ambition is to make it “a showcase of positive ecological practice” with natural processes favoured where possible. The farm featured on the BBC’s Countryfile programme in March 2020. SRA funding 40%, Interreg 2 Seas 60%.

Aller catchment



Selworthy Farm. A pilot project of ‘Stage 0’ full river re-connection, cross-slope hedgerow planting, tree planting and riparian fencing. ‘Stage 0’ is the name given to an increasingly influential process pioneered on rivers in the US state of Oregon. In simple terms, it is about restoring rivers so they re-connect with their surrounding landscapes, branching out into a slower, more complex pattern of multiple channels, pools and wetlands. Where there is the will and the space for this to happen, evidence shows it brings numerous benefits for people and wildlife. It reduces flood risks, improves water quality, and makes bigger and better habitats for more plants and creatures. “Nature likes a mess,” says Ben Eardley of the National Trust, who is leading the Porlock Vale Riverlands project. SRA funding 40%, Interreg 2 Seas 60%.



Whiteman’s Beaver Site, Holt Ball. The SRA funded 20% of the costs of fencing the three-hectare enclosure for two pairs of beavers introduced to Whiteman’s Moor wood. The beavers’ activities are slowing the flow of water to the lower catchment of the River Aller and improving water quality. They create a mosaic of ponds and wetlands that filters water and reduces silt and other pollutants. Interreg 2 Seas funded 60%, the National Trust 20%.

Holt Ball/East Luccombe, headwaters of Aller catchment. 250 metres of double-row cross-slope hedge planting, to increase infiltration and transpiration (the the take-up of water by plants). SRA funding 40%, Interreg 2 Seas 60%.

Selworthy, headwaters of Aller catchment. 500m of double-row cross-slope hedge planting at Selworthy to increase infiltration and transpiration. SRA funding 40%, Interreg 2 Seas 60%.



Great Wood tree planting. 2,200 trees have been planted below Great Wood in a field which forms a flow path directly onto the A39. The trees will help to reduce the flow of water on to the main road and lower down to the Aller catchment. SRA funding 20%, Interreg 2 Seas 40%, National Trust 20%.

CAPITAL GRANT SCHEMES BEGUN OR COMPLETED IN 2019-20

Horton (near Ilminster), Pottery Farm, River Isle. 480 trees and shrubs were planted on 0.4 hectares of waterlogged soil which is next to a tributary of the River Isle and was prone to run-off. The River Isle feeds into the River Parrett near Midelney, south of Langport.



Nunney, Sharpshaw Farm, Nunney Brook (source to confluence with Mells River). A scheme that began as a highways referral. Water running off a long sloping field through a gateway was exacerbating road flooding, and causing problems in winter with cars slipping on ice. Following visits from FWAG SW advisers, several moves have been made. A concrete sleeping policeman has been built across the gateway and the entrance has been filled with hardcore. Water is now diverted into a new 12-metre long blind ditch, where it is held back before soaking slowly through brashy soil. Local highways officers report success.



Westbury-sub-Mendip, Old Ditch Farm, River Axe (source to Cocklake). 254 trees have been planted across flow pathways in Dead Pit and Bottom Meadow to improve the infiltration of water and delay run-off onto Lynch Lane, Westbury-sub-Mendip, and down into the village. To guard against nibbling and rubbing by cattle and sheep, the trees have been fenced off.



Wigborough, Creedy Bridge floodplain storage scheme - South Petherton parish, River Parrett catchment. Work was originally done here for the Parrett Catchment Project (PCP), a partnership launched following summer flooding in 1997 and prolonged flooding in 1999-2000. The scheme's aim was to hold back floodwater, then control its release. A review of PCP schemes carried out for the SRA in 2019 by FWAG SW showed that part of an embankment here had eroded. Instead of being managed, floodwater could escape through the gap. SRA funding meant the bank could be repaired and strengthened. The gap was filled in with soil taken from elsewhere on the site and a protective layer of coir matting was installed. New fencing will protect the feature from livestock.



Winsford, Little Ash Farm, Winn Brook: Three brash dams and two woody dams have been constructed in Winn Brook, to slow the flow of water and trap small pieces of debris and sediment, thereby reducing problems for culverts downstream. 365 metres of fencing has also been erected to exclude livestock. This benefits water quality and reduces bankside erosion. The SRA funded 60% of this project, Headwaters of the Exe 40%. See also p.45.

Wiveliscombe, Withycombe Farm, tributary of Hillfarrance Brook: Two hedges planted across flow pathways in steep fields, to slow the flow of water going down to a pond. Other applications to increase the usefulness of the pond and a former mill leat are awaited.

TRIPLE C MATCH-FUNDED SCHEMES



The EU's Interreg 2 Seas part-funds Hills to Levels through the Triple C initiative. The three Cs stand for Climate resilient, Community-based, and Catchment planning and management. The SRA match-funds Triple C schemes in Somerset. In April 2019, a short film showcasing Hills to Levels won First Prize in the Interreg 2 Seas Video Awards.



Activities in 2019-20

Chapel Allerton, near Ashton Windmill: More than 20 metres of filter fencing and two rolls of coir matting were installed to retain more water and sediment in a field. Water running off was causing prolonged road flooding. This scheme began life as a Highways Referral: for the full story see page 43.



Chesterblade

Chesterblade - Banks Farm: Five leaky woody dams were built in a cascade along the stream that runs from the north side of Small Down Knoll towards Chesterblade Bottom. Some of the dams used living trees as anchors. The dams quickly began to take effect and slow the flow of water locally.

Dommett - Folly Farmyard: A small pond has been created along a flow pathway to complement a larger water retention pond previously funded by the SRA. The new pond temporarily holds water so that sediment can settle out, then eventually water overflows into the larger pond. In this way the new pond helps to stop the larger main pond from silting-up, so the bigger pond keeps more of its water storage capacity. Both ponds also – in a woodland setting – are good for wildlife.



Dommett

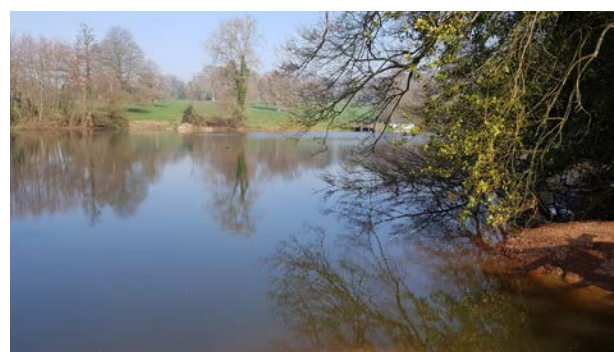
The farmer here has been an enthusiastic supporter of measures to slow the flow of water down through the catchment of the River Ding, which feeds into the River Parrett. In 2018-19, for example, hedge-laying techniques were adapted to create living, green wood dams with saplings of willow and hazel hinged across a watercourse. Observations over the last year suggest this hinging technique has been working well. As a living thing, the dam is likely to serve for longer.

Wiveliscombe, Goulds Farm: A 105 metre bank has been created and a hedge planted on top of it with native species (hawthorn, blackthorn, hazel, dogwood, spindle, field maple and Guelder rose). The bank and hedge have been fenced, and this cross-slope ensemble is now slowing field run-off and limiting flow erosion pathways from the farm's uphill boundary.

The bank and hedge are also helping to direct more run-off down to a bund and pond funded by the SRA in 2017. On 3 March 2020 – during the wet winter – the farmer said he was “pleased to report that both our pond and bund have been working really well over the last few weeks”.

A 2018-19 follow-up

Cothelstone: In 2018-19, two phases of work were completed at Cothelstone. Briefly, in phase one, a large pond was de-silted. In phase two, a sluice structure was installed to enable the pond to operate as a leaky pond that could store more water and then release it slowly. Phase one was funded by the SRA, phase two by the SRA and Triple C. Phase 3 in 2019-20 involved the restoration of a historic silt trap upstream. This work was funded by Triple C and the landowner. The whole three-part scheme will increase water storage capacity in the Back Stream catchment by at least 3,700 cubic metres. Back Stream feeds into Norton Brook which joins the River Tone near Silk Mills Road in Taunton.



HIGHWAYS REFERRALS IN 2019-20

Somerset West and Taunton 2019-20

Carhampton: Reports from residents of run-off from a field damaging nearby properties, mainly gardens, plus possible pollution problems. FWAG SW to investigate.

Cheddon Fitzpaine: Reports from West Monkton Parish Council of localised road flooding also affecting property. Alleged problems include blocked drains and a relief pipe unable to cope with run-off from fields. FWAG SW to investigate.

