2017-18 END OF YEAR REPORT: *NO-PHOTOS VERSION*

CONTENTS

Somerset Rivers Authority *is a partnership between 11 of Somerset's existing Flood Risk Management Authorities (FRMAs): Somerset County Council, West Somerset Council, Taunton Deane Borough Council, Sedgemoor District Council (DC), South Somerset DC, Mendip DC, the Axe Brue and Parrett Internal Drainage Boards, the Environment Agency, Natural England and Wessex Regional Flood & Coastal Committee. The SRA's purpose is to provide a higher standard of flood risk management than is affordable from the existing budgets of those FRMAs.*

This 29-page version of the SRA End of Year Report 2017-18 has been published without photos, to allow for quicker, cheaper printing. A 40-page version with photos can be downloaded from the SRA Website: www.somersetriversauthority.org.uk **Or call the SRA on 01823-355111 or email** sra@somerset.gov.uk

PART 1: EXECUTIVE SUMMARY

This End of Year Report covers everything done, still being done, or not done by Somerset Rivers Authority (SRA) between the start of April 2017 and the end of March 2018. More detail is given than is customary in reports such as this because the SRA would like you to know how much is being achieved with your money across the county.

In 2017-18, the SRA spent just over £3.6million on actions designed to give Somerset extra flood protection and resilience. Partners delivering work for the SRA also committed to spend a further £1.8m, so when all of the final invoices have been submitted and paid, the total spent on works on the ground across Somerset in 2017-18 will have been more than £5m.

SRA money comes from a range of sources. For 2017-18, the SRA got funding of £2.843m through council tax and contributions from Somerset's Internal Drainage Boards. In addition, £3.104m was brought forward from previous years, for spending on actions still in progress. At the start of April 2017, the SRA had 56 actions on the go, including 23 newly approved by the SRA Board in March. Sixteen actions were completed (which means done *and* fully paid for) during 2017-18. Altogether, since the SRA's launch in 2015, 60 actions out of 100 have been completed. Some actions take more than one calendar year to deliver; others are delayed for various reasons, such as odd discoveries (eg, Dunster asbestos, a Stoke sub Hamdon blockage).

The SRA backs several key projects, using Growth Deal funding from the Heart of the South West Local Enterprise Partnership (HotSWLEP). In 2014, Somerset was awarded £13.049m by HotSWLEP to pay for work on major, long-term schemes up to 2021. In 2017-18, £1.083m was spent, out of a total so far of £6.507m. Five schemes were supported: Bridgwater Tidal Barrier, Sowy / King's Sedgemoor Drain (KSD) enhancements, Natural Flood Management (Hills to Levels), the Taunton Strategic Flood Alleviation Improvements Scheme and dredging activities.

All schemes are progressing, at different rates but with the same determination to reduce flooding. A Bridgwater Barrier would reduce tidal flood threats from the River Parrett to assets worth about £2.5 billion. The aim is for a Barrier to be working in 2024, to then protect nearly 13,000 homes and businesses for more than 100 years. A full programme of Sowy / KSD enhancements continues to be challenging and costly, so revised plans are being drawn up for increasing the system's capacity to carry water. An important new feature of 2017-18 is the development of a Strategic Approach to Mitigation. This work is being led for the SRA by Natural England. Its main aims are to reduce costs and risks, to help schemes such as the Barrier, Sowy/KSD and further dedging to go ahead, and to secure a wide range of environmental benefits.

SRA actions are grouped in five workstreams: Dredging & River Management (W1), Land Management (W2), Urban Water Management (W3), Resilient Infrastructure (W4) and Building Community Resilience (W5). W1 currently gets the largest share of SRA spending, for activities such as the innovative use of quicker, cheaper water injection dredging techniques along 5km of the Parrett down from Burrowbridge. Other successes include two national awards for the Hills To Levels partnership (W2), initiatives on Sustainable Urban Drainage Systems (W3), A38 and A372 improvements plus extra maintenance and investigations (W4), and grants and training (W5).

Everything the SRA does is rooted in Somerset's 20 Year Flood Action Plan, drawn up during the devastating floods of 2013-14. The SRA itself emerged from this Plan, and now oversees it. The Government has drafted a Rivers Authorities & Land Drainage Bill which - with Government support - is being taken forward as a Private Member's Bill by the Somerton and Frome MP David Warburton. The aim is to establish the SRA as an independent legal entity that can raise funds for itself from council tax and is thereby enabled to make longer-term plans for the delivery of the extra flood risk management works that history has starkly shown Somerset needs.

PART 2: PERFORMANCE AND FINANCE - Delivery Progress Summary

Delivery: Summary

2017-18 saw the SRA delivering its third annual Enhanced Programme of works. Twenty-three actions were approved by the SRA Board for delivery across Somerset. The total 2017-18 funding from SRA Local Partners (council tax and contributions from Somerset's IDBs) was £2.843million. After provisions were made for contingency (£95k), four staff and overheads (£200k), and £150k was put aside for Sowy/King's Sedgemoor Drain enhancements and/or pioneer dredging, the amount available for the 2017-18 Enhanced Programme was £2.398m.

2017-18 also saw the SRA and its partners continuing to work on actions that began life in earlier years. Some of these were always expected to take more than one calendar year to deliver; others were delayed for a variety of reasons, such as environmental considerations, issues with land ownership, or sheer complexity.

An SRA action is a work or collection of associated works that gives Somerset extra flood protection or resilience, and advances Somerset's 20 Year Flood Action Plan. Maintenance dredging of the Parrett is one action: so is the jetting of a few dozen drains.

An action is recorded as completed when all costs have been fully claimed by the SRA's delivery partners. This can be several months after works on the ground have finished. By the end of March 2017, 44 SRA-funded actions had been completed.

At the start of the 2017-18 financial year (in April 2017), the SRA had 56 actions on the go, including the 23 newly-approved by the SRA Board in March 2017. Table A *(below)* shows that 16 actions were recorded as completed during 2017-18, leaving 40 still in progress.

Table A: Action Status Table

Status of Actions	Actions in the 2017-18 Enhanced Programme - Local Partners Funding	Actions from previous years' Enhanced Programmes - Local Partners and 2015-16 Interim Funding	DCLG* Funded actions
Actions completed by end of March 2017	N/A	40	4
Actions programmed for 2017-18	23	27	6
Actions completed during 2017-18	4	12	0
Actions in progress	19	15	6

* 2014-15 Funding from the Department of Communities & Local Government (DCLG), as it was then called. This is money given to support Somerset's 20 Year Flood Action Plan, before the SRA was formally launched, then inherited by the SRA.

Table A excludes key projects funded using Growth Deal money from the Heart of the South West Local Enterprise Partnership (HotSWLEP). More information about these projects can be found on page 5 and in Part 3a of this report.

Part 3b gives detailed information about what has been achieved, and what is being achieved, on all actions in the SRA's 2017-18 Enhanced Programme and on all actions carried forward from previous years.

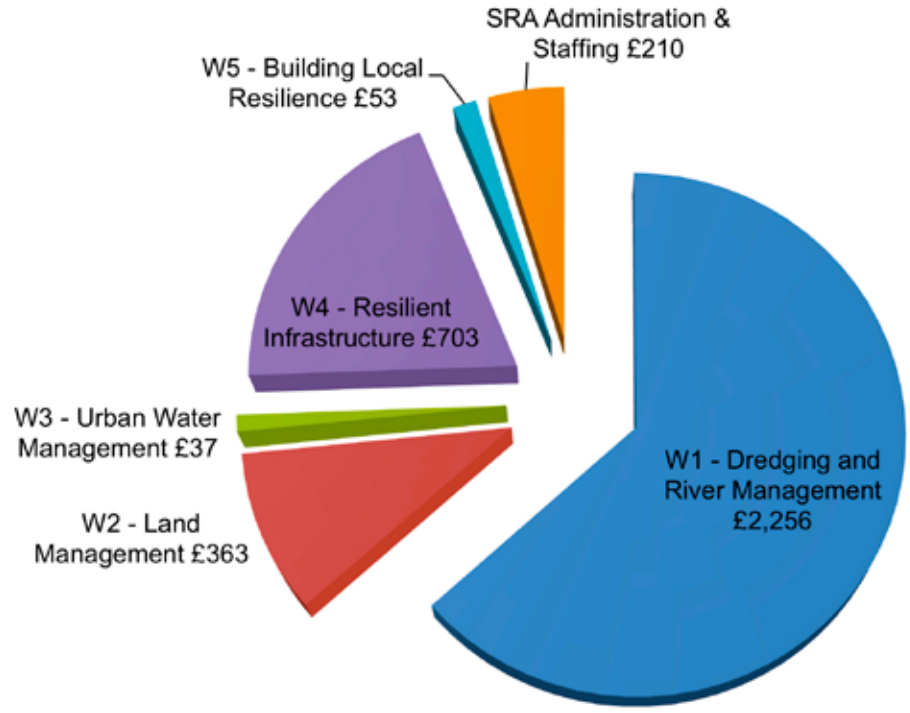
Delivery: Financial Spend by Workstream

The pie-chart below shows SRA money spent during 2017-18, by Workstream. The figures show funding from all sources, namely SRA Local Partners (council tax and contributions from Somerset's Internal Drainage Boards), the Heart of the SW Local Enterprise Partnership (HotSWLEP) Growth Deal Fund, Interim Funding from 2015-16 and DCLG funding from 2014.

All SRA-funded actions are part of the SRA's five main Workstreams, delivered for the SRA by its delivery partners (local councils, Environment Agency, IDBs, Natural England, FWAG SW).

- **W1 - *Dredging and River Management***
- **W2 - *Land Management*** including natural flood management activities
- **W3 - *Urban Water Management*** including Sustainable Urban Drainage Schemes (SuDS), planning and enforcement
- **W4 - *Resilient Infrastructure*** including improvements and extra works to stop roads flooding
- **W5 - *Building Local Resilience***, giving inspiration, support, advice, information and practical help to communities, households, businesses, and landowners across Somerset to encourage and enable them to become more resilient and resistant to the impacts of flooding

Amount Spent* by SRA in 2017-18 by Workstream (£'000)**



Total £3,622

*Spent: *Amount claimed by delivery partners from the SRA during 2017-18* ** Includes funding from HotSWLEP

Most SRA spending during 2017-18 was in W1, Dredging and River Management. £476k was spent on maintaining dredged profiles, silt monitoring, and de-silting with a further £162k spent on the Environment Agency's Wessex De-silt Top Up. The SRA contributed £300k to the £4.35m Cannington Flood Alleviation Scheme which was operational over the winter of 2017-18 and stopped the village flooding. Other spending included: £206k on Main River Asset Improvements, £96k on improvements to pumping stations, £43k on tree work along the River Brue, and £23k on a variety of extra works in South Somerset and Sedgemoor. The SRA gave £65k of Local Partner funding to the Taunton Strategic Flood Alleviation Improvements Scheme (not to be confused with the £65k also given to this scheme from HotSWLEP funds - see next page). Other funds were spent on delivering work continued from previous years.

Natural Flood Management projects in W2 were funded by both HotSWLEP and Local Partners' money. During 2017-18, £363k was spent on Hills to Levels schemes to 'slow the flow' of water down to vulnerable areas, projects to encourage better soil husbandry and so reduce surface water run-off, and visits to investigate problems with road flooding and subsequent work on land management solutions. £137k of this spend came from 2017-18 Local Partner funding.

Work continued on W3, Urban Water Management. A small rain garden project, popular with residents, was completed in Taunton. Other projects have been focused on research and investigation: the lifespan of the EU-backed Sponge initiative is 2016 to 2020: so this workstream has so far not had cause for significant capital expenditure. During 2017-18, £37k was spent.

On W4, Resilient Infrastructure, £703k of Local Partner funding was spent during 2017-18. Actions included a package of enhanced highway maintenance programmes (de-silting structures, drain jetting, gully emptying, targeted edge of road clearing - £392k), a new drainage scheme on the A38 at Rumwell (£115k - came in under budget), and new drainage pipes to re-direct floodwater away from a low blind bend on the A372 at Pibsbury Corner in Huish Episcopi (£25k - also under budget). The remaining £171k funded inspections and remedial works to culverts under roads in IDB areas (£73k), CCTV surveys of drains and culverts, and Local Flood Risk Management Measures continued from previous years (such as Old Cleeve to Blue Anchor drainage upgrades).

SRA spend on W5, Building Local Resilience, was £53k in 2017-18. Working with communities has a pace that varies from place to place; it can take time to build up trust, develop ideas and get the best from people. The SRA-funded Community Resilience Officer has worked closely in the past year with flood-affected communities, and grants have been given to communities for training and equipment. Phase Two of the Levels Land Trust scheme has progressed, using funds given by DCLG in 2014.

Heart of the SW Local Enterprise Partnership Growth Deal Funding and Key Projects

heart of the south west local enterprise partnership | HM Government

In 2014, the SRA was given £13.049million from the HotSWLEP Growth Deal fund to pay for work on several long-term key projects up to 2021. So far, £6.507m of this Growth Deal money has been used. In 2017-18 the total spent was £1.083m. Of this, £328k went towards the Bridgwater Tidal Barrier, £65k towards the Taunton Strategic Flood Alleviation Improvements Scheme, £226k on Slow the Flow Natural Flood Management schemes, £399k on Sowy/King's Sedgemoor Drain enhancements (including some outstanding claims for work on the major Beer Wall scheme near Othery), and £64k on dredging activities. Part 3a of this report gives more key project details.

Finance: Summary

Table B *(next page)* shows the financial summary for 2017-18.

The total funding available in 2017-18 (excluding HotSWLEP Growth Deal funding) was £5.947million. This figure includes £3.104m brought forward from previous years and the Local Partners' funding for 2017-18 of £2.843m. The amount spent by the SRA in 2017-18, using money from these sources, was £2.539m. A further £1.083m was spent on activities funded by HotSWLEP Growth Deal money, making a total of £3.622m (as in the last line of the Spent column in Table B). Take out £210k for SRA staff and overheads, and £3.412m was spent on works on the ground.

However, it is vital to remember that there is a time-lag between delivery partners receiving their contractor invoices and then raising a claim to the SRA.

The final total spent by the SRA on actual works that happened in 2017-18 will therefore turn out to be greater than £3.412m.

Because SRA delivery partners have committed costs of £1.815m that are still to be claimed from the SRA, the final total will be around £5.227m.

Project spending is monitored throughout the year by the SRA Board. When savings are made in one project, funds can - subject to Board approval - be allocated to different works. These works may extend an existing project or be completely new. This is why in Table B some figures shown under Difference vary from those under Carry Forward to 2018-19. A balance of £3.408m - excluding HotSWLEP Growth Deal Funding - will be carried forward to 2018-19. The amount of Growth Deal Funding still available to the SRA, up to 2021, is £6.542m.

Table B: Somerset Rivers Authority 2017-18 Financial Summary

Funding Source	**Original Funding 2017-18**	**Spent* 2017-18**	**Difference**	**Carry forward to 2018-19**
	£'000	**£'000**	**£'000**	**£'000**
SRA funding - excluding HotSWLEP Growth Deal				
Enhanced Programmes**	4,545	2,329	2,216	2,298
Provision for Sowy/KSD and/or dredging	1,004	0	1,004	1,004
Contingency***	155	0	155	85
SRA staffing and overheads	243	210	33	21
Totals	**5,947**	**2,539**	**3,408**	**3,408**
HotSWLEP Growth Deal				
Dredging, Sowy/KSD, Bridgwater Tidal Barrier, Slow the Flow, Taunton Strategic Flood Alleviation Improvements Scheme		**1,083**		
TOTAL SPENT* BY SRA 2017-18, including HotSWLEP		**3,622**		

* Spent: *Amount* claimed *by delivery partners from the SRA during 2017-18 (not including contractually commited costs of £1.815m, so the final total spent by the SRA on works that happened in 2017-18 will be £3.412m + £1.815m = £5.277m).*

** SRA Enhanced Programmes were funded in 2016-17 and 2017-18 by council tax and contributions from Somerset's Internal Drainage Boards (IDBs). The first Enhanced Programme in 2015-16 included Interim Funding from Defra of £1.9million, and a combined contribution of £800,000 from Somerset County Council, West Somerset Council, Taunton Deane Borough Council, Sedgemoor District Council, South Somerset District Council, Mendip District Council, and the Axe Brue and Parrett Internal Drainage Boards. The SRA also inherited Flood Action Plan funding given in 2014 by the Department of Communities & Local Government (DCLG).

*** £70k was re-allocated from Contingency to other projects throughout the year. This is why the Carry Forward of £85k is £70k less than the Original Funding of £155k.

PART 3a: KEY PROJECTS – Main River* Dredging

After the floods of 2013-14, the Environment Agency spent £6million on the pioneer dredging of 8km of the Parrett and Tone. Since then, Somerset Rivers Authority has funded more pioneer dredging (750m downstream of Northmoor Pumping Station in 2016) and three rounds of maintenance dredging between Burrowbnridge and Westonzoyland Pumping Station (in late 2015-early 2016, autumn 2016, and December 2017). Maintenance dredging has been targeted at sections of the Parrett that were pioneer-dredged in 2014, where silt has built up most again along this tidal river. In autumn 2016, trials of water injection dredging techniques were carried out as part of the SRA's development of a Dredging Strategy. The Strategy is establishing the most cost-effective methods, times and places for removing silt.

Silt monitoring is now carried out in spring and autumn to inform the SRA's maintenance dredging programme. Works include topographic section surveys of the river channel and bathymetric surveys along the river length.

Arrangements are being made for the pioneering development and installation of flux monitoring equipment that measures silt movement in rivers in near real-time. Fixed location sensors will be fitted at New Bridge on the River Tone and at Oath Lock and Somerset Bridge on the River Parrett.

Maintenance Dredging: ***Achieved:*** A Public Sector Co-operation Agreement (PSCA)* between the Parrett IDB and the Environment Agency allowed the IDB to let a water injection dredging contract to Van Oord UK, following the successful trials of this method in autumn 2016.

Water injection dredging was carried out day and night over 10 consecutive high tides during one week in early December 2017.
The works cleared around 32,000m^3 of silt from a 5km length of the River Parrett downstream from Burrowbridge. The volume of silt shifted in one week was more than got taken out over a period of four months using conventional maintenance dredging methods in late 2015-early 2016.

A further tide was used for a trial run on heavily vegetated and consolidated silt berms not dredged in recent years, to test the effectiveness of water injection dredging for pioneer dredging. Results showed the method could be successful, but refinements would be needed.

Works also included bathymetric and topographic channel surveys to monitor the success of the dredge, along with environmental monitoring to assess its impact on water chemistry, fish and invertebrates.

Channel surveys and environmental monitoring activities are ongoing to ensure works have been effective and environmentally acceptable, and to inform the need for future dredging.

Pioneer dredging - Parrett: In July 2017 the Board of the SRA made a commitment to dredge the River Parrett upstream from Burrowbridge to Oath, as soon as a legally compliant and affordable scheme can be found.

A note on Main Rivers and Public Sector Co-operation Agreements: *Main Rivers are usually larger streams and rivers, but some are smaller watercourses of local significance. In England, Defra (the Department for Environment, Food & Rural Affairs) decides which watercourses are Main Rivers. The Environment Agency has powers to work on main rivers to manage flood risk. However, the Agency may enter into a Public Sector Cooperation Agreement (PSCA) with another risk management authority to enable works. So, for e.g., if a PSCA is agreed with Somerset Drainage Boards Consortium (SDBC), SDBC can apply for environmental permits, seek the agreement of landowners and procure works on Main River, for the SRA. SDBC comprises the Axe Brue and the Parrett Internal Drainage Boards (IDBs).*

Main River Dredging works listed in this section have been done on behalf of the SRA by the Environment Agency (using its powers) or the IDBs (via a PSCA).

Being achieved: A multi-faceted high level plan was drawn up, a project manager appointed and preparatory work got under way.

Including:

- Channel surveys to establish current channel profiles
- Habitat and species surveys, timed to cover key species
- Evaluation and optimisation of initial design, using computer hydraulic monitoring and information from surveys and investigations
- Review of draft contract documents
- Development of procurement arrangements

When all data is obtained, final contract documents will be issued for tender, with a view to works being done during autumn 2018.

Pioneer dredging - Brue: An initial technical partners' meeting has been held for members of relevant stakeholder groups to identify different sensitivities and opportunities and agree an approach to flood and water level management in the Brue catchment. Full stakeholder consultation is now proposed.

Strategic Mitigation: Many projects funded by the SRA involve complex issues. An important part of the SRA's purpose as a partnership is to bring people together in ways that seek to resolve those issues, so that delivering schemes becomes easier and cheaper.

In July 2017, the SRA Board agreed to fund the development of a Strategic Approach to Mitigation. Mitigation means works done to offset any unavoidably negative effects of projects. First, so as not to break the law (eg Habitat Regulations). Second, because Board members know that many people in Somerset (and beyond) love the county for its world-class landscapes and wildlife. So it makes sense to combine the best possible ways of reducing flood risks and protecting the environment.

Under the Habitats Regulations process, Flood Risk Management projects in Somerset need to be assessed both individually and in combination with other projects. Any environmentally damaging effects of projects need to be addressed through mitigating actions and in some cases, this process has been very time-consuming. The SRA Board agreed that more streamlined and generic ways of dealing with complex and demanding situations should be developed. Strategic Mitigation work is therefore being led for the SRA by Natural England, which has successfully been involved with more than 40 other similar approaches across the country.

The main aims of Strategic Mitigation in Somerset are to reduce costs and risks, to enable flood risk management schemes in the county to go ahead, and to secure a wide range of environmental benefits.

The work is expected to help SRA-funded schemes including River Parrett pioneer and maintenance dredging, River Brue pioneer dredging, Sowy/King's Sedgemoor Drain Enhancement, Bridgwater Tidal Barrier and improvements to pumping stations.

Being achieved: The project began in late November 2017 with the establishment of a working group of key partners and stakeholders: Natural England, 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 South West, Royal Society for the Protection of Birds and Somerset Wildlife Trust.

Members agreed to focus first on:

1) Enabling Maintenance Dredging: The plan is to produce - by the end of August 2018 - a 5 Year joint Natural England / Environment Agency advice / protocol and associated consent to enable ongoing maintenance of the recently dredged profiles of the River Parrett and the River Tone. This will mitigate for and minimise direct in-channel impacts, enabling maintenance dredging to progress in a timely and cost-effective manner.

2) Enabling measures that will reduce flooding to be delivered, whilst ensuring greater certainty of A Resilient Wetland at the Heart of Somerset: The SRA Board wants to achieve better management of water

during periods of wet weather, and better management of the natural environment (especially maintenance of the water levels necessary to protect the wetland environment). All key stakeholders have agreed that these two aspirations must go hand in hand. They would also like floodplains to be managed in ways that maximise the resilience of vulnerable farmland. This means, for example, supporting the adaptation of farms with land in vulnerable areas. (This ties in with SRA-funded projects on Maintaining the Resilience of Wet Grassland, *page 15*, and Levels Land Trust, *page 26-27*).