Fitzhead, Wiveliscombe Road: A Somerset County Council Highways officer reported that a potato field was causing run-off problems. Following a meeting with a FWAG SW adviser, the farmer renting the field installed some temporary soil bunds to retain water. As potatoes are a 1 in 7-year crop, the problem is unlikely to be an annual one, particularly as some buffer strips have also been put in at the edges of the field through a Countryside Stewardship Mid-Tier agreement put together with FWAG SW.

Langford Budville to Holywell Lake: Problems on the road caused by soil erosion from winter wheat; temporary filter fencing installed to trap sediment and slow the flow.

Lower Bilbrook: FWAG SW investigated localised flooding caused by water from three sources converging in the sunken road under the railway bridge. Site meetings were held with a local resident, the Dunster Estate and the tenant farmer. It was agreed that as fields on both sides are above road level it is inevitable that some water will run down. To combat this, it was agreed that road drains should be checked regularly and any blockages removed, and that soil in fields should be maintained in a good structural condition to enhance infiltration and reduce the risks of runoff. Flows should also be slowed locally because the farmer has been installing grass buffer strips through a Countryside Stewardship Mid-Tier agreement and he has twice been successful in bidding for grants for better maize management in SRA-backed online auctions for natural flood management works.

Milverton, Baghay Farm Lane: Run-off and silt from an arable field were causing problems on the road and in residential areas. Large gullies in the field caused by soil erosion were a factor. Appreciating that there were issues, the farmer dug some channels across the field to divert water away from properties and installed a series of temporary bales on the headland to help reduce soil loss on to the road. FWAG SW plan to visit again so that more long-term measures can be mutually mulled over.

Sampford Brett, Capton Farm: Red soil run-off was flowing out of a field and heading for the western end of Sampford Brett via a hard concrete footpath. A FWAG SW adviser visited the site with the landowner and provided filter fencing as a temporary measure to keep soil in the field. Advice was also given about improving soil integrity and structure, to help reduce erosion and problems with field gullies in future.

Tolland, Grove Farm: A local resident reported that water was running out of a gateway following parsnip cropping. FWAG SW visited to discuss temporary mitigation methods. The farmer put straw bales in the gateway to help keep water in the field. As the field has now been returned to grass, it is unlikely to cause any further problems.

South Somerset

Forton and Tatworth: Reports of a brook struggling to cope with heavy loads of water from ditches dug by farmers. FWAG SW visited to see if natural flood management measures could slow the flow of water down from the hills. There are three separate landowners; it was not possible to reach an agreement.

Misterton, Station Road: Resident advised by Somerset County Council's local highways office to report field run-off causing road flooding and also affecting nearby properties. FWAG SW to visit.

Isle Brewers, Bushfurlong Road: Reports of run-off causing localised flooding and damaging the highway. On FWAG SW's first visit the road was closed by flooding. Investigation ongoing.

Haselbury Plucknett, Clay Castle: Reports of highway flooding and a roadside ditch requiring clearing and maintenance. FWAG SW to visit.

Haselbury Plucknett, Swan Hill, Puddletown: Reports of run-off from arable fields contributing to localised flooding on East Close. However, when FWAG SW visited during wet weather, no evidence of flooding was seen, quite possibly because the area was then cropped with temporary grassland. If land use changes, and if future reports of problems are received, this site will be re-visited.

Podimore: Reports of frequent road flooding prompted a FWAG SW investigation into several ditches, pipes and fields. Ditches owned by private landowners were well-maintained and flowing well, nor did maize stubble appear to be a factor. However, the ditch next to the sewage works was very overgrown and needed digging. FWAG SW contacted Wessex Water to discuss this.

Wincanton, West Hill: Following reports of maize field run-off causing localised road flooding and problems, FWAG SW visited the landowner, who agreed to dig a trench to an existing drain which is piped to a nearby gully. This helped but further improvements are to be discussed.

Maperton, North Cheriton Road: Reports of run-off causing highway problems, FWAG SW to investigate.

North Brewham, Hammer Street: Reports of water running off from fields and emerging out of blocked ditches during heavy rain, and then pouring in torrents down the road, damaging the highway and leaving debris. FWAG SW to visit landowner.

Norton Sub Hamdon, Great Street: Sheep grazing over the winter in stubble turnips poached the ground in one field, and carrot harvesting compacted soil in the field next to that, so run-off flowed down a track and on to Great Street. As the stubble turnips field was due to be cropped with maize, another high-risk crop for run-off, FWAG SW visited to inspect the soil and offer advice. Matters discussed included cultivating the ground to improve the infiltration of water, and ways of managing maize during and after harvesting that could reduce run-off and erosion this coming winter. FWAG SW also suggested entering into a Countryside Stewardship Mid Tier scheme that could provide payments for establishing grass buffer strips in the field.

South Petherton, Whitfield Lane: As soils in this area are very sandy and light, they are also very prone to erosion. Over the winter, run-off from an arable field was flowing down Whitfield Lane and Carey's Hollow causing problems with silt deposition and flooding. In late January 2020, FWAG SW visited the landowner to discuss issues and inspect the soil. In February, filter fencing was supplied as a temporary measure to try to reduce the amount of sediment leaving the field. In March, a report to the landowner advised various measures to improve the soil's resilience and boost its aggregation, such as applying organic manures, incorporating straw residues from crops, using cover crops, and including grass in the field's crop rotation cycle. FWAG SW also suggested installing silt traps in two corners of the field, and establishing a grass buffer area to slow the flow of any runoff. A follow-up is planned.

Tintinhill to Montacute: The co-ordinator of Martock's flood wardens, Gordon Swindells, reported that run-off from a gateway on the Tintinhull to Montacute road was causing localised flooding. Following talks with the landowner and a Somerset County Council Highways officer, FWAG SW devised a scheme and put it out to tender. An application for SRA / Triple C funding is expected, once some revised specification details have been agreed with the landowner. (For other news involving Mr Swindells see page 53).

Sedgemoor

Cannington, Currypool: Runoff causing localised road flooding on road. FWAG SW visited and drew up a plan of action. Suggested improvements include removing a manure heap, reducing soil compaction and installing a larger culvert pipe. A scheduled meeting with the landowner had to be postponed because of the coronavirus pandemic.

Chapel Allerton, Ashton Windmill: Somerset County Council's local highways team reported that water running off from a field was causing road flooding, sometimes for long periods. A FWAG SW soil inspection in October 2019 found problems with ground compaction. As a first step, coir rolls and filter fencing were installed, funded by the SRA and Triple C (see page 39). At a meeting between FWAG SW, the landowners, a Somerset County Council Highways officer and the local county councillor, the next best step was agreed to be sub-soiling. This could not be done over the winter of 2019-20 as the weather was too wet. However, sub-soiling is planned for late summer/autumn 2020, after the landowner successfully bid for SRA funding in the latest online NFM auction held in March 2020. After that work is done, it can be decided whether more actions need to be taken, such as hedge-laying and possibly ditch and culvert work.

Moorland: Reports of a blocked gully and polluted material sitting on the road, with concerns about direct discharge into Northmoor Main Drain and thence the River Parrett. A FWAG SW site visit made with the nearby farmer in June 2019 found no evidence of problems. A repeat visit during wet weather in winter likewise found nothing requiring any further action.

Wembdon, A39 Quantock Road: Reports of significant surface water run-off from adjacent farmland for at least the last 2 winters, raising dangers of flooding and ice. An investigation by Somerset County Council's area highways office showed that a farm drainage ditch and pond appeared not to have been maintained for some time, while the creation of a field gate had also severed the ditch, so that water is now discharging on to the road. Ongoing investigation by FWAG SW.

Stone Allerton: A parish councillor reported localised road flooding. A FWAG SW visit with the councillor explored a range of issues including silted-up manholes, standing water in ditches, numerous springs feeding into a stream and a complicated historic drainage system of French drains. FWAG SW intend to focus on the need for ditch maintenance as the best solution.

Mendip

Lamyatt, Portway Hill: Reports of run-off from maize fields causing soil on the road to block drains. An initial inspection by FWAG SW in November 2019 showed that grass had been drilled following maize, which should have helped to reduce run-off over the winter, however local highways officers say that some problems continued into 2020. It is therefore hoped to find solutions for next winter.

A few 2018-19 follow-ups

Some cases take longer than a year to resolve. The SRA values persistence and determination.

Mendip

Dinder and Masbury, A371: Reports of surface water on private land discharging on to the highway. FWAG SW, the estate landlord and tenants met in February 2019 to discuss natural flood management and maize management. The farmer at Masbury has created a leaky pond; talks at Dinder are ongoing as local highways officers report continuing concerns.