Next Steps: The project team is waiting for detailed design and modelling data which describes the 'in combination' impacts of proposed dredging and river channel works. This is needed before work can be done with IDB engineers and members to develop an agreement which will provide certainty about the implementation of whatever water level management measures will be required to mitigate for flood risk reduction schemes that could harm legally-protected wetlands. Preparatory meetings with NFU, CLA and IDB members have indicated support for this approach.

Other de-silting work

The SRA funds de-silting work on watercourses additional to those currently de-silted by the Environment Agency and IDBs, through, for example, the Agency's existing Wessex De-Silt programme. The aim is to improve the ability of channels to carry water away from flooded and flood-prone areas and deliver it to pumping stations and outfalls more quickly. This reduces the frequency, duration and overall severity of flooding.

De-silting also adds value to watercourses as it reduces the risk of low oxygen levels in channels and of fish dying in small, heavily silted channels. It can reduce how often main rivers need to be weed-cut as part of routine Environment Agency work, which saves money and brings environmental benefits.

Additional de-silting / dredging - *Not yet achieved:* Sections of Decoy Rhyne, Division Rhyne and James Wear River, all in the Godney area and classifed as main river, were assessed for dredging/de-silting. Inspection showed it would be unsafe to use machines on banks for this work. This is because parts of the banks of all three watercourses are in poor condition, with water overtopping and/or percolating.

The Parrett IDB (acting under a PSCA with the Environment Agency) therefore intends to seek the SRA's approval for spending money originally given for dredging/de-silting on bank restoration work instead. The argument being this would reduce local flood risks and enable safe access for future dredging/de-silting.

Mark Yeo (local sections): De-silting work at Rooks Bridge was deferred from 2016-17 for environmental reasons. When a site visit was made later in 2017, silt had cleared naturally, so no work was required at that time. ***Not yet achieved:*** The Mark Yeo will be inspected during 2018 to establish whether other localised silt problems need to be dealt with.

Wessex De-Silt Top Up: This addition to the Environment Agency's ongoing Wessex De-Silt programme was approved by the SRA Board in 2016 after five other schemes were withdrawn, moved or underspent - so their funding could be re-allocated. A lot of de-silting work was deferred from late 2016-early 2017 for environmental reasons - in several places because dissolved oxygen levels in the water were too low.

Achieved: **1)** In 2016-17, the Environment Agency dredged 3.5km of the Westport Canal in Hambridge. The SRA funded the dredging of the remaining 700m in September 2017.

2) Early in 2017, the Environment Agency cleared 5,000 tonnes of silt from Witcombe Bottom, immediately upstream of Long Load Pumping Station, to enable more efficient pumping. The silt was stockpiled locally for use in building up low banks of the River Yeo. Geo-technical analyses checked the material was right for the job, and with further suitable spoil hauled from Westport Canal, improvements to Long Load flood banks were duly made by contractors Land & Water, for the SRA. Better banks will help to reduce flooding and disruption caused by road closures. Checks

to see whether the banks had been affected by settlement of material were made in spring 2018. Some repairs to access routes are expected to be done by summer 2018.

3) Isle Brewers Mill Stream was de-silted by the Environment Agency for the SRA in September 2017. The stream's banks will be re-seeded, if required, in summer 2018.

4) Huntworth Brook was de-silted by the Environment Agency, for the SRA, in autumn 2017. Huntworth Brook feeds the Screech Owl outfall into the River Parrett, where the SRA has also funded the installation of a powerful new pump *(see pages 14-15)*.

5) Bridgwater: Hamp Brook and Stockmoor Rhyne were de-silted by the Environment Agency for the SRA in autumn 2017, and ugly masses of dumped rubbish were also removed from Hamp Brook. Along Hamp Brook and Stockmoor Rhyne, the Environment Agency is only usually funded to deliver the annual maintenance activities of weed removal and vegetation management. This year's extra SRA-funded maintenance means that more water can now get more quickly via Stockmoor Rhyne to Stockmoor Pumping Station for evacuation, while Hamp Brook can now discharge more water more quickly into the Parrett between tidal cycles. In both cases, flood risks are now reduced. The banks of Stockmoor Rhyne will be re-seeded, if required, in summer 2018.

KEY PROJECTS – Sowy/King's Sedgemoor Drain (KSD) Enhancement

Background: Somerset's 20 Year Flood Action Plan proposed to improve the entire River Sowy / KSD system, while balancing a range of interests. The main aim was to increase the amount of water that could be evacuated through the Sowy/KSD, so as to relieve pressures on the River Parrett and the River Tone, and enable upstream and downstream pumping stations to be operated earlier. This would confer operational flexibility in times of flood and benefit places such as Langport, Muchelney, Thorney, Moorland and Fordgate.

Part of the impetus came from a dramatic experience during the floods of 2013-14. In February 2014, after the Environment Agency decided to fully open up Monk's Leaze Clyse sluice, at the head of the River Sowy near Aller, flood water levels fell by 80cm in two days.

The Sowy is a man-made river that branches off from the Parrett at Monk's Leaze Clyse and after 12 km (7.5miles) joins up with the KSD. It was conceived after severe floods in 1960 as a relief channel to the Parrett. Construction started nine years later (after a series of delays and difficulties) and took three years. To save money, the river was only built to 57% of the water-carrying capacity originally planned. But structures such as bridges were built full size so as to leave a future generation a range of possibilities for making further improvements.

A lot of important work has been done by SRA partners since 2014, and the emphasis now is on establishing plans for the next three years up to 2021. Plans are proceeding in conjunction with the development of other SRA-funded proposals for pioneer dredging *(see pages 7-8)* and the Strategic Approach to Mitigation *(pages 8-9)*. The Somerset Levels & Moors are a highly complex landscape, heavily protected by environmental designations, and the combined effects of all schemes must be considered - and all schemes must be legally compliant.

Sowy/KSD works funded by the SRA have so far used Growth Deal money from the Heart of the South West Local Enterprise Partnership (HotSWLEP). Future works are expected to use more Growth Deal money, but sums have also been put aside from Local Partners (council tax and IDB contributions).

The Sowy/KSD project is led for the SRA by the Environment Agency, working closely with the Parrett Internal Drainage Board.

Major improvement works were completed during 2016-17 at **Beer Wall** on the A372 near Othery and at **Chedzoy Flap**. ***Achieved:*** In 2017-18, bank repairs were required at Beer Wall because high flows eroded newly-cut river channels before grass was established. (Grass roots help to bind soil together). A few concrete cracks were also repaired and some trees moved.

At **Dunball**, during 2016-17, Somerset County Council removed obstructive masonry (popularly known as the "lump of concrete" from beneath Dunball Old Bridge to improve the capacity and flow of water through the final stretch of the King's Sedgemoor Drain. ***Being achieved:*** In 2017-18, the Environment Agency has been monitoring river flow to help assess the impact of this work. More channel widening is likely to be required to further smooth flow upstream.

Vegetation was cleared around Dunball Rail Bridge and Parchey Bridge during 2016-17, and surveying was done to see if de-silting work would be beneficial. ***Being achieved:*** Designs are being drawn up for bridge clearance work later in 2018.

Finalising a major programme of channel widening for the Sowy/KSD, across 20km^2 of an already complex landscape, continues to be challenging. ***Being achieved:*** An outline scheme proposal was developed during 2017-18 to deliver channel widening along the full length of the Sowy / KSD. The Environment Agency used this proposal to assess the constructability and costs. The initial cost estimate was significantly more than is available through the SRA and HotSWLEP. The Environment Agency and the IDB therefore undertook further investigations, to develop a scheme which is more affordable but still delivers the desired objectives of channel enhancements and increased capacity. Work is ongoing, with a revised Sowy/KSD proposal due to be taken to the June 2018 SRA Board meeting for consideration.

KEY PROJECTS – Bridgwater Tidal Barrier

A Bridgwater Tidal Barrier will reduce tidal flood risk to assets worth about £2.5 billion – including nearly 13,000 homes and businesses – for more than 100 years. The scheme is being developed by the Environment Agency and Sedgemoor District Council, working with consultants from Jacobs. Somerset Rivers Authority is using Growth Deal money from the Heart of the South West Local Enterprise Partnership to support the scheme's initial stages. Funding for matters such as the Barrier's construction will come from other sources. The Barrier's estimated cost, over its whole life, is £100 million. Nationally, the scheme is to be classified as a Major Project, with the Treasury and Defra getting more closely involved.

The preferred location for a Bridgwater Tidal Barrier is between Express Park business park and Chilton Trinity village. The gate will be a double vertical lift gate, of proven reliability in silty places like the River Parrett. The aim is for a Barrier to be working in 2024.

Flood defences downstream of the Barrier will also be improved. Plans include maintaining existing frontline defences and building a new secondary line of defences to better protect communities and infrastructure during extreme weather.

Being achieved: Numerous actions have been taken to progress the scheme, including:

- consulting people throughout the year, with public drop-in sessions in Bridgwater, Chilton Trinity and Combwich and events for Express Park businesses, NFU members and landowners
- developing outline design for the Barrier, its operational site and downstream defences
- starting work on preparing the Transport and Works Act order for the Barrier and the planning application for the downstream defence improvements
- completing baseline environmental surveys, issuing Preliminary Environmental Information Report to stakeholders
- working with stakeholders to identify wider opportunities and enhancements that could be delivered alongside the Barrier scheme, subject to funding and approvals
- visiting the Hull Tidal Barrier to learn lessons from its operation and recent refurbishment
- appointing a Parliamentary Agent (Bircham Dyson Bell) with experience of delivering Boston and Ipswich Tidal Barriers
- meeting the Boston Tidal Barrier project team to learn lessons from their recent public inquiry
- consulting with Sedgemoor District Council as Harbour Authority on navigation clearances for the gates and impacts on current harbour legislation

- liaising with the Environment Agency's Large Projects Review Group, particularly over the economic assessments

Next steps include further site investigations, including boreholes within the river channel at the Barrier site, developing an outline design for the Barrier and downstream defences, consulting on proposals in the autumn, then submitting the Transport and Works Act Order and planning application in summer 2019. Consultation with Chilton Trinity Parish Council and landowners will continue to address any concerns raised.

KEY PROJECTS – Taunton Strategic Flood Alleviation Improvements Scheme (TSFAIS)

Taunton needs flood risk reduction works that will protect existing properties and allow the town to develop safely. SRA funding is helping the Environment Agency and Taunton Deane Borough Council, as partners, to provide strategic flood alleviation improvements. This scheme is also an important component of the pioneering Taunton Garden Town initiative - which involves the SRA-backed Sponge project - *see pages 19-20*.

Past studies have put the case for 1) improved flood defence walls in Taunton, combined with 2) a flood storage area upstream, at Bradford on Tone, to provide capacity for the next 100 years.

Being achieved: Following engagement with landowners to get access, topographic surveying and ground investigation works have been done at Bradford on Tone.

In Taunton, the project team analysed an option known as "Taunton Town Centre Raised Walls with flood storage on the Sherford Stream". Borehole and topograhic work was completed in 2017, along with ecological and desk-based archaeological surveys. The aim was to determine what flood risk benefits this option would offer Taunton town centre, and to assess its performance and cost against the Bradford on Tone proposal.

Having compared these single options, using computer modelling and concept designs, the project team began work in January 2018 on developing a cost-effective combination. This Combined Options work has identified local interventions that could provide a useful increase in flood capacity. These possibilities will be further investigated during 2018.
The aim is to have a Strategic Plan ready for consultation around the end of 2018. It will focus on the most appropriate component(s) to take forward in the short term. In 2019, it is hoped to seek appropriate consents for flood risk reduction works.

Part 3b: SRA ENHANCED PROGRAMMES

W1 – Dredging and River Management

Dredging and de-silting activities are covered in Key Projects (see pages 7-10).

West Somerset Streams: A high proportion of watercourses in West Somerset are classified as 'Rapid Response Catchments' and 'High Risk' rivers - 'High Risk' means people could die in times of flood. Where watercourses can fill up and flow dangerously quickly when it rains, it is important to maintain their capacity to convey and discharge safely as much flood water as possible. SRA funding enables extra maintenance to be delivered by the Environment Agency.

Achieved: **1) Carhampton** - A39 bridge/ culvert: cleared of five tonnes of silt and gravel downstream. Vegetation was also cleared from about 200m of watercourse downstream of the A39. Both activities followed on from SRA-funded clearance works in Carhampton in 2016-17.

2) Minehead - Parkhouse Lane, Minehead: Culvert cleared to improve the conveyance capacity of the Bratton Stream. ***Plus:*** The final stage of works on the Bratton Stream through The Parks in Minehead, funded by the SRA in 2016-17, was also completed. It had been deferred from spring 2017 to allow for fish spawning. Most of Minehead lies within the floodplain of the Bratton Stream and its tributaries. About a third of the properties in the town and nearly all of its businesses are at high risk of surface water flooding.

Being Achieved: Near Gallox Bridge, **Dunster**. A project joint-funded by the SRA and the Environment Agency, delivered by the Environment Agency using contractors Land & Water. Its aim is to prevent the erosion of a 35-metre stretch of bank, by putting in a 'rock roll' system, and thereby in turn protect an access track and the main River Avill flood bank. Site investigations included an ecology survey, the use of ground-penetrating radar and a topographical level survey. A detailed design was completed and work began - but matters were delayed by the unexpected discovery of asbestos piping, of uncertain origin. Its removal required specialists. Work was completed in April 2018.

West Sedgemoor and Aller Moor Viewed Rhynes: Previous funding regimes restricted maintenance on these moors mostly to every other year. Extra, SRA-funded annual maintenance ensures that drainage channels can convey flood water to Main Rivers and pumping stations. This helps to protect local homes and businesses, local roads and 650 metres of the A378 at Wrantage. It also enables seasonal water level management in accordance with Water Level Management Plans and it reduces the likelihood of summer flooding, which can be particularly damaging to farmers and wildlife. ***Achieved:*** Just under 30,000 metres of additional channel maintenance (weed clearance and sediment removal) was delivered by the Parrett IDB for the SRA on West Sedgemoor and Aller Moor.

Sedgemoor District Council flood relief and drainage assets: Additional SRA funding gives Sedgemoor DC greater capacity to deal with issues before they become problems and to put in enhancements, such as telemetry, that make flood defence schemes and infrastructure more efficient. ***Being achieved:*** CCTV surveys were done in North Newton, Cheddar and Wedmore to identify problems and allow preventative maintenance to be planned. Further CCTV work will be done using funds carried forward to 2018-19, to help ascertain conditions and plan more repairs. ***Achieved:*** Carried forward from 2016-17. In summer 2017, telemetry equipment was installed at Blake Gardens, Bridgwater and Bays Pond, Cheddar. Real-time data will help flow regulation and barrier deployment.

Brue Tree Work: Throughout the Brue valley catchment, water is collected and distributed via rhynes, drains and channels, so as to obtain desired levels. The main artery of this water management system is the River Brue. This project increases the capacity of parts of the Brue to carry water. Originally part of the SRA's Enhanced Maintenance Programme for 2015-16; delayed for environmental reasons.

Being achieved: As the Brue is a Main River (*see page 7)*, a Public Sector Co-operation Agreement between Somerset Drainage Boards Consortium (SDBC) and the Environment Agency, enabled SDBC to deliver this activity for the SRA. SDBC - with contractors WM Longreach - carried out 1.3km of tree work between the A38 road bridge at Highbridge and Hackness Sluice. Increasing flow in these lower reaches of the Brue will allow water to evacuate faster at times when there is a risk of flooding.

Work involved the selective removal of trees, branches and scrub vegetation using pole-saws and chainsaws operated from a floating, tugboat-propelled pontoon. Because of the environmental sensitivity of the area, a 'light-touch' approach was taken. Ecologists oversaw the work, so as to ensure protection for water voles, otters, kingfishers and other birds. Felling, pruning and scrub-removing was only carried out where trees, branches or vegetation were judged to significantly impede high level flows. Further carefully targeted maintenance work upstream of Hackness Sluice is planned for autumn 2018, then more in 2019-20.

Pumping Station Repairs and Improvements: SRA funding enables extra resilience, security and efficiency at permanent pumping stations. It means the Environment Agency can better protect people, homes, businesses and land.

Being achieved: **1)** SRA funding is being used by the Environment Agency to develop plans to automate Westonzoyland Pumping Station. Plans involve replacing the current single pump - powered by a 1990s' lorry engine - with a more efficient and powerful electrical canister pump (like that used at Screech Owl - *see pages 14-15*) and a supplemetary pump for use when need be. Automation would enable

better use of Environment Agency staff time: for example, no worker would have to be sent out to Westonzoyland to get the old engine going and then later turn it off. Preparations have included a topographical survey and the production of an Options Appraisal that includes costings and a detailed outline design. A Final Report will inform the business case for the work and budgetary requirements for 2018-19. A bid to the SRA is expected in 2019-20 for funding for an automated trash screen (like that coming at West Sedgemoor - *see below*).

2) The Environment Agency is using SRA funding to develop plans at West Sedgemoor Pumping Station for a new trash screen that can be cleared automatically. Such a screen protects pump equipment, by stopping material being sucked into the pumping mechanism. Preventing blockages also reduces flood risk locally by stopping water backing up. Work has so far included a detailed study of the West Sedgemoor compound to work out the best ways of carting off the soggy heaps of material that a screen is expected to catch. As access is tight, it is crucial that the drivers of skip lorries and trailers have enough space to manoeuvre and turn their vehicles round. Trials have been run, and a model layout prepared, with encouraging results. The scheme will therefore progress in 2018-19.

Carried forward from 2016-17 - *Being achieved:* A design and construction plan has been completed for roof repairs at North Drain Pumping Station but work has been delayed to minimise the impact on roosting bats. As bats are legally protected, mitigation measures have also been taken: for example, new bat boxes were put up in 2017. Roof repairs due to start May 2018. ***Not yet achieved:*** Saltmoor Pumping Station - roof repairs, possibly combined with lifting-out of old pump when roof is off. Work delayed by complications to do with asbestos, Listed Building status and cost.

South Somerset Enhanced Maintenance: SRA funding enables smaller schemes that deal with local issues in a pro-active way that makes flood alleviation schemes work with extra effectiveness. Some unspent funding was carried forward from 2016-17. ***Achieved:*** Enhanced maintenance to repair bank erosion on Merriott's flood attenuation dam, upstream of Moorland Road.

Main River Asset Improvements: The Environment Agency has many assets in Somerset; bids for national funding fall short of what is needed to maintain and improve them all. SRA funding enables stronger action to be taken against flooding and potential flooding.

Being achieved: **1) Frome.** Repairs to part of Frome's Flood Defence Scheme, which protects 300 properties. The focus has been on the River Frome's revetment: that is the fortified layer which protects earthen river banks - and the properties and the roads behind those banks - from erosion, especially on bends where this shield is pressed hardest during times of high flow.

A design and build contract was awarded in September 2017 to contractors Land & Water by the Environment Agency, which is delivering this scheme for the SRA. Minor vegetation works have been done, and banks surveyed to establish priority areas.

Extensive consultation has included talks with Frome Town Council, Mendip District Council, Wessex Water, Network Rail and local community groups.

Work has begun on a detailed design which reflects input from all of these interested parties. It is focused on strengthening the 'toe' of the revetment in particularly problematic areas and on improving the condition of the outfalls that spill over different sections of the revetment.

Ecological considerations have also been important. For example, the coarse fish spawning season (March 15th – June 15th) ruled out construction then. Works are therefore due to start in the second half of June.

Being achieved: **2) Huntworth, near Bridgwater** - Carried forward from 2016-17. Delivered for the SRA by the Environment Agency. A new electric canister pump was installed in autumn 2017 at the Screech Owl outfall near Huntworth, close to Bridgwater. It is operational. It was used over the winter and early spring to remove excess floodwater from

around The Boat & Anchor Inn and from along Marsh Lane by the Huntworth Business Park (which includes an Argos distribution centre and The Canalside conference centre).

Not installed (as at 31 March, 2018) was a supporting hydrometry and telemetry station at The Boat & Anchor to provide information about local flood levels and (if need be) remotely trigger the pump into action. Permission from the Canal & River Trust was required to put equipment on land owned by the Trust. It is due to be installed by the end of June 2018.

The whole scheme is also tied-in with the SRA-funded de-silting of Huntworth Brook *(page 10)*, which feeds into the Screech Owl outfall.

Maintaining Resilience of Wet Grassland: This project is investigating how water levels and land can be managed to enable flood-resilient farming and good environmental outcomes in flood-prone areas for the next 20 to 30 years. Work began as part of the SRA's 2016-17 Enhanced Programme, and more funding was given for 2017-18. The Parrett IDB is leading the project for the SRA, working closely with Natural England.

Being achieved: After five initial visits to landowners in 2016-17, exploratory work continued with visits to seven more landowners in West Moor SSSI, south of Langport at the River Isle/River Parrett junction. The aim has been to find out more about people's individual approaches to farming and to discuss their environmental grants. Grassland condition surveys, which began in February 2017, continued until July 2017; bird surveys were carried out from April to June 2017. Information gathered is being used to help assess current water level management arrangements, so as to establish issues of concern and identify possible improvements.

Opportunities for collaborative working are also being explored, as this wet grassland resilience project may fit in very neatly with the Levels Land Trust work outlined on pages 26-27. Since January 2018, therefore, Will Barnard from Pawlett Hams has been consulting West Moor landowners again, getting their views about the idea of a 'moor association' and their thoughts and feelings in general about farming on the moor. He has also been consulting graziers.

Once people involved have agreed a way forward, talk will turn more specifically to how engineering works could bring benefits to both farmers and wildlife. Such works could include better maintenance of existing water level management control features or the design and installation of new equipment.

Ring banks: After a public consultation about the possibility of ring banks for Moorland, Chadmead and Fordgate in 2015, which revealed significant opposition in Fordgate to the idea, the SRA Board commissioned further work in Chadmead and Moorland. The aim was to see whether residents - given more information - could reach a consensus, either for or against. Consensus is important because a ring bank protectively circling people's homes has to be an 'all or nothing' job. No gaps can be left because water could flow through those gaps and the ring bank would not work. As there was more initial consensus in Chadmead, a draft technical report was prepared by the Parrett IDB, suggesting three possible design options. ***Being achieved:*** Two meetings were held in August 2017 with local people, so they could decide for themselves what (if any) progress was desirable. Feedback from the meetings was encouraging. Property owners therefore agreed that a detailed survey should be carried out on their land in April 2018. This will enable the preparation of a technically sound ring bank design. Local people will be consulted about this design and *if* everyone supports the idea of a ring bank actually being built, attention will turn to how its construction and maintenance could be funded.

Step change in encouraging and enforcing riparian work: After the 2013-14 floods, it was widely felt in Somerset that problems were exacerbated because too few riparian owners knew and carried out their responsibilities, particularly for maintenance. There was a need to be more pro-active.