Vobster Cross to Hatchett Hill: Surface water from private land is discharging on to the highway. Discussions have been held with the farmer and the Mendip division of Somerset County Council's Highways Department about possible solutions, including enhanced flood water storage in the field and clearing the culvert beneath the road. No definitive answers have yet been found but they are still being sought.

Sedgemoor

North Petherton: In 2018-19, FWAG SW advised the landowner about run-off from a field adjoining Dancing Hill and the High Street in North Petherton. Following that, the landowner won a grant for better maize management in the 2019 online NFM auction (12.37 hectares at this site). It is maize which has caused problems here in the past: no difficulties when in grass.

South Somerset

Peasmarsh, near Ilminster: In 2018-19, there were reports of run-off from a field next to the A358 causing flooding to properties. The farmer agreed to install a cross drain in the gateway to divert run-off to an adjoining ditch. FWAG SW have since contacted the farmer several times. It is still hoped that works will be completed.

Taunton Deane (as was)

M5 southbound near Shoreditch: More work has been carried out in 2019-20 on serious problems that FWAG SW began to investigate for the SRA in 2018-19, namely frequent flooding on the M5 southbound carriageway near Shoreditch causing several accidents. In 2018-19, FWAG SW and Highways England visited the site with the landowner. Soil was inspected and areas were identified for natural flood management. A scheme has now been drawn up and an application for SRA funding is expected soon. (In 2018-19, a programme of drainage maintenance was also agreed with Highways England).

Trull: In 2018-19, FWAG SW began discussions with a farmer about water flowing onto the road from farm fields and a track. In 2019-20, further discussions were held as part of wider catchment work seeking to resolve issues at Dipford reported by the local county councillor. However, two wet weather surveys then showed no problems. It is now thought that issues in the past were caused by roadside ditches that had not been maintained.

Wiveliscombe, Pyncombe Lane: Surveys in 2019-20 showed positive results from moves made in previous years to reduce the risks of landslides and run-off.

Earlier works funded by the SRA included the installation of Redi rock stabilising blocks, coir matting, coir rolls and filter fencing, and the shift of boundary fencing away from field edges to reduce land slippage into Pyncombe Lane. Tarmacking along the road edge to aid drainage, and road sweeping to clear debris, has also helped to keep existing drains working well.

In fields buffering the lane, field corners have been left ungrazed and grass field margins have been established, following helpful discussions with landowners about soil structure and avoiding grazing and machinery movements on fields after prolonged spells of wet weather.



SOIL VISITS 2019-20

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

Sometimes soil investigations lead on to bigger natural flood management projects.

For example, a visit to the Exmoor village of Winsford in late 2018 prompted the Winn Brook dams created in summer 2019 (see page 38).

Mendip: Butleigh, Lower Hill Farm (combined with Mid Tier Countryside Stewardship).

Sedgemoor: Fordgate, Fordgate Farm (x2 - second time to look at establishment of clover cover crop); **Stawell**, Manor Farm (x2 – second time to look at soil health progress).

Somerset West and Taunton: Carhampton, Bridicott Farm (to look at lucerne establishment); **Durston**, Lodge Farm (to look at miscanthus soils); **Exford**, Beech Tree Farm; **Kingston St Mary**, Volis Farm (to discuss herbal ley fields); **Leighland**, Miscanthus Nurseries, just north of A38 Wellington bypass (visit to ground above Leighland); **Lucombe**, Holnicote Estate (meeting with estate management to discuss soil survey); **Luxborough**, Slowley Farm; **Sherford**, Cutcliffe Farm (x2 – an initial soil husbandry visit and discussion of soil-related options under Mid Tier Countryside Stewardship, then a follow-up); **Staple Fitzpaine**, Smokey Farm (to look at soil under festulolium grasses); **Stogumber**, Hill Farm (meeting to discuss Soil Report and NFM and soil measures under Catchment Sensitive Farming).

South Somerset: Dillington Estate (to look at management of ground for potatoes and discuss potential options for buffer strips); **West Camel**, Downhead Manor Farm (to discuss Integrated Pest Management workshop and soil management).

2019-20 SUMMARY: Work on the production of **Somerset-specific guidance for high quality Sustainable Drainage Systems (SuDS)**, following the publication in 2018-19 of a major SRA review of SuDS across Somerset. Also drawing on lessons from the SuDS review, countywide **SuDS inspections** have been carried out at sites being built. **SuDS initiatives in Taunton**, and a **Yeovil SuDS** and surface water study, have progressed.

The first aim of this workstream is to reduce local flood risks. The second is to make places better to live and work.

The SRA's 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.

More could be done across Somerset to use SuDS to their full potential. A massive SRA review found little evidence of developers deliberately considering water quality, biodiversity and amenity. Amenity means features such as paths for walking around SuDS or play areas making imaginative use of rainwater. Some sites had missed opportunities.

Through this workstream the SRA seeks to encourage more high-quality SuDS on new developments and at existing sites which can be retro-fitted. Methods used include encouragement, investigation and demonstration.

ACTIVITIES IN 2019-20

SuDS GUIDANCE

Somerset-specific guidance on Sustainable Drainage Systems (SuDS) is being produced to encourage the creation of high quality, multi-benefit, integrated SuDS at new sites across the county. This project is being led for Somerset Rivers Authority by Somerset County Council using contractors JBA Consulting. Work in 2019-20 has included surveys, workshops, and the preparation of draft Somerset Local Standards for new housing developments, commercial properties and community facilities. By law, new developments must not increase flood risks. They must also prepare for future climate change.

The draft Somerset Local Standards draw upon some of the problems identified and lessons learned through the 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 draft Somerset Local Standards therefore cover issues such as water quantity, water quality, biodiversity and amenity. They set out key principles and specify requirements. Three brief examples: firstly, new developments in the Tone catchment must deal with higher flood risks from the River Tone. Secondly, the question of who maintains SuDS has long concerned the Board of Somerset Rivers Authority and the public. The draft local standards make it clear that planners expect to see a full maintenance and operational management schedule for the entire lifetime of a development. Thirdly, the draft local standards spell out that SuDS should be integrated as part of landscape designs and made accessible for residents to enjoy. In practice this means creating more imaginative public spaces such as car parks and play and recreation areas, and offering people chances to boost their health and wellbeing through features such as paths for walking around SuDS.

The aim is to have detailed guidance finalised and agreed later this year for adoption by Somerset's Local Planning Authorities. Some delays were caused in spring 2020 by the effects of the coronavirus pandemic.

A thorough and detailed Somerset SuDS website is also being created. This features far too many subjects to list here individually, but broadly they 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, district councils, and Exmoor National Park Authority); plus case studies, construction, inspection, operation and maintenance. A section for residents on Living with SuDS includes the opportunity to download a free copy of *Simple SuDS for Local People*, a very useful guide written by self-declared 'floodies' Teresa Bridgeman, who chairs West Somerset Flood Group, and Phiala Mehring of Reading University.



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.

Also picking up on points from the 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 intelligence-guided pro-active service is led for the SRA by Somerset County Council's Flood Risk Management Team, working closely with highways inspectors and district council planners. Fine judgements need to be made about when it is best to visit sites so that if problems are found they can be easily rectified for the good of a development and the people who will live or work there, without recourse to enforcement. Sites inspected over the last year include ones at Cheddar, Frome, Glastonbury, Henstridge, Langport, Monkton Heathfield and Taunton.

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

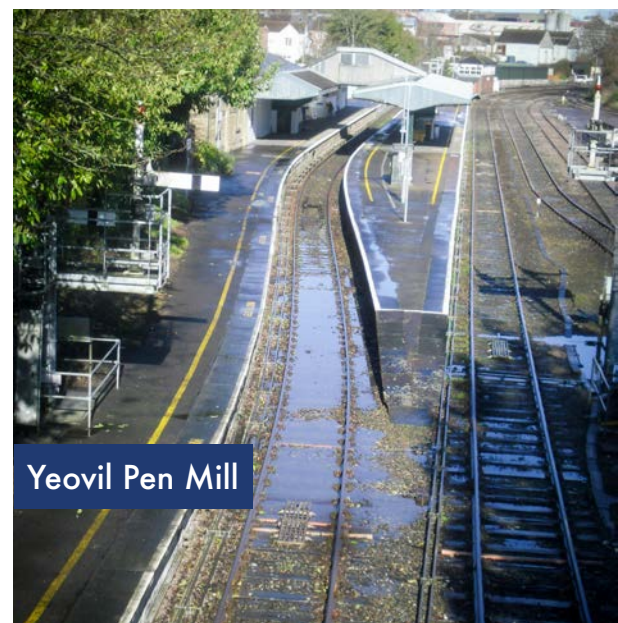
The aim of Sponge2020 is to encourage 'innovative participatory adaptation solutions to reduce the risks of and damage from urban flooding... at considerably lower costs'. As Taunton has been designated a Garden Town, the county council has been collaborating with Somerset West and Taunton Council on the design and construction of additional SuDS at Coal Orchard. GreenBlue Urban tree pits will bring water storage and water quality benefits. Good quality mature trees will enhance the regeneration of this high-profile town centre site.