Who is a riparian owner? A riparian owner is somebody who has any sort of watercourse (including a main river) on or under their property, or next to any boundary of their

property - unless that watercourse is known to be owned by someone else. Ownership of watercourses along boundaries extends to the centre of those watercourses.

In Somerset, the Environment Agency will continue to deal with the owners of main rivers. Somerset County Council as the Lead Local Flood Authority, and the Internal Drainage Boards, will also continue to carry out their usual business regulating ordinary watercourses in Somerset.

The main purpose of SRA involvement with riparian ownership problems is (as ever) to provide an *additional* resource. So, for example, whereas the county council and IDBs focus on getting single issues sorted out at lots of different sites across Somerset, the new SRA-funded Riparian Responsibilities Officer will seek to deliver greater benefits by targeting areas with multiple problems or opportunities. The Riparian Responsibilities Officer will raise awareness of maintenance responsibilities, encourage riparian owners to undertake maintenance and, where appropriate, undertake enforcement of the Land Drainage Act and Internal Drainage Board byelaws.

Being achieved: A Riparian Responsibilities Officer was jointly appointed by Somerset County Council (SCC) and the IDBs, for the SRA. The officer began work in September 2017, initially for one day a week, quickly moving up to 2.5. SCC and the IDBs worked together to identify and agree an appropriate scope of works to maximise the benefit of this additional resource for the SRA and its partners. Meetings, site visits and research have helped to formalise ways of identifying sites and adding value to forthcoming SRA-funded projects such as the major examination of problems in and around Beckington.

Cannington Flood Alleviation Scheme:
Part of the SRA's Enhanced Programme for 2016-17, carried forward after the scheme's completion was delayed by the need to divert a gas main. An SRA contribution of £300,000 enabled a £4.35m scheme to go ahead, led by the Environment Agency in partnership with EDF, Cannington Parish Council, Wessex Water and Somerset County Council.

Achieved: A new relief channel to divert flood water away from Cannington and better protect 200 homes and the A39 was completed in mid-July and a Hydro-Brake® flow control structure in late summer 2017. As part of the re-modelling of the area, a new access has been created to The Grange (a large, historic complex of holiday accommodation). CCTV and hydrometry / telemetry equipment have been installed, and fencing and planting carried out. Some final landscaping work was deferred because of bad weather. It is due to be done before the end of June 2018.

W2 – Land Management

This workstream is led for Somerset Rivers Authority by the Farming & Wildlife Advisory Group SW. In total this year, FWAG SW advisers have made more than 300 SRA-funded farm visits. Their focus has largely been on three strands: 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; soil husbandry to reduce surface run-off; and 'highways referrals' – that is, looking for answers to highway flooding problems in better management of land nearby.

Forty-one Natural Flood Management grants have been approved by the SRA this year. Thirty-one used the final tranche of the £550,000 earmarked for this workstream in 2014 from the Heart of the SW Local Enterprise Partnership Growth Deal Fund. Ten used money from local partners (council tax and contributions from Somerset's Internal Drainage Boards). There is usually a time-lag between grants being approved and work being done at sites by contractors. This is why (in the next paragraph - 'Achieved') the number of schemes completed during the year is different to the number of applications; also some schemes get more than one grant, for different elements.

Achieved: 17 Natural Flood Management schemes have been completed (using 29 grants). They are listed alphabetically, mostly by the nearest sizeable settlement.

West Somerset: 1) **Beggearn Huish**, Huish Farm - Washford catchment: installation of

cross-drain in gateway, ditch clearance leading to gateway, silt trap, cross drains, bund, new ditches, to reduce road and footpath flooding; 2) **Brompton Ralph**, Manor Farm, Hillfarrance Brook, Tone catchment: cross-drain and leaky pond; 3) **Compartment 28 and Tim Wood, upstream of Roadwater**, tributary of Traphole Stream: woody dams; 4) **Crowcombe**, Hurley Farm, Doniford Stream and tributary of Doniford Stream - leaky woody dams and bankside scrapes to lower floodplain and increase storage near Leigh Mill Bridge, to reduce flooding on Leigh Lane; plus five large woody dams in goyle-like tributary (ravine) of Doniford;

Taunton Deane: 1) **Bishops Lydeard**, Portman Farm, Back Stream catchment: four leaky dams (gabions) and one leaky woody dam, leaky pond with sluice-type structure and adjustable weir boards; 2) near **Hoccombe** in Fitzhead parish – tributary of Halse Water, Goulds Farm, Tone catchment: leaky pond and bunded scrape; 3) **Marcombe Valley**, Hole Farm, tributary of Tone in upper Tone catchment: re-instate boundary bank with timber from nearby trees to slow and filter run-off from bridleway, create a dozen leaky woody dams; 4) **Milverton**, Bickley Farm, tributary of Hillfarrance Brook, Tone catchment: leaky pond storing up to 5000m^3 of floodwater; 5) **Nynehead**, Hornshay Farm, River Tone catchment: 160m of hedge planting next to Nynehead Road to slow the flow and reduce road flooding;

South Somerset: 1) **Buckland St Mary**, Folly Farm, River Ding and River Parrett catchment: multiple small-scale schemes across one farm – bunded scrape, de-silted old lime kiln and flow spreader, restored pond, ditch work, leaky dam, and floodplain scrape, field corner scrape, pair of bunded scrapes, woody dams; 2) **Charlton Mackrell**, East Somerton Lane, West Somerton Lane, North Boxhill Lane, South Sug Lane, tributary of River Cary: improvement of ditches, installation of gateway culverts and headwalls, to reduce flooding of roads and homes; 3) **Montacute**, Montacute House, tributary of Wellhams Brook: woody debris dams in Park Covert and at east end of Montacute Park; 4) **Odcombe**, Orchard Fields, tributary of Wellhams Brook, Parrett catchment: two woody dams, two log-stop sediment traps and pipe trash screen, de-silt pond and install leaky pipe outlet with penstock, clear vegetation; 5) **Queen Camel**, Camel Hill Farm, Dyke Brook: leaky pond with check-dam sediment trap and leaky pond pipe outlet; 6) **Shepton Montague**, Higher Farm, River Pitt catchment: installation of pipe, headwall, trash screen, re-grading of track and installation of four cross-drains into ditch, re-jigging of ditch and installation of in-check dams, to reduce road flooding towards Pitcombe; 7) **Stoney Stoke**, Lushes Farm, upper catchment of River Pitt: temporary water storage pond, tree planting (approx 4000m^2), woody dams; 8) **Yeovil** (Brympton parish), Lufton Manor College, Wellhams Brook, Parrett catchment: major pond de-silting, woody dams, new penstock;

Sedgemoor: 1) **Cossington**, Cossington House Farm, Cousney Rhyne: installation of new culvert with headwalls and increased capacity in receiving ditch, to stop road flooding.

Being achieved: Investigating and encouraging better **soil husbandry** to reduce the run-off of surface water has become a more important part of this workstream. Keeping their soil in good health also brings obvious benefits to farmers.

This year, half-field cultivation trials have been carried out on five farms to assess effects on infiltration, run-off and soil structure, as well as crop yield.

The farms involved were; *West Somerset* - Brompton Regis (Ruglands Farm), Luxborough (Westcott Farm), Beggearn Huish (Huish Farm); *Taunton Deane* - Croford, near Wivelisombe (Castle Farm); *Sedgemoor* - North Newton (Newcotts Farm). Work has included testing methods such as arable and grassland sub-soiling and following these up with the monitoring of infiltration rates, run-off and sward height.

Trials have also been run of different varieties of cover crop, and their effects on infiltration. Cover crops are grown more to improve soil health and manage soil erosion than for the harvests they yield. They are planted over the winter to maintain ground cover and reduce run-off. Trials of cereal-based and legume-based

mixes on one farm allowed FWAG SW and the farmer to compare effects on soil erosion. The farm was West Yeo Farm near Moorland in the Sedgemoor district.

Other activities this year have included running a soil discussion group, holding small events with farmers to discuss and publicise interesting matters such as trial results, and researching a Maize Charter. Moving towards good practice with maize-growing is particularly important because of the high risks of soil erosion and soil structural issues associated with a late-harvested crop. Providing advice about how best to select sites, and how best to harvest and manage fields post-harvest, will help to reduce the risks of run-off over winter months.

The Hills to Levels YouTube Channel features three very informative and useful new videos, filmed in Somerset with local FWAG SW Resource Protection Specialist Jo Oborn, exploring Soil Compaction and Infiltration issues and giving masses of advice.

Achieved: 41 **Highways/Lead Local Flood Authority referral follow-up visits** by FWAG SW. The purpose of these visits is to see whether capital schemes of work, or land management changes, could bring about improvements at places with flooding problems. Many different outcomes are possible. At some places - for example, Charlton Mackrell *(South Somerset)*, Cossington *(Sedgemoor)* and Crowcombe *(West Somerset)* - talks have led to successful applications being made to the SRA for Natural Flood Management grants and works being done. More details of schemes at the three places just cited are given in the paragraphs above about NFM grants. The lists below show places visited in different districts.

West Somerset: Carhampton (Eastbury Farm), Crowcombe (Hurley Farm), Luxborough (Chargot Estate), Monksilver, Old Cleeve (Binham Farm), Roadwater, Stogumber (Rexton Farm);

South Somerset – Barrington (Bonnings Lane), Charlton Mackrell, Compton Durville (Meadowlea Farm), Curry Rivel (Northwing Nursery), Fivehead (Swell Court), Haselbury Plucknett (Rushywood Farm), Lopenhead (Meadowlea Farm), Marston Magna (Easton Farm), Martock (Bower Hinton), North Cadbury, Odcombe, South Petherton (Frogmary Green Farm), Whitestaunton (Northay Lane), Wigborough (Wigborough Manor - application proposed for SRA grant), Yeovil (Ashington);
Taunton Deane – Ash Priors, Combe Florey (Pit Pear Farm), Cothay (Elworthy Road), Luckham Bridge (Bickley Farm), Lydeard St Lawrence (Nethercott Lane), North Curry (Lillesdon Court Farm), Wellington (Tone Dale), Wiveliscombe (Pyncombe Lane - final inspection visit after SRA-funded roadside land stabilisation works);

Sedgemoor – Cannington (Swang Farm), Charlynch (Gothelney Farm), Cossington (Bell Lane), North Newton (One Tree Farm/ Brook Street), North Petherton (Dancing Hill, Quantock Farm), Wedmore (Plud Streeet);

Mendip - Binegar Bottom (where an SRA grant application has been approved for two scrapes and bunds to hold back rapid run-off and reduce Gurney Slade road flooding), Cranmore and East Cranmore (Merryfields), Critchill on the edge of Frome (Sharpshaw Farm), Vobster Cross to Hatchett Hill (Lydes Farm - no signs of run-off seen). A field was also visited in Upton Noble.

Over the border in West Dorset consultation visits were made north of Sherborne (at Patson Hill – River Yeo catchment) and to Leigh (Drummers Farm – Yeo catchment).

Other activities have included:

- mapping Natural Flood Management and flooding hotspots to help decide which farmers and landowners to approach;

- developing delivery in new areas (Somerset Frome, Cale, Pitt, Upper Stour catchments);

- supporting the National Trust's Porlock Vale Streams project in West Somerset (part of the Trust's major Riverlands initiative), and exchanging experience and information more generally with the National Trust. Places of current mutual interest include the Holnicote Estate, Washford, Monksilver and the Doniford Brook.

- FWAG SW is also involved in a PhD monitoring project with Bristol University. Data being collected from Natural Flood Management structures funded by the SRA will help to create computer models that can evaluate the effects of Natural Flood Management at catchment-scale. This is potentially a very significant piece of research, because one of the debates about the value of Natural Flood Management in the past has been about the geographical spread of its impact.