Also as part of Sponge, a proposal to retrofit SuDS onto car parking areas at County Hall and Shire Hall has been developed for the county council by contractors WSP. This proposal is currently progressing through the necessary statutory approval processes.

A site near Parkfield School in Taunton has been identified for a **Highway SuDS Retrofit Trial**. This will show how SuDS can deal with surface water and deliver more benefits than traditional drainage schemes. The school is particularly keen on proposals for improving safety for pedestrians and enhancing part of the local environment. It is hoped to give pupils chance for some active learning with Somerset County Council ecologists.

This project is being led for the SRA by Somerset County Council's Flood Risk Management Team working in partnership with the Highways Department. Design is scheduled for this year, and construction for next. The idea is to allow more time for the coronavirus pandemic to recede so that pupils can get involved.

In South Somerset, the **Yeovil Urban SuDS Study** has been investigating how surface water flooding 'hotspots' around the town could be tackled through the use of SuDS. As with other activities in this Urban Water Management workstream, a guiding principle is that carefully placed and well-designed SuDS can also offer local people recreational and educational opportunities, and benefit wildlife and the environment. The study is being delivered for the SRA by the Farming and Wildlife Advisory Group Southwest, working with Somerset County Council, and using Yeovil Rivers Community Trust (YRCT) as contractors.





Milford Dip

The Trust has been surveying parts of Yeovil to check on the ground whether areas marked on Environment Agency flood risk maps are indeed prone to surface water and sewer flooding. Findings have also been cross-checked against the Strategic Flood Risk Assessment (Level 1) commissioned by South Somerset District Council and Somerset West and Taunton Council in 2019.

Several locations have been identified where SuDS could potentially address surface water flooding problems and provide other benefits. The highest priority areas are:

- Town Centre (Quedam, Cattle Market, Glovers Walk, Yeo Leisure Park, Old Station Road/Beefeater/Premier Inn/Wilko/Tanyard View)
- Horsey Lane, Millbrook, Police Station site, West Hendford
- Pen Mill Trading Estate, Fiveways School, Pen Mill Railway Station, Camborne Grove/Camborne Street
- Milford Valley, Elizabeth Flats
- Westfield Estate (Westfield Road/Westfield Grove/Westfield Recreation Ground) and Westfield Academy
- Lynx Trading Estate



Pen Mill Trading Estate



Lynx Trading Estate

Milford Valley has significant open space. Smaller green spaces are at Westfield Recreation Ground, Westfield Academy, Birchfield, Fiveways School and around Yeovil College. Ideas for larger SuDS features at these sites are being considered.



Westfield Academy

Elsewhere the focus is on possibly retro-fitting SuDS measures such as rainwater harvesting, green roofs, rain gardens, permeable surfaces, and small ponds. As well as reducing flood risks, such features would help to increase Yeovil's resilience to climate change and make the town more attractive. Promising opportunities currently exist in Yeovil because of plans for redevelopments at several key locations, for example the cattle market, Glovers Walk, and the police station site.



Upper Milford Valley

In its Enhanced Programme for 2020-21, the SRA is also funding the production of an overarching Surface Water Management Plan for Yeovil. The Yeovil Urban SuDs Study will feed into that long-term action Plan. The Plan will enable much stronger bids to be made for national Flood Defence Grant In Aid payments for tackling specific problems.

The SRA and its partners want Yeovil to enjoy a more comprehensive, efficient and cost-effective approach to surface water management.

Proposals for some top priority sites have been developed into outline designs. More work will be done in 2020-21, particularly on continued engagement with partners including Wessex Water, South Somerset District Council, Yeovil Town Council, Yarlinton Housing Group, landowners and managers, and on raising public awareness of flooding and climate change issues around Yeovil.

2019-20 SUMMARY: Extra maintenance works across Somerset to reduce flood risks to roads and nearby properties, including gully-emptying, drain jetting, and de-silting of structures. Drainage upgrades at **Monksilver**; drainage upgrades and road-raising at **Shurton** and **Burton**; big studies around **Beckington**, **Cheddar** and the A38 Blackbird Bends near **Wellington**; designs for a flood warning system at **Martock** and for culvert replacements in **West Huntspill** and **Mark**.

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.

So as it oversees the Flood Action Plan, Somerset Rivers Authority deals with highways as well as waterways. Hundreds of places susceptible to local road flooding benefit from extra maintenance works funded by the SRA. Bigger schemes tackle long-running problems. For example, in 2019, the tellingly-named Water Lane in Burton has been raised up.

SRA studies focus in more detail than ever before on different aspects of flooding problems, as recently around Cheddar and Beckington near Frome. Investigations also strike new ground, as 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 2019-20

ENHANCED MAINTENANCE OF HIGHWAYS AND STRUCTURES

Gully emptying: Somerset County Council's Highways Department empties gullies in areas most susceptible to flooding once a year. The SRA funded an additional six-month round for 14,221 of the highest-risk gullies countywide; far too many to list individually! The aim is to keep roads open, make them safer, preserve access for communities, and safeguard properties from flooding.

Drain jetting: 185 places benefitted in 2019-20; 47 in Mendip, 61 places in Sedgemoor, 62 in Somerset West and Taunton, and 15 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, because they feature on annual gully-emptying rounds. Final selections are made using local knowledge and professional judgement.





Higher Alham



Cockhill



Oldford

De-silting of structures: Works were carried out in 2019-20 at 12 locations.

Mendip: Higher Alham, between Batcombe and Cranmore, River Alham; **Oldford**, Selwood parish, between Frome and Beckington, River Mells.

South Somerset: Cockhill South, **Cockhill** near Castle Cary, River Cary, SRA funded part of larger refurbishment scheme; A359 Lambrook New, **Lambrook**, near Marston Magna, Hornsey Brook, River Yeo.

Somerset West and Taunton: Claremont Drive (between Galmington Drive and Essex Drive) and New Barn Park, Queensway, **Comeytrove**, Taunton, both on the Galmington Stream, **Boniton Cross**, A396 west of Dunster, River Avill; B3224 bridge, **Exford** - in front of the Exmoor White Horse Inn, vegetation removed from the River Exe by hand from gravel bars; Rill, Parsonage Lane, **Kingston St Mary** parish; Stoke Road, **Stoke St Mary**, River Tone catchment; Vokers, Gerbestone Lane near **M5 J26**, West Buckland parish, River Tone catchment.

Culvert inspections and remedial works in Internal Drainage Board (IDB) areas: The main aims of this project are to improve the conveyance of water and to help prevent disruption to residents and road users. In 2019-20, designs for the replacement of two culverts were prepared, one at Puriton Road in West Huntspill, the other at Northwick Road in Mark. These works were about to go out to tender in late March 2020, when coronavirus lockdown restrictions were introduced. Both schemes are now expected to happen in autumn 2020, workers' safety permitting. Both schemes will involve temporary road closures.



SCHEMES

Monksilver: The SRA Board agreed in September 2018 to put £170,000 from underspends on projects in 2017-18 into flood protection works in Monksilver. Somerset County Council's Highways Department then designed a scheme for the SRA, focusing on problems at the northern and southern ends of the village.

Parts of Monksilver flooded several times in recent years, because the drains in key places could not cope with the volumes of water coming down off the Brendon Hills.

A contract was let to Skanska and works began in April 2019. The first two phases were completed by mid-May 2019. These focused on upgrading drainage systems down Beech Tree Hill and along the B3188 (pictured, left). After a pause to allow Monksilver's popular church fete to go ahead at the start of June, a third phase was completed. This improved parts of the drainage system going down from Birds Hill Lane into High Street.

At least 15 properties in Monksilver have benefitted from works to stop mud and water surging down towards people's homes from surrounding steep hills, roads and bridleways.

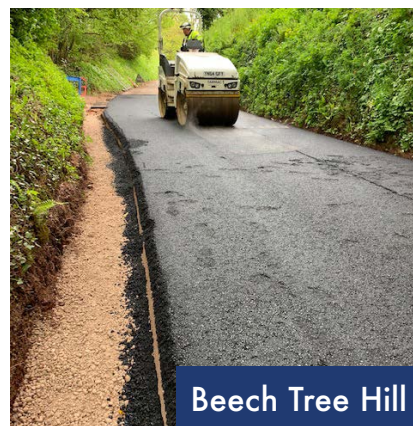
The whole scheme complemented earlier projects by Somerset County Council, and more minor SRA-funded activities such as underground CCTV surveying, drain jetting, de-silting near The Notley Arms and natural flood management works upstream at Combe Sydenham. The latter were delivered for the SRA by the Farming & Wildlife Advisory Group SouthWest, as part of the Hills to Levels initiative.