Hills to Levels: In March 2018, at the Environment Agency's major Flood & Coast Awards for Project Excellence, Hills to Levels won the first Duncan Huggett Award for the Environment.

Also in March, Hills to Levels was selected as a finalist for the 2018 UK River Prize, in the category 'Catchment-scale project - Demonstrating a whole river approach to restoration'. (At the River Restoration Centre Annual Conference in April, Hills to Levels won the UK River Prize).

Hills to Levels began life in 2015 as a collaboration between FWAG SW, Somerset Wildlife Trust (SWT), the RSPB and the Royal Bath & West Society. Given two years' funding by the People's Postcode Lottery, the project's aim was to help Somerset farmers to manage their land more effectively in times of heavy rain so as to 'slow the flow' from high ground to low and thereby better control flooding. The project has long been backed by the SRA, first using HotSWLEP Growth Deal money, and more recently funds from Local Partners.

Agreement has now been reached between the SRA, FWAG SW, RSPB, Somerset Wildlife Trust and the Royal Bath & West Society that the SRA should become a key partner of the Hills to Levels brand, now that funding from the People's Postcode Lottery has run out. This means, for example, that Hills to Levels will feature more on the SRA's forthcoming new website later this year. Regularly-updated information about Hills to Levels can also be found on FWAG SW's new website: https://www.fwagsw.org.uk/hills-to-levels

W3 – Urban Water Management

Rain garden project: A small demonstration project (half-funded by Somerset Rivers Authority, half by Wessex Water), delivered for the SRA and Wessex Water by Somerset County Council. The contractor was Westcountry Rivers Trust (WRT).

The aim was to show the environmental and run-off reduction benefits of 'rain garden' techniques. So as to seek wider public benefits than would arise from funding work at privately-owned properties, SCC and WRT chose to collaborate with Taunton Deane Borough Council (TDBC) and focus on council-owned sheltered housing at Kilkenny and Middleway in Taunton. Carried forward from the SRA's Enhanced Programme for 2016-17.

Achieved: Contract awarded to WRT, after tendering, in April 2017. Meetings held with residents in August to discuss their role in developing the project. SuDS designers, and WRT contacts who had previously worked on similar projects, were then consulted about further ideas and conceptual designs. At Kilkenny Court, the project team also worked with the intergenerational dementia-awareness project Reminiscence Learning, who have previously developed 'dementia gardens'. Ideas put into action in autumn 2017, with residents enthusiastically involved. As a follow-up to the success of this activity, it is hoped to do more with these communities as part of the closely-associated Sponge project *(see next entry)*.

Sponge EU: The SRA is contributing to the Somerset element of an international EU project known as Sponge to raise awareness of what can be done in urban areas to reduce run-off and hence flooding whilst also enhancing the environment. The project is led locally by Somerset County Council (SCC) and Westcountry Rivers Trust (WRT). SCC is currently developing demonstration projects to retrofit SuDS (Sustainable Urban Drainage Systems) into retail parking areas. WRT is supplementing this endeavour with work on residential SuDS in and around Taunton.

Being achieved: SCC has been collaborating closely with WRT. For example, the Trust's

Ecosystems Services opportunity mapping for Taunton, used to identify potential residential areas to target, is also helping to shape SCC's ambitions for SuDS in parking areas.

WRT has been promoting Sponge in suitable areas and, as a result, has begun working with community groups. Small-scale SuDS retrofits are now being planned in schools, parks and council housing. Many sites have been suggested by community groups / land owners, in response to community engagement activities.

In 2018-19, WRT is particularly keen to work with schools on getting pupils to create SuDS in school grounds. A Community Raingardens project will follow on from a pilot scheme funded by the SRA and Wessex Water (see previous entry) and work at Longrun Meadow (where it is planned to introduce meanders and a reed bed into a section of drainage channel). The aim is to get more volunteers building and maintaining rain gardens in public spaces.

SCC is developing ideas for larger retrofits in car parks owned by Taunton Deane Borough Council (TDBC). A consultant has been commissioned to establish in more detail what is feasible. One reason SCC is working with TDBC on Sponge is that it fits in with the council's major Garden Town initiative, designed to create more green spaces with native trees and hedgerows, ponds, and natural landscaping.

In July 2017, a training workshop was held in Taunton for all of the UK's partners in Sponge (SCC, WRT, Essex County Council and Southend-on-Sea Borough Council), and several participants from the Netherlands.

Sponge has been promoted in Somerset through a workshop for local stakeholders, presentations at meetings and attendance at events. Both SCC and WRT intend to run more public engagement activities over the summer to raise general awareness of SuDS that can be implemented on private land and to enthuse land owners. Local festivals will be attended and some events will be put on independently. The project team is also looking at opportunities to take Sponge to other towns in Somerset. Sponge will continue until 2020. It is not affected by Brexit.

Planning requirements: A project to get and share the best, most up-to-date knowledge about how the planning system can be used in Somerset to secure better drainage. Methods include reviewing national and local policies and guidance, and interviewing many local practitioners involved with different aspects of the planning process. The aim is to make sure that developers know - and do - what is required. Work is being led for the SRA by Somerset County Council. It began as part of the SRA's Enhanced Programme for 2016-17.

Being achieved: Knowledge gained about Planning requirements has been informing other SRA-funded projects such as the SuDS Review. Research so far is also the basis for a new scheme in the SRA's 2018-19 Enhanced Programme: the production of a Somerset-specific planning guidance document to supplement the West of England Sustainable Drainage Guide for Developers. This guidance will be adopted by Somerset's local planning authorities.

SuDS Review: A study into whether selected Sustainable Urban Drainage Systems across Somerset were a) adequately designed, b) constructed as designed, c) have any deficiencies, d) are being adequately maintained. This initiative is attracting widespread interest from national professional bodies for three main reasons. Firstly, because it is unique. Secondly, because the way SuDS work in practice affects the lives of people dwelling nearby and further afield. Thirdly, because well-designed SuDs can deliver many other benefits aside from drainage, such as greener, more attractive places. Carried forward from the SRA's Enhanced Programme 2016-17.

Being achieved: This project is being managed for the SRA by Somerset County Council (SCC), using consultants JBA. It was thought, to begin with, that 12 sites might be enough. After seven were examined, and initial findings summarised, the SRA Board agreed in July 2017 to allocate extra funding, so that a much fuller picture could be obtained of SuDS performance in Somerset.

In August, JBA prepared a revised brief and programme and an expanded list was developed with input from SCC, Wessex Water, some Local Planning Authorities, district council drainage engineers, the Environment Agency and Somerset Drainage Boards Consortium. Innovative recording templates have been developed by JBA with SCC and Wessex Water. Wessex Water have also contributed significantly to actual inspections, by sharing staff time and expertise, particularly knowledge of places where they own and maintain assets. Ongoing involvement from other partners has also helped to refine this project. Two dozen inspections are now complete: a report is being circulated to partners for comment in spring 2018, with publication scheduled later in 2018.

SuDS Inspection: Many Sustainable Urban Drainage Systems (SuDS) built by developers remain in private ownership instead of being taken on ('adopted') by a Flood Risk Management Authority (FRMA) such as a local council. Historically, FRMAs have taken the view that if they are not going to be looking after particular SuDS in the future, then it is not imperative to go and inspect them when they are being built. All the more so because no authority is funded to inspect SuDs that are going to stay in private hands for future maintenance, and there are many other demands on FRMAs' limited resources. And yet, these unadopted SuDS will affect people's lives for years to come, not just residents in the new homes these systems were built to serve, but road-users and people living further afield as well. Therefore, as an extra service for local people, Somerset Rivers Authority pays for checks on SuDS that are not going to be adopted. The SRA can do this because of the unique way it has been set up and is funded. Carried forward from the SRA's Enhanced Programme for 2016-17.

Being achieved: The inspection team (Somerset County Council's Highway Development Supervision Team) has begun to identify possible sites for inspection and to prepare templates for inspection and reporting. Mendip District Council planners and engineers have begun telling applicants for certain sites which include SuDS thay they should let the inspection team know when the building of their SuDs is coming up. Developments with significant SuDS will be inspected during 2018-19 as schemes get built.

Encouraging urban and village run-off reduction: A Somerset-wide campaign – drawing on all of the above strands in Workstream 3 – to raise awareness of urban water management issues, and to provide and promote advice to householders and businesses who may wish to improve drainage locally and decrease run-off, by putting in place things such as permeable paving, green roofs, water butts, extra trees, rain garden features such as suitably-planted sunken areas, etc. ***Being achieved:*** Research being done, strategy being prepared by the SRA.

Wirral Park: Wirral Park balance pond and pumping station was built in 1989 to help protect Glastonbury against flooding. In 2015-16, the SRA funded the replacement of life-expired one-way flap valves and gate valves, and the removal of two skips full of silt and debris from the inlet channel. This was Phase 1 of a scheme designed and delivered by Mendip District Council to ensure that Wirral Park would continue to protect more than 200 homes and four hectares of industrial estate. ***Not yet achieved:*** Phase 2 will upgrade Wirral Park's dated electrical control system to meet current regulations and allow remote monitoring should the need arise. The pumping station was inspected in October 2017 and a detailed report was produced on the exact requirement to upgrade it. Action due end of May/June 2018.

W4 – Resilient Infrastructure

A38 drainage improvements: The A38 is one of Somerset's busiest roads, giving access to and from Taunton and Wellington, and carrying over 17,000 vehicles a day. It is the emergency diversion route if the M5 is closed. SRA funding will help to reduce flooding along two strategically important sections.

1) A38 Rumwell: Flooding at Rumwell frequently affected half the carriageway. Sometimes the whole road would be submerged, with gridlock very quickly resulting. The problem was a drainage system that was over 90 years old and could not cope.

Achieved: A new drainage system has been installed. The work was delivered for the SRA by Somerset County Council's Highways Department using contractors Skanska, and Bridgwater-based sub-contractors P Phillips & Sons.

2) A38 Chelston: Investigation and feasibility works have been undertaken by Somerset County Council's Highways Dept for the SRA.

Not yet achieved: A scheme is scheduled to be designed and carried out in 2018-19, to complement the works at Rumwell.

East Stoke, Stoke sub Hamdon flood alleviation: A scheme to help prevent the flooding of 10 properties at East Stoke and the road between Stoke sub Hamdon and Montacute (near Yeovil). Improving a culverted watercourse will enable the better capture, storage and removal of surface water runoff. This scheme is being delivered for the SRA by Somerset County Council. ***Being achieved:*** The council's contractors Skanska began a CCTV survey, but could not complete it because of a large blockage which needed to be investigated further. Two manholes were put in to give better access and a full CCTV survey was then done. Its results are awaited. Residents will be told what was found and what further actions are required for a successful scheme to be designed and built.

A372 Pibsbury Corner, Huish Episcopi: The A372 is a strategically important part of Somerset's principal network, used by around 8,000 vehicles a day. Half the carriageway was regularly flooded, causing safety problems as vehicles negotiated their way round a blind corner. Flooding also affected four properties and hampered access to the popular Huish Episcopi allotments site. ***Achieved:*** The main aim of the works was to intercept and re-direct water before it caused problems down at Pibsbury Corner.

More than 135 metres of new drainage pipes were therefore installed, along with several new gullies. Three new headwalls were built to secure pipes where water flows out into ditches. Sections of ditch were cleared. The A372 carriageway and footway were also re-profiled to remove the low point where water flooded the inside of the bend.

The works were delivered for Somerset Rivers Authority by Somerset County Council's Highways Dept using contractors Skanska and Bridgwater-based sub-contractors P Phillips & Sons.