Shurton and Burton Highway Flood Relief: Shurton and Burton are small settlements in the parish of Stogursey in West Somerset, not far from Hinkley Point. Works in autumn 2019 benefitted local residents and properties by reducing the risks of Shurton and Burton being cut off by flooding. They also improved an emergency evacuation route from Hinkley Point, where more than 2,000 people are building a new nuclear power station.

The site of works at Burton was between Water Farm and Little Water Farm on Water Lane. At Shurton, along Shurton Road either side of Newnham Bridge. Records show both places had a long history of flooding, with problems at Shurton made worse by an obstructed water channel.

Somerset County Council's Highways Department designed improvements for the SRA. Along Water Lane at Burton, the road was raised by up to 30 centimetres (1 foot) and the roadside drainage system was strengthened and upgraded. Along Shurton Road, the carriageway was raised by up to 50 centimetres (19.7 inches). More than 600 tonnes of bituminous material were laid. The drainage system was also improved, with new outlets put into the stream that flows under Newnham Bridge. Contractors included local crews from Skanska, Tarmac, CH Contracting from Frome and Pete Phillips & Sons from Bridgwater.

To maintain the benefits of this work in the future, Stogursey Parish Council has agreed to work with landowners who have riparian responsibilities for clearing watercourses, to further reduce flood risks.



Flood alert system: For the SRA, Somerset County Council's Highways Department has designed a flood detection and warning system – with four signs – for Stoke Road in Martock. Once posts have been installed by contractors Skanska, other equipment should follow within two months.

Stoke Road is vulnerable to flooding between Martock and the A303. Martock's flood warden co-ordinator Gordon Swindells, an ex-policeman, has been particularly concerned about the risks of people getting injured, and vehicles submerged and damaged, when it is dark. Real-time alerts will promote safety.

Mr Swindells has also been involved with several natural flood management schemes in the Martock area. See the Tintinhull to Montacute entry on page 42 for a recent example.

In 2019, he was named as a national River Champion by the River Restoration Centre. Mr Swindells was presented with his award by SRA Chair Cllr David Hall at an SRA Board meeting held in the Yeovil headquarters of South Somerset District Council.



INVESTIGATIONS

Every year Somerset Rivers Authority aims to fund a small number of investigations. The SRA looks particularly for issues that lie beyond the scope of what other individual organisations can do on their own – or for issues that fall between the gaps of what other organisations are doing – or for some combination of the two. As a co-ordinating body, the SRA can get different organisations working together as partners in ways they would do not otherwise. Niggly problems do not get neglected; better results follow.



Beckington surface and foul water investigation

The historic village of Beckington near Frome has long suffered flooding problems. Almost every possible aspect of these has now been investigated for Somerset Rivers Authority. Only a small number of inaccessible features – such as old stone-lined culverts going underneath houses with no manhole covers – escaped attention.

Investigations were led for the SRA by Mendip District Council's Flood Risk Consultant Caroline Murray of CALM Engineering (*pictured above with Jane Moon of Hydromorph*) working in collaboration with Wessex Water, Somerset County Council's Highways Department and the Farming & Wildlife Advisory Group SouthWest (FWAG SW). Partners and contractors have surveyed land, watercourses, wells, roads and drainage systems around Beckington. Residents' co-operation has been invaluable.

An Options Appraisal Report is now being written, and a bid for further SRA funding is expected, so that moves can be made to tackle problems from different angles. The village centre would especially benefit from flood risk reduction works.

Progress in 2019-20

Surveys of Beckington were previously carried out for Wessex Water and Somerset County Council's Highways Department (SCC Highways). Their findings were collated for the SRA, but they did not fully show how rainwater and run-off are conveyed through Beckington, or how different areas are – or are not – connected.

Additional surveys have therefore been completed in and around the village, to identify opportunities for improvements, and also to spot potential mis-connections that could be fixed to boost the foul sewer system. Activities included:

A walk-over survey and initial assessment of the different routes down which surface water can flow was carried out around Beckington. A follow-on watercourse survey was carried out with specialist consultant Jane Moon of Hydromorph in September 2019.

Experts in land and natural flood management techniques from FWAG SW undertook initial consultations with landowners to ascertain their appetite for taking part in schemes to slow down the flow of water from farmland upstream of the main drainage routes into Beckington. This work is ongoing.

Detailed CCTV surveys of Beckington's underground surface water system took place over 13 days in April and May 2019. These surveys were funded by the SRA.

In June 2019, the project team had initial talks with Wessex Water about areas where surface water was mis-connected into the foul sewer network. They picked out areas that might require revisiting during a final 'mop up' survey to prove connections to the foul sewer from areas that had been identified but were not accessible by camera. They also discussed periodic sewer blockages caused by wet wipes and fat deposits.

In August 2019, SCC Highways upgraded parts of the road drainage system identified as problematic in 2016. All road-edge gullies were thoroughly cleaned. The project team and Highways also identified several buried manholes and inaccessible highway drains that had previously prevented a full survey of the surface water system. Improvements were made at these sites so they could be covered in a final 'mop up' survey.

In November 2019, the project team received A36 drainage details from Highways England. Ongoing discussions are focused on reducing the volume of surface water draining into Beckington.

A final 'mop up' survey was undertaken in February 2020. The results are being analysed and mapped for the SRA as part of the production of a Beckington Drainage Review. In addition, Wessex Water are considering what the better understanding of Beckington's drainage network that has been acquired could mean for the village's sewer system.



A **study of flood risks in and around Cheddar** has been produced for Somerset Rivers Authority by Somerset County Council and contractors JBA Consulting. A recent example of flooding problems came in November 2017 (*pictured above*), when the B3135 through Cheddar Gorge was closed for a week while rocks and debris were removed and the road was repaired.

The study will be used to help identify measures which could be taken by the SRA and its partners to safeguard properties, businesses and a very special part of Somerset. Landscape and environmental designations include Mendip Hills Area of Outstanding Natural Beauty (AONB), Special Area of Conservation, and Site of Special Scientific Interest (SSSI).

In November 2019, a community drop-in session was held in the Village Hall. Around 50 members of the public provided useful insights into local flood risks and shared helpful details of their concerns about potential causes and impacts of flooding. Information was also gathered through online questionnaires and meetings with other stakeholders including the Parish Council, caving groups and local businesses. All this helped to increase knowledge and understanding of the history and mechanisms of Cheddar flooding.

Data was collated from various sources including the Environment Agency, Bristol Water, Wessex Water, Sedgemoor District Council, Goughs Cave and local landowners and caving clubs. The project team carried out a detailed review of this data and compiled a chronology of historic flood events. They also combed through previous studies of local flood risks.

The team then identified significant overland flood pathways in Cheddar. They analysed these so as to better understand where water comes from, where it goes and the impact it has on local properties and infrastructure. Locations affected include Gough's Cave, The Cliffs, Redcliffe Street, Draycott Estate, Cheddar Reservoir, Axbridge Moor and Hamfield, Barrows and Hillfield.

Possible mitigation and resilience measures are now being assessed. They include Natural Flood Management, Property Flood Resilience, CCTV Surveys (to provide greater understanding of the connectivity of culverts and sewer pipes within the village), gully maintenance and clearance, desilting of the River Yeo through the village, and better flood warning and insurance arrangements.

Another public event in Cheddar Village Hall will be held to discuss the study's findings and to outline possible next steps. Questions and comments will be encouraged. It has not yet been possible to arrange a date for this event because of coronavirus pandemic restrictions.

A38 Blackbird Bends flood alleviation study: In 2017-18 the SRA funded drainage improvements on the A38 at Rumwell. In 2018-19, a new drainage pipe was installed for the SRA across the A38 near Chelston. In 2019-20, a study began into the catchment upstream of the area around Blackbird Bends on the A38 near Wellington. The aim is to identify works that will further reduce the risks of flooding along this busy and important road, which is used by more than 17,000 vehicles every day. Also, if the M5 is closed, the A38 is used as a diversion, so it is important to keep it open.

On behalf of the SRA, Somerset County Council commissioned contractors WSP. Surveys of local watercourses and culverts have been carried out and a model produced of local flow mechanisms. Results and recommendations are expected by autumn 2020.

2019-20 SUMMARY: Two new community engagement officers began working with people, groups and parish councils across Somerset; affordable flood insurance survey results were analysed and fed back to communities; four communities got SRA grants for equipment; the SRA part-funded Somerset’s second Community Resilience Day; a very localised community flood alert system has been devised as a pilot project; Adapting the Levels (part-funded by the SRA) held successful events in Wedmore and Langport and worked with parish and town councillors, farmers and communities on the Somerset Levels & Moors on ways of adapting to the water-related effects of climate change (flooding and drought); a pilot project is being planned with Climatewise at the University of Cambridge.

One of the six main objectives of Somerset’s 20 Year Flood Action Plan is to “Increase resilience to flooding for families, agriculture, business, communities and wildlife”. The Plan said that after the floods of 2013-14 people should first be helped to re-establish their day-to-day lives. Communities, individuals and businesses should next be helped to prepare and adapt for future floods. The SRA has never sought to claim that floods in Somerset can ever be entirely prevented. But if people can become better informed and better equipped, they will be better placed to protect themselves against floods and to recover more quickly afterwards.



Dawn James (left) and Emma Giffard



W5 leader Nicola Dawson (behind house)

So the SRA now funds a full-time Community Engagement Officer (Emma Giffard) and a Community Engagement Support Officer (Dawn James). Emma and Dawn work closely with Somerset County Council’s Civil Contingencies Unit and are members of Somerset Prepared. Somerset Prepared is a partnership between local emergency services (Police, Fire & Rescue, Ambulance) and organisations that help to enhance local resilience (such as British Red Cross, the Community Council for Somerset, the Environment Agency, Rotary International, Safe South West and Somerset Local Authorities Civil Contingencies Partnership). As members of this partnership, Emma and Dawn can benefit from – and contribute to – advice, guidance and support for local initiatives.

BUILDING RELATIONSHIPS / COMMUNITY FLOOD GROUPS

The SRA's new community engagement team have been getting out to places to meet parish councils and people at risk of flooding, to discuss concerns and offer support. Communities visited have included: Aller, Bridgwater, Burrowbridge, Cheddar, Huish Episcopi, Langport, Martock, Monksilver, Moorland, Othery, Somerton, Stawell, Thorney, Washford, Wedmore, West Camel and Westonzoyland.

Dawn and Emma want to help communities build local resilience by developing and strengthening relationships. Put simply: 'make friends before you need them'.

So, for example, Dawn and Emma worked with residents in Langport and Huish Episcopi who were eager to re-establish a local flood group. Together they won support from Langport Town Council and Huish Episcopi Parish Council, then in March 2020 held a very successful recruitment day in Huish school hall, followed by a tour of Langport flood defences hosted by staff from the Environment Agency. The group's intention is that every area at risk of flooding in Langport and Huish Episcopi should benefit from a dedicated cadre of flood wardens.



Flood group members with Adrian Govier of the Environment Agency (far right)

Chris Bottomley, of Langport and Huish Episcopi Flood Group, said: "The SRA community engagement team acted as a catalyst in getting the first Flood Group meeting off the ground. It was useful to be able to access contacts through the SRA and also the SRA provided significant help in putting the meeting together by providing resources and literature for the meeting that would not have otherwise been available to us. The tour of the Langport pumping station was also very interesting."

Dawn and Emma have been contacting flood groups across Somerset. It is intended to establish networks and communication systems that would allow volunteer flood wardens to share information and knowledge, and support each other.



Dawn James



COMMUNITY FLOOD ALERTS

The aim of this project is to try out ways of setting up very localised early flood warning systems, through using smart, low-cost, low-maintenance devices at key locations identified by flood wardens, flood group members and residents.

In parts of West Somerset there is felt to be a particular need for faster and more detailed information about specific local flood risks than it is currently possible to provide through the Environment Agency's system of alerts and warnings. In 'rapid response' catchments with high-sided valleys and deep lanes, flood waters can rise very quickly when there is heavy rain on the hills, posing high risks to people's lives.

The SRA's remit is to provide extra services meeting local priorities through working in partnership. In response, therefore, to requests from West Somerset Flood Group, the SRA's new community engagement team have been working with the Environment Agency and Somerset Drainage Boards Consortium on research into flood alert systems and suppliers. Lessons have been learned from localised Environment Agency trials in Devon and Northamptonshire.

A preferred supplier has now been identified. Procurement and installation will start in the Washford catchment – including Luxborough and Roadwater – in the second half of 2020.



John Rowlands (Environment Agency) speaks at Somerset Resilience Day

SOMERSET COMMUNITY RESILIENCE DAY

Following the success of the first Somerset Community Resilience Day in October 2018, the SRA part-funded a second event in October 2019. More than 50 volunteers, wardens, councillors and community leaders travelled to North Petherton for talks, workshops and displays. A key feature was giving people chance to learn from each other's experiences. Subjects included how to get – and keep – local people engaged and how to write and update emergency plans.

The event was organised by Somerset Prepared, and five other agencies and organisations were also involved with different elements of the day.

COMMUNITY GRANTS

The SRA funds a small number of grants for equipment and training given to Somerset communities by Somerset Prepared. Four places benefitted in 2019-20:

Somerset West and Taunton: **Allerford & Selworthy Community Hall** – shed for storing resilience equipment; **Dulverton Town Council** – solid base for flood resilience shed to protect contents from vermin, sand and sand bags, hi-viz jackets, heavy duty gloves, black plastic for defence of properties.

South Somerset West and Taunton: **Ham Village Flood Committee** – two water depth marker boards for installation at Ham footbridge and Coalharbour bridge.

Mendip: **Holcombe Parish Council** – heavy duty storage box and equipment including hi-viz jackets, emergency blankets, torches and a portable battery radio for listening to emergency updates on BBC Radio Somerset.

FLOOD INSURANCE SURVEY

In November-December 2018, a flood insurance survey was carried out for the SRA by the Community Council for Somerset. Lack of affordable flood insurance was one of many worries faced by households in Somerset after the floods of 2013-14, and one of the survey's aims was to find out if this was still a problem in some of the worst-hit communities. A particular focus was on what difference the setting-up of Flood Re in 2016 had made. Questionnaires were sent to 1,300 households in Athelney, Burrowbridge, East Lyng, Fordgate, Moorland, Muchelney, Oath, Thorney, West Yeo and Westonzoyland, and county councillors engaged with residents in Chadmead and North Curry. People elsewhere in Somerset were able to get involved with the survey if they wanted to. Just under 400 people responded.



A full report of the survey's findings was published in 2019 on the Somerset Rivers Authority's website. Key points include:

76% of those who responded to the consultation had flood insurance, 22% did not, and 2% reported that they could not get insurance.

74% were able to access affordable flood insurance without problems, while 21% had experienced some difficulty with this.

For those who were flooded out of their homes, problems with affordability rose to 41%.

Comments showed that many had experienced large increases in premiums, sometimes more than 100%. Some respondents reported excesses of between £3,000 and £30,000.

56% had remained with the same insurer since 2013-14 and 32% had changed insurer, with the remaining respondents stating this was not applicable to them.

62% were not aware of Flood Re, a joint initiative between the Government and insurers to make insurance more affordable.

47% of respondents agreed or strongly agreed that their household was less at risk of flooding now than in 2013-14, 32% were unsure, 19% either disagreed or strongly disagreed, and 2% expressed no opinion.

46% agreed or strongly agreed that their community was more prepared than in 2013-14, 33% were unsure, 17% either disagreed or strongly disagreed, and 3% expressed no opinion.

47% agreed or strongly agreed that works undertaken by the SRA and other public bodies has reduced the risk of flooding, 33% were unsure, 18% either disagreed or strongly disagreed, 2% expressed no opinion.

When questionnaires were first sent out, the SRA promised to get back to people with the survey's results, and this was done by the SRA's community engagement team. As flood insurance remains a challenge for many people, residents were also offered advice about ways of getting the best possible prices. For example, it is important to check that insurers are quoting for exactly the right address (a bigger problem than is commonly recognised), to check that brokers can access Flood Re, to use online price comparison sites, and to seek other quotes even when intending to stay with the same insurer. Information was given about new types of flood insurance that use sensors to detect water, and advice offered on how to access emotional support for people affected by flooding. Also posted was a leaflet, designed by Mary Dhonau of Know Your Flood Risk and provided by Flood Re, with practical ideas about improving properties' flood resistance and resilience.

Flood Re is a not-for-profit fund owned and managed by the insurance industry, that insures insurers against flooding losses. The SRA's community engagement team consulted with senior Flood Re staff, who were very interested in the survey's findings. Talks led to further conversations with ClimateWise, an insurance industry initiative based at the Cambridge Institute for Sustainability Leadership at Cambridge University. ClimateWise looks at cases across the world to find better ways for insurers to deal with increasing environmental pressures caused by climate change. Following discussions with the SRA and Somerset County Council, ClimateWise has identified Somerset as a preferred location for a pilot study, to consider and develop new ways forward.