Lower Bilbrook Lane: Improving drainage along Lower Bilbrook Lane will stop around 10 residents in the West Somerset hamlet of Bilbrook from being cut off and preserve access for other road users. This SRA-funded scheme is additional to an earlier Somerset County Council project that helped to collect water from the small watercourse that joins into the highway system along Lower Bilbrook Lane. This new scheme is supported by the parish council. ***Being achieved:*** Investigation, feasibility and initial design works have been undertaken by Somerset County Council's Highways Dept, on behalf of the SRA. Work is due to be carried out in summer 2018.

Flood alert systems: Proposed installation of sophisticated new flood detection and warning systems that provide real-time information, to help generate and broadcast warnings and reduce the risk of people getting injured and vehicles damaged, particularly when it is dark. Carried forward from 2016-17. ***Not yet achieved:*** Three sites have been selected by Somerset County Council's Highways Dept for the SRA – A359 Yeovil to Sparkford Road near Mudford; A378 Langport Road, Wrantage; Oake Road, Bradford on Tone. In October 2017, the SRA Board agreed to increase the amount of funding available for these flood alert systems and to provide an annual sum for their maintenance. Since then, following a re-evaluation of the proposed supplier's charges, the Highways Dept is undertaking a procurement exercise to be sure of obtaining best value for money.

Inspections and remedial works to culverts under roads in IDB areas: A long and ongoing project to investigate and improve more than 700 of the most vulnerable and strategically important culverts within Somerset Internal Drainage Board (IDB) areas.

It has not always been clear who is responsible for these structures. SRA funding was therefore given for two reasons: firstly, to gain a better understanding of all these culverts; secondly, to improve them, regardless of who owns them.

Activities such as removing blockages, and replacing structures which are broken beyond repair, will improve the conveyance of water and will help to prevent disruption to residents and road users.

Being achieved: A comprehensive database has been prepared, identifying more than 700 culverts beneath roads in IDB areas. The culverts' condition has been assessed and work schedules prepared for improvements at the highest priority sites. De-silting, vegetation clearance, high-pressure water jetting and structural repairs have begun.

One early site was Northwick Road near Mark. Along quite a stretch of the south side of this road runs Northwick Rhyne *(pictured)*: on the north side are non-viewed rhynes (which do not get the same IDB maintenance as Viewed Rhynes). The problem here was that water from the non-viewed rhynes was topping over Northwick Road into Northwick Rhyne and threatening to flood a house nearby. The IDB cleared a small culvert that had been found blocked-up. Water levels dropped within minutes and by next morning were back to normal.

Other early sites have included Glastonbury Bypass and roads nearby, and Park Rhyne which crosses Tucker's Lane between Baltonsborough, Butleigh and Street.

Funding for this enhanced flood risk management work began in 2016-17. It will continue in 2018-19.

De-silting structures: Somerset County Council's existing budgets only allow for the de-silting of structures such as bridges when there is a threat to the structure itself. Extra SRA funding enables de-silting where there is also a benefit to the watercourse and, therefore, a reduced risk of flooding to roads and nearby properties.

Achieved: De-silting of structures was completed in *Mendip* at **Dean**, beneath the A361 near Shepton Mallet, on a watercourse close to the Methodist Chapel and not far from two reservoirs; Ford House in **Ford**, between Chewton Mendip and Litton, on the River Chew beneath the B3114; near **Witham Friary**, close to Witham Hall Farm on a tributary of the River Frome: in *Taunton Deane* - Ash Mill Stream at Ash Farm on a tributary of the River Tone **between Chelston and East Nynehead**; Theats Farm, Creech Heathfield Road, **Creech Heathfield**, on a tributary of the River Tone; Ford South in **Ford** near Wiveliscombe, on a tributary of Hillfarance Brook, beneath the B3188; Stoke Culvert in **Stoke St Gregory** near the turn to Windmill - part of the Sedgemoor Old Rhyne system; in *South Somerset* - Ding Bridge in **Horton** parish, which carries the River Ding under the A358 between the A303 roundabout near Horton Cross and the turn to Broadway; Battspool Culvert and Battspool, south of **Wincanton**, between Brain's Corner and Rodgrove Stud, near the turn to Batchpool Lane, where two tributaries of the River Cale meet at a junction; Moor Lane A, on Moor Lane, **Wincanton**, just north of the A303, on a tributary of the River Cale at the back of the Bennetts Field Trading Estate, and Moor Lane B, just to the south of the A303.

Not yet achieved: *South Somerset* - Cockhill South - Part of a larger improvement / strengthening scheme planned for 2018-19, at Thornymarsh Lane, south of **Cockhill near Castle Cary**, on the River Cary; *West Somerset* - Ford Twin Arches, awaiting Environment Agency consent, at Ford Bridge on the River Avill, beneath the A396 near **Timberscombe**. Expected start date mid-April 2018.

Carried forward from 2016-17 - ***Achieved:*** *West Somerset* - Monksilver, near The Notley Arms.

Gully emptying: Somerset County Council's Highways Department empties gullies in flood-susceptible areas once a year. The SRA funded an additional six-month round for 17,800 of the highest-risk gullies in these at-risk areas. The purpose was to keep roads open, make them safer, preserve access for communities, and safeguard properties from flooding. 8,883

gullies (49.9% of the initial target figure) were given an extra emptying. Numbers were fewer because of issues to do with the bedding in of a new contract and the need to ensure best value. ***Partly achieved:*** Hundreds of Somerset locations benefited from this extra work. Places covered - listed by council ward - were: Alcombe, Bishop's Hull, Bishop's Lydeard, Blackdown, Blackmoor Vale, Bradford on Tone, Bridgwater Eastover, Bridgwater Fairfax, Bridgwater Hamp, Bridgwater Victoria, Bridgwater Westover, Bruton, Brympton, Burrow Hill, Butleigh & Baltonsborough, Camelot, Cannington & Wembdon, Cary, Chewton Mendip & Ston Easton, Comeytrowe, Cranmore, Creech, Croscombe & Pilton, Doulting & Nunney, East Polden, Curry Rivel, Glastonbury St Benedict's, Glastonbury St Edmund's, Glastonbury St John's, Glastonbury St Mary's, Huntspill & Pawlett, King's Isle, Knoll, Langport & Huish, Martock, Milverton & North Deane, Minehead Central, Minehead South, Monument, North Curry & Stoke St Gregory, Moor, Neroche, North Petherton, Northstone, Norton Fitzwarren, Postlebury, Puriton & Woolavington, Quantocks, Rodney & Westbury, Ruishton & Creech, Shepton East, Shepton West, South Petherton, Staplegrove, St Cuthbert Out North, Taunton Fairwater, Taunton Lyngford, Taunton Manor and Wilton, Taunton Pyrland & Rowbarton, The Pennards & Ditcheat, Tower, Trull, Turn Hill, Wedmore & Mark, Wellington North, Wellington Rockwell Green & West, Wells Central, Wells St Thomas, Wessex, West Monkton, West Polden, Wiveliscombe & West Deane, Wookey & St Cuthbert Out West, Yeovil South.

Drain Jetting: Under existing budgets, Somerset County Council's Highways Dept 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. Drain jetting sites feature on annual gully rounds; final selections are made using local knowledge and professional judgement.

Achieved: Locations that benefitted from this work - listed mainly by parish - were: *West Somerset* – Brompton Ralph, Brompton Regis, Brushford, Carhampton, Crowcombe, Dulverton, Exford, Exmoor (Simonsbath to Challacombe), Holford, Luxborough, Old Cleeve, Luccombe (Horner & West Luccombe), Porlock, Minehead, Sampford Brett, Withycombe. *Taunton Deane* – Cotford St Luke, Durston, Fitzhead, Kingston St Mary, Langford Budville, Milverton, Ruishton, Staple Fitzapaine, Stoke St Mary, Taunton, Trull, Wellington, West Buckland, Wiveliscombe. *Mendip* – Chilcompton, Clapton, East Pennard, Frome, Litton, Pilton, Pylle, Shepton Mallet, Upton Noble, Wookey. *Sedgemoor* – Berrow, Cannington, Greinton, Lympsham, Moorland, North Petherton, Spaxton (including Merridge Hill), Westonzoyland, Woolavington. *South Somerset* – Ash, Brewham, Bruton, Chilton Cantello, Charlton Mackrell, Ilton, Limington, North Barrow, Queen Camel, Tatworth and Forton, Tintinhull.

Reactive drain jetting was carried out in *Mendip* at Garston Street in Shepton Mallet.

Countywide targeted edge of road clearing: The aim of this SRA-funded action is to reduce flood risks by stopping detritus entering and blocking drainage systems. Roadsides in rural areas highly susceptible to flooding are therefore swept after trees have shed their leaves. The work is delivered for the SRA by Somerset County Council's Highways Dept; it is an extra activity for Somerset because the county council does no other sweeping. Local knowledge and professional judgement are used in choosing sites and (where possible) road-edge clearing is integrated with other preventative maintenance activities such as extra gully-emptying. ***Partly achieved:*** Work was done in Sedgemoor at Brean (Warren Road, Brean Down), Compton Bishop (Webbington Road, Vernon Lane, Church Lane, Bourton Lane) and Spaxton (Merridge Hill, Bush Road, Bush Lane, Parishlands; Courtway Lane and Lower Merridge). This year's activities were limited because of issues to do with the bedding in of a new contract and the need to ensure best value.

CCTV surveys: Accurate information enables Somerset County Council's flood risk team to identify issues and to encourage the owners of watercourses and structures to take responsibility for them. If need be, CCTV survey results also help the team to carry out

enforcement. In 2017-18, surveys have been used to address local flooding problems and local concerns about the condition of culverted watercourses; inform investigations; and support proposed schemes.

Success stories include the identification of a blockage in a culvert in Charlton Musgrove, which was subsequently unblocked by its owner. A neighbour - whose home had been in danger of flooding internally in 2016 - got in touch just before Christmas 2017 to say thank you for the work done. It was reported that the system was now working well even in heavy rain.

The CCTV budget has also been used to support a Parrett IDB investigation for the SRA into problems with surface water flooding in Moorland. The surface water drainage system here is based on an old agricultural network of ditches. As the village has grown, householders and developers have filled-in, culverted and piped many sections of ditch and several key locations have been found to be blocked or obstructed. Problems include the dumping of garden waste, and a lack of maintenance by property owners. SRA-funded CCTV surveys have been helping to establish the true extent and nature of Moorland's difficulties. It is then hoped to better establish people's responsibilities for maintenance and to develop a shared understanding with Moorland residents about the way their village drainage system works and what needs to be done to make sure it works well.

Being achieved: Surveys completed in: *West Somerset* - Cutcombe (Luckwell Bridge, Long Lane - one ton of road plainings removed from system), Old Cleeve (Roadwater Road), Withypool (Withypool Cross to New Bridge); *Taunton Deane* - Bishops Lydeard (Hearne Lane), Creech Heathfield (Charlton Road), Curry Rivel (Church Street - to support 2018-19 Somerset County Council scheme to alleviate Primary School flooding), Pitminster, Wiveliscombe; *Sedgemoor* - Enmore (Enmore Road x2), Moorland (Northmoor Green Road and Church Road), North Newton (Coxhill Farm); *South Somerset* - Charlton Musgrove, Cudworth, Fivehead (Lower Cottage Lane), Ilchester (The Mead), Ilminster (Shudrick Lane - to support 2018-19 Ilminster flood alleviation study), Misterton (four locations, partly in support of a Somerset County Council flood alleviation scheme after six homes flooded in February 2016), Norton sub Hamdon (five locations); *Mendip* - Frome (Forest Road).