“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 feeds into many different parts of the SRA's work, particularly into the following two projects, both ongoing.

WETLAND BIOMASS FEASIBILITY STUDY

‘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 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.

In 2019-20, to establish whether wetland biomass is a realistic commercial proposition, the SRA has been funding a real-life case study, centred on the possible installation of a boiler using wetland biomass in Somerset County Council's highways depot at Dunball north of Bridgwater. Issues covered have included the technical and economic efficiency of biomass, possible subsidies and how to handle ash and waste.

If this study shows that wetland biomass is commercially viable, it could lead gradually to the creation of new businesses and jobs on the Somerset Levels. It could give landowners a diversified income and offer Somerset a local alternative fuel.

ADAPTING THE LEVELS

Somerset Rivers Authority and the EU's Interreg 2 Seas European Regional Development Fund are funding a major project called Adapting the Levels. This involves communities, farmers and landowners, businesses, water management experts and local government. The aim is to get local people and organisations co-operating and adapting to the water-related effects of climate change (flooding and drought). The project will run until 2023. Its delivery partners are Somerset County Council, the Farming & Wildlife Advisory Group SouthWest and Somerset Wildlife Trust.

Adapting the Levels offers grants to farmers and landowners on the Somerset Levels & Moors for measures which will help them to 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 will be shared between different countries.

Augmented reality sandbox - making it rain



Wedmore drop-in



Langport drop-in



Langport consultation

The SRA's community engagement officers have therefore begun working with project officers from Somerset Wildlife Trust and consultants Trioss to create draft adaptation pathways with large numbers of local people. Initial focus areas have been parishes on Tealham and Tadham Moors near Wedmore, and Wet Moor and West Moor near Langport. Residents and businesses, landowners, farmers, policy makers, councils, and infrastructure experts have all been contributing experiences, ideas and knowledge. The process is one of seeking and building consensus.



SRA Board substitute member Cllr Clare Paul



Dawn James (left) and Shelly Easton (Adapting the Levels)

Two public drop-ins were held in February 2020, one in Wedmore, one in Langport. Their purpose was to raise awareness about the local impacts of climate change, to share information about nature-based solutions to flooding and drought, and to give people chance to chip in to Adaptation Pathways. Over 330 people attended, and the events received widespread positive feedback. One big successes was an augmented reality sandbox. This let players model sand into any kind of shape they wanted. The system responded by projecting a contoured map onto the sand. Participants could then make it 'rain' and see how rainfall (really, just blue light) moved across the landscapes they had made. This device was extremely popular with children and adults. It helped people to visualise how water is managed on the Somerset Levels & Moors, and will be used again at future events. Event information boards are online at <https://www.adaptingthelevels.com/information-boards>

A Moor Associations Co-ordinator, a Farm Liaison Officer and a Water Management Adviser, all employed through FWAG SW, have been working directly with farmers and landowners. Moor Associations were encouraged by the SRA in an earlier strand of work now absorbed into Adapting The Levels. The first association formed was West Moor Futures Group. Other groups are emerging on Wet Moor and Tealham and Tadham Moors. In a presentation to the SRA Board in January 2020, co-ordinator Will Barnard explained the benefits of forming associations in areas with fragmented land use. Experience showed that greater co-operation between farmers and a single management structure enabled greater collective buying power, more machinery sharing, better grazing arrangements and improved farmland infrastructure. Mr Barnard said that modest capital schemes – such as restoring droves – could make marginal landscapes significantly easier to manage. Adapting the Levels' target is to make 4000 hectares more sustainable when up against "climate and economic change" (to quote Somerset's 20 Year Flood Action Plan again).

Other Somerset Co-Adapt projects are in the catchment of the River Culm, which rises near Holman Clavel in the Blackdown Hills, and in Porlock Vale, where works fuse with the National Trust's Riverlands initiative, and nine schemes have so far been part-funded by the SRA through Hills to Levels (see pages 36-37).



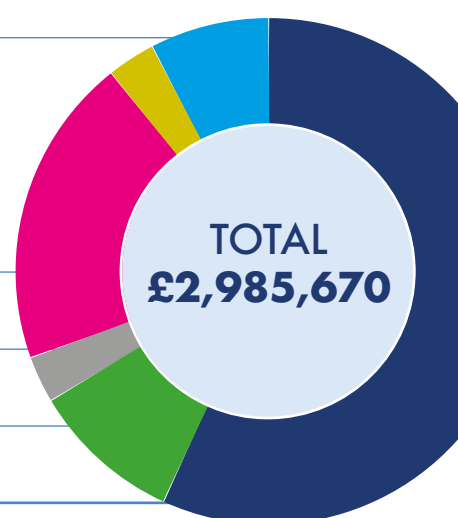
Several partners in the SRA – Somerset County Council, Mendip District Council, Sedgemoor District Council, Somerset West and Taunton Council and South Somerset District Council – have all declared climate emergencies and pledged to take action. Members of the SRA Joint Scrutiny Panel, largely drawn from local councils, have frequently raised concerns about climate change and the subject featured regularly in Parliamentary debates about the Rivers Authorities and Land Drainage Bill (see pages 6-7).

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.

2019-20 LOCAL PARTNER FUNDS

Somerset Rivers Authority (SRA) gets 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 2019-20, the SRA received Local Partner Funds from these two sources totalling £2,946,300 (£2,926,300 'shadow precept', £20,000 from the two IDBs – £10,000 each). The SRA Board set a budget for 2019-20 of £2,985,670, with additional funds of just under £40,000 taken from contingency. The Board allocated 92.5% of this funding to an Enhanced Programme of works containing 28 schemes and activities, all designed to advance Somerset's 20 Year Flood Action Plan. The remaining 7.5% of funding was for staffing, administration and overheads.

BY WORKSTREAM	TOTAL £	%
Dredging and River Management	1,703,500	57
Land Management	292,500	9.8
Urban Water Management	87,000	3
Resilient Infrastructure	589,000	19.7
Building Local Resilience	87,670	3
SUB TOTAL	2,759,670	
Staffing, administration, overheads	226,000	7.5%
TOTAL	2,985,670	



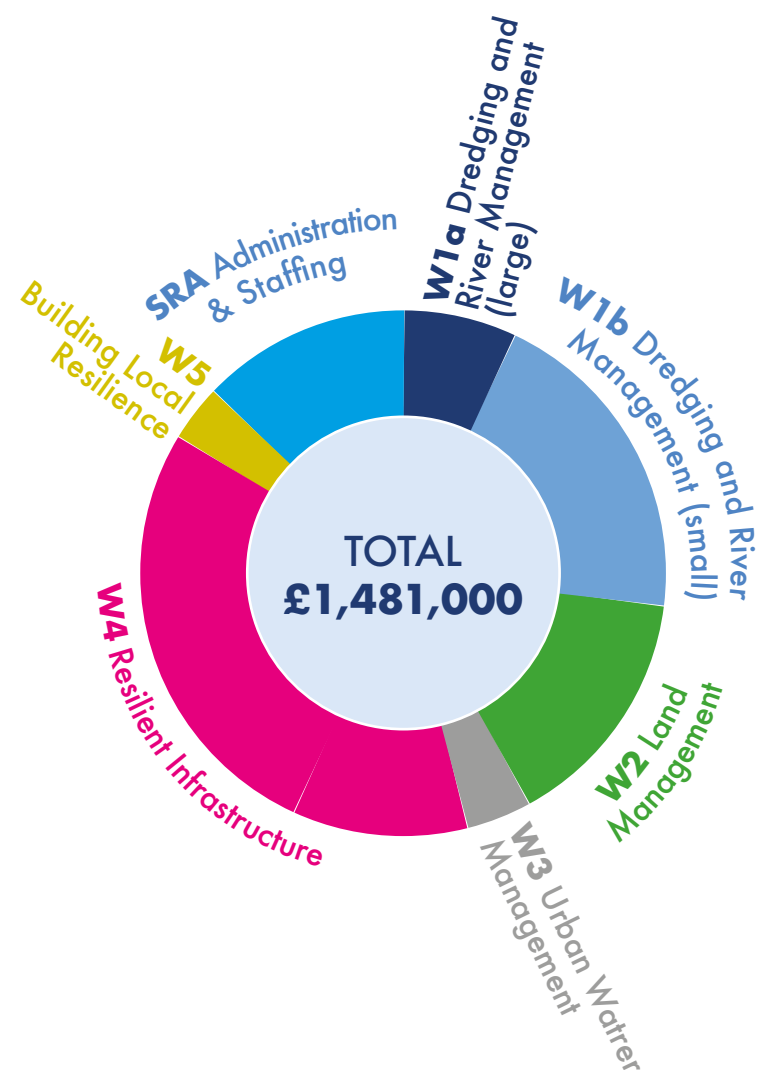
FINANCIAL STATEMENT

Since its launch in January 2015, the SRA has received Local Partner Funds of nearly £14.5m, and used these to fund 155 schemes, actions and initiatives. A large proportion are delivered within the same financial year. Some require longer term research, design, planning and implementation, so take longer to complete.

LOCAL PARTNER FUNDING 2019-20 FINANCIAL SUMMARY	ALLOCATED FUNDS AT START OF 2019-20 FINANCIAL YEAR £k	SPEND IN 2019-20 £k	ALLOCATED FUNDS CARRIED FORWARD TO 2020-21 ONWARDS £k
Enhanced Programme of works	6,399	1,287	5,112
Contingency	220	0	452
Staffing, administration, overheads	242	194	48
TOTAL	6,861	1,481	5,612

* The 'shadow precept' raised for Somerset Rivers Authority by Somerset County Council and Somerset's four district councils is a 1.25% 'alternative notional amount' (ANA) which is added to individual council tax bills, by permission of central government. The ANA can be used only to fund Somerset Rivers Authority. The level of the charge has not increased since 2016-17. For more information see page 6.

Financial Summary



The pie chart to the left shows SRA Local Partner Funding spend during the 2019-20 financial year, by Workstream (£k).

The SRA does not commission works directly, instead SRA partners deliver works on behalf of the SRA. Once works are complete, funds are claimed back from the SRA. Funds claimed back represent the SRA's actual spend. During 2019-20 the SRA processed delivery partner claims for Local Partner Funds totalling £1,287,000.

87% (£1,287,000) delivering the SRA's Enhanced Programme of works

13% (£194,000) for staff, administration and overheads

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 – through match-funding arrangements – SRA funding has been used to lever extra money into Somerset.

ADDITIONAL FUNDING SOURCE	PROJECT	EXTERNAL FUNDS AWARDED	SRA CONTRIBUTION
Interreg 2 Seas European Regional Development Fund, Co-Adapt	Adapting the Levels	€1,024,497	£297,940
Interreg 2 Seas European Regional Development Fund, Sponge EU	Somerset Sponge Project	€730,162	£80,000
Interreg 2 Seas European Regional Development Fund, Triple C	Natural Flood Management	€358,000	£90,000
Hills to Levels Multi Benefits through Environment Agency's Water Environment Improvement Scheme	Natural Flood Management	£363,000	£91,000

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 gave £13,049,000 through the Heart of the South West Local Enterprise Partnership (HotSWLEP) Growth Deal Fund. Specifically, the aim of this funding – which is channelled through the SRA – was to enable the delivery of larger capital schemes up to March 2021.

This project overall is called Somerset Flooding. Its purpose is to reduce the duration, depth and frequency of flooding. It has five main elements. Spending upon each of them is set out in the table below. (More details about their delivery can be found in the W1, W2 and the 'Progress on key elements of Somerset's 20 Year Flood Action Plan' sections of this annual report.)

The Somerset Flooding project has a budget of £38,270,747. The SRA's Growth Deal money is a crucial component in a complex mosaic of match-funding arrangements agreed by HotSWLEP. Other money comes from SRA Local Partner Funds, Flood Defence Grant in Aid, Triple C, the Environment Agency, Sedgemoor District Council, New Homes Bonus, Community Infrastructure Levy and the Department for Environment, Food & Rural Affairs (Defra).

SOMERSET FLOODING 2019-20 SUMMARY (£)	HotSWLEP FUNDING ALLOCATION £	MATCH FUNDING TOTAL £	FUNDING SPENT UP TO END 2019-20 £	FUNDING SPENT DURING 2019-20 £
Pioneer Dredging River Parrett	2,444,263	9,416,681	9,194,537	1,027,728
River Sowy/King's Sedgemoor Drain Enhancement Scheme	7,989,737	2,399,130	5,760,167	822,734
Bridgwater Tidal Barrier (<i>contribution</i>)	2,000,000	5,076,177	6,179,052	3,963,174
Land Management Capital Grant Schemes	550,000	1,281,577	1,817,864	1,000
Taunton Strategic Flood Alleviation Improvements Scheme (<i>contribution</i>)	65,000	7,048,182	813,182	77,463
TOTAL	13,049,000	25,221,747	23,764,802	5,892,099

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



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. The SRA funded the pioneer dredging of a further 750m of the Parrett downstream of Northmoor Pumping Station in 2016, and the pioneer dredging of 2.2km of the Parrett between Stathe and Burrowbridge in 2019. For more on this subject, including the SRA's use of water injection dredging techniques combined with silt monitoring, see the W1 section of this report.

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.

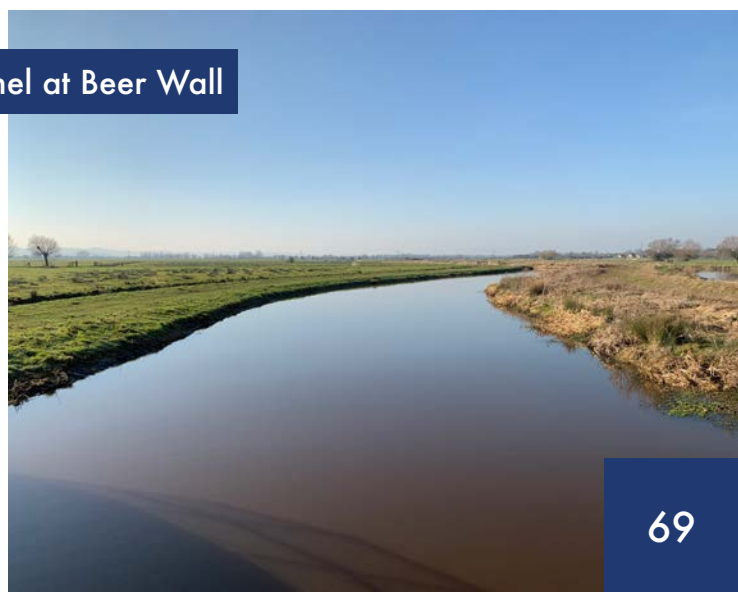
What we have achieved: Over the winter of 2013-14, the A372 at Beer Wall near Othery was flooded for weeks and then closed for expensive emergency pumping. Subsequently, Somerset County Council raised and repaired the road, and installed four massive culverts to allow more water to go underneath it. 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 as part of measures 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. Further works are planned.

For more Sowy/KSD details, see the W1 section 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 178 actions across Somerset. For a summary like this, one thread may serve to show the SRA's approach. Since 2016, SRA funding has allowed for extra pro-active drain jetting at locations known to suffer problems with flooding. In 2019, with a good spread of records now available, the effectiveness of this preventative maintenance programme was assessed. At 26 places, drains have now been jetted many times. This indicates intrinsic problems which it makes sense to fix. With this 'better understanding', in March 2020 the SRA Board chose to invest in 'infrastructure solutions', namely asset upgrades at frequently-jetted sites. After investigations, and possibly excavations, have been carried out, it is expected that collapsed sections of drains will be repaired, or systems made larger.

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 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 assist the Environment Agency and Sedgemoor District Council through the project's initial stages. Specifically, Growth Deal funding was provided to enable the project team to reach the point of submitting an application for the Transport and Works Act Order that is required to build the Barrier. This application went in to the Department for Environment, Food & Rural Affairs (Defra) just before Christmas in 2019. A Barrier is expected to be ready for use in 2024. It will protect at least 11,300 homes and 1,500 businesses. For more details, see the W1 section of this report.

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: More than 600 farms have been visited as part of the Hills to Levels initiative, in which the SRA is a partner and major funder. Overall, more than 330 schemes have been delivered and more than 600 natural flood management structures created using funding from a range of sources. Somerset Rivers Authority itself has approved grants for 263 of those 330-plus natural flood management schemes. This includes direct land management improvements across 1,600 hectares of land through online NFM auctions. 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. For more details of this work, which has won three national and international awards, see the W2 section of this report.

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 is now being followed up with the production of Somerset-specific guidance for property developers on best practice. Other activities such as SuDS inspections also aim to ensure that urban run-off is well managed.

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.



Somerset
Rivers Authority

Copyright © 2020 Somerset Rivers Authority

www.somsetriversauthority.org.uk

[www.twitter.com/SRAnews](https://twitter.com/SRAnews)

www.facebook.com/SomersetRiversAuthority