Unspent funding will be used for more CCTV surveys in 2018-19.

Local flood risk management measures: For the SRA, Somerset County Council and contractors Skanska have been tackling extra cases of property and/or highway flooding from surface water and ordinary watercourses. Funding carried forward from 2015-16. ***Achieved:*** Old Cleeve to Blue Anchor: Surface water flooding was causing trouble for road-users and householders. After a CCTV survey in 2016-17, a detailed design was prepared for extra drainage. This was installed in autumn 2017. ***Being achieved:*** The design of a scheme to intercept surface water is being finalised for Frog Lane, Enmore, after extensive engagement with residents and landowners and some additional survey work. Construction will be programmed once problematic issues such as access have been finally overcome.

W5 – Building Local Resilience

This year has seen a change in focus of parts of this programme. Following the 2013-14 floods, very close working with affected Levels & Moors residents helped them to develop their own community flood plans. Several groups are now well-established and communities have the collective knowledge and experience to decide their own best courses of action.

The emphasis now, therefore, is more on providing inspiration, support, advice, information and practical help to communities, households, businesses, and landowners across Somerset to encourage and enable them to become more resilient.

Furthermore, Somerset Rivers Authority is making the building of community resilience an integral part of all of its planning. In March 2018, the SRA's Community Resilience Officer ran a workshop for SRA partners, and guidance is being developed to help partners ensure that

they include, inform and listen to communities when developing SRA projects. Bodies such as Natural England, FWAG SW, Somerset Wildlife Trust and the IDBs have been provided with support for community engagement.

Being achieved: Somerset communities have been given advice, information and money. In Curry Rivel, for example, the SRA's Community Resilience Worker, FWAG SW and Somerset County Council's flood risk management team have been helping the community and the village primary school to identify ways of reducing flood risk and building local flood resilience. *(See p.33 for Curry Rivel's CCTV work)*. In North Curry and Huntham, the SRA also brought together several agencies to work with residents on tackling local flooding issues.

The SRA has helped people to access grants from the SRA-funded Community Resilience in Somerset Partnership (CRiSP) fund.

1) Butleigh & Butleigh Wootton: A small SRA-funded CRiSP grant enabled the parish's emergency team to buy two extra torches, so each team member now has a torch.

2) Chadmead: Chadmead is a small community, accessed via two un-adopted roads, with extremely patchy sat nav and mobile signals, very poor road surfaces, and no lighting. During the floods of 2013-14, emergency services and other agencies struggled to locate Chadmead residents because of a lack of signage. An earlier SRA-funded CRiSP grant addressed that problem. This year, after 15 months of partnership working and discussion and negotiation, agreement was reached between residents and landowners on several further improvements. These included road-surfacing, signage for a temporary diversion, and arrangements as part of the community plan for local people to work with farmers and their labourers on moves to increase resilience for them all. Another SRA-funded CRiSP grant supported this initiative.

3) Holcombe: Holcombe Parish Council has compiled an Emergency Plan, which its nine members will implement when occasion (eg, flood) demands. Each parish councillor will take on a specific role, with the Village Hall designated as their emergency HQ. CRiSP gave an SRA-funded grant towards emergency equipment, stored securely at the hall.

4) Moorland: An SRA-funded CRiSP grant paid for half of the cost of a new plywood-lined hut at Moorland Village Hall. The hut is used to store flood wardens' equipment, previously kept high up in the Hall's loft, only reachable via a ladder. As flood wardens have keys to the hut, all their gear is now much more accessible in a crisis, while still being secure.

5) Wiveliscombe: Wiveliscombe Town Council updated its Emergency Plan, after consulting the local fire brigade, the 10 Parishes Business Group, Community Centre representatives and the Village Agent, the Rugby Club and local shops and food outlets. An SRA-funded CRiSP grant helped pay for an emergency box for the town, with equipment including Hi Viz vests, foil blankets, torches, lamps and two-way radios (the area has poor mobile phone coverage).

6) Training and awareness: The SRA's Community Resilience Officer (CRO) worked with Safe Southwest and the Environment Agency to refresh existing flood warden training materials before training sessions with communities in the autumn. An SRA-funded CRiSP grant put £900 towards the cost of work books and other materials for this resilience boosting. The CRO also ran a successful training session on community resilience with students on the Public Services and 999 Academy courses at Bridgwater & Taunton College in October 2017. Other activities were tied in with the Environment Agency's Flood Awareness Week in November, while Levels & Moors communities were encouraged to review their community plans in preparation for winter, and offered support if required. (Community plans provided a good basis for local action when it snowed heavily in March 2018. Although plans were developed largely in preparation for flooding, they do help in other emergencies).

Levels Land Trust: Somerset's 20 Year Flood Action Plan suggested "establishing a 'Community Land Trust' to support a land swap/ transfer/purchase scheme" as a possible means of facilitating "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."

Being achieved: **Phase 1** - Based on its successful development and operation of a Land Trust on Pawlett Hams, Somerset Wetland and Wildlife Foundation was commissioned to explore what might be achieved on vulnerable parts of the Levels through innovative tenure and collaborative land management mechanisms. Conclusions stressed the need for greater collaboration between farming, conservation and water management sectors, using a positive common goal as a tool for change.

Phase 2 - FWAG SW, which is delivering this project for the SRA, appointed Will Barnard from Pawlett Hams as a contractor. Work done has included: liaising with partners (Parrett IDB, Natural England, RSPB) and the SRA-funded Maintaining the Resilience of Wet Grassland project *(see page 15)*; developing a protocol and a questionnaire for visiting landowners on West Moor; visiting all landowners and farmers and seeking agreement on taking forward a new West Moor Association. Work on developing and implementing this association will continue into summer 2018, with a similar approach then rolled out onto Wet Moor in the autumn.

PART 4: Progress on key elements of Somerset's 20 Year Flood Action Plan

Background: The Somerset Levels & Moors Flood Action Plan was published in March 2014, after the floods of 2013-14. When Somerset Rivers Authority was launched on 31 January, 2015, the Plan was widened to include the whole of Somerset.

The SRA oversees the Plan. It has six key objectives:

1. Reduce the frequency, depth and duration of flooding
2. Maintain access for communities and business
3. Increase resilience to flooding for families, agriculture, businesses, communities, and wildlife
4. Make the most of the special characteristics of the Somerset Levels and Moors (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.

TARGETS

This section details progress against key targets in the 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: The Environment Agency dredged 4km of the River Tone upstream of Burrowbridge, and 4km of the River Parrett, back to their 1960s' river profiles in 2014. Since then, the SRA has funded maintenance dredging in 2015, 2016, and 2017, dredged a further 750m of the Parrett downstream of Northmoor Pumping Station and is developing plans to dredge the Parrett between Oath and Burrowbridge. For more details, see Part 3a 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: Somerset County Council raised and repaired the A372 at Beer Wall, and installed four massive culverts, to allow more water to go under the road. The Environment Agency, acting for the SRA, then increased the capacity of the Sowy/KSD by creating two new offshoot channels for the Sowy and Langacre 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, and improvements to Chedzoy Flap (to better protect farmland around Chedzoy and Andersea). For more Sowy/KSD details, see part 3a of this report.

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: The SRA has so far taken forward exactly 100 actions across Somerset, involving – in total – many hundreds more of different elements countywide. Works have included maintenance and repairs to river channels and ordinary watercourses; improvements to a wide range of flood risk management assets such as pumping stations; plus the raising of roads and the upgrading of drains. An extensive programme of silt-monitoring has made dredging more effective and increased understanding of the Parrett and Tone. Significant investments have been made in research for the major Taunton Strategic Flood Alleviation Improvements Scheme.

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: A location and design have been chosen for a Bridgwater Tidal Barrier: two 'vertical lift' gates between Express Park and Chilton Trinity. Following further public consultation in autumn 2018, the Environment Agency and Sedgemoor District Council plan to apply for the necessary consents in spring 2019, and start building in 2022, so a Barrier is operational in 2024. It will protect nearly 13,000 properties.

The SRA has used Growth Deal money from the Heart of the South West Local Enterprise Partnership to support the scheme's initial stages.

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. It covers not just the Levels, but the whole of Somerset. The Government has drafted a Rivers Authorities & Land Drainage Bill which (when passed) will establish the SRA as an independent legal entity that can raise funds for itself from council tax and is thereby enabled to make longer-term plans for the delivery of the extra flood risk management works that Somerset needs. With Government support, the Bill is currently being taken forward as a Private Member's Bill by the Somerton and Frome MP David Warburton.

Catchment-sensitive farming / Natural Flood Management

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 400 farms have been visited as part of the Hills to Levels initiative, and more than 450 schemes delivered using funding from a range of sources. The SRA has approved grants for more than 130 natural flood management schemes and backed soil management initiatives and numerous investigations of flooding problems on roads. For more details of this work, which has so far won two national awards, see pages 16-19.

Urban water management

We must: Manage urban runoff by ensuring best practice in planning and Sustainable Urban Drainage Systems (SuDs) implementation.

What we have achieved: All Somerset Local Planning Authorities reviewed their planning

policies with regard to flooding and a West of England Sustainable Drainage Developer Guide was published in 2015, supported by Somerset County Council and the Environment Agency (both SRA partners).

The SRA's 2018-19 Enhanced Programme is funding the production of a Somerset-specific planning guidance document to supplement the West of England guide. Progress is being made on a range of other initiatives, particularly the major Sponge project and the unique SuDS review *(pages 19-20)*.

Increasing business and community resilience

We must: Sustain and enhance business and community resilience capacity.

What we have achieved: An SRA-funded Community Resilience Officer has worked with local communities, parish councils, the Environment Agency, district councils, emergency services and other interested parties. Detailed community flood resilience plans - to help people prepare for, or respond to, any future flooding - have been distributed door-to-door in Burrowbridge, Moorland, Fordgate, West Yeo, Chadmead and Aller.

A Somerset community resilience website has been created to provide a comprehensive and easy access information source for resilience, linked to flood risk information: www.somersetprepared.org.uk

Numerous SRA-funded grants have been given to communities by the Community Resilience in Somerset Partnership (CRiSP). The latest awards can be seen on page 26.

Information and advice have been offered to a number of individual communities. Communities have included: Chadmead, Huntham, North Curry, Curry Rivel, Curry Mallet and Muchelney.

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 West Somerset Council, Taunton Deane Borough Council, Sedgemoor District Council, South Somerset District Council, Mendip District Council, Somerset County Council, the Parrett and Axe Brue Internal Drainage Boards, the Environment Agency, Wessex Regional Flood & Coastal Committee and Natural England.

A Joint SRA Scrutiny Panel has been established, with members drawn from the county council, district councils and IDBs. (The Panel can choose, if it so wishes, to expand its membership to include members of the public or representatives of other bodies.)

The SRA's Management Group, Technical Group, Dredging Strategy Board and Communications Group engage with SRA partners and many other organisations and individuals as required (FLAG, West Somerset Flood Group, The Mead residents' group near Ilchester, NFU, CLA, Somerset Catchment Partnership, Somerset Wildlife Trust, RSPB, Highways England, Somerset Water Management Partnership, etc).

The SRA provides a strategic overview of the continued delivery of Somerset's 20 Year Flood Action Plan and compiles the Somerset Common Works Programme - the combined list of all the planned Flood Risk Management works of Somerset's Flood Risk Management Authorities and other partners. The SRA identifies extra work that needs to be done and commissions its delivery across Somerset.

Web: www.somersetriversauthority.org.uk
Email: sra@somerset.gov.uk
Tel: 01823 355111