

Somerset Rivers Authority

The logo graphic consists of three curved, overlapping lines in shades of blue, sweeping from the bottom left towards the top right, positioned below the text.

Somerset Rivers Authority interim funding 2015/16: a report for Defra

Submitted to Defra: 21 June, 2016

Somerset Rivers Authority was set up with interim funding of £2.7 million for 2015/16. The Department for the Environment, Food and Rural Affairs provided £1.9 million, Somerset County Council £600,000, and Mendip District Council, Sedgemoor District Council, South Somerset District Council, Taunton Deane Borough Council, West Somerset Council and Somerset Consortium of Drainage Boards £200,000 between them.

Establishing the Somerset Rivers Authority (SRA) was a key Action of the Somerset Levels and Moors Flood Action Plan, developed at the Government's request after the floods of 2013/14 and signed off by the former Secretary of State for the Environment, Owen Paterson, in March 2014. "We must establish a Somerset rivers board that has greater control and responsibility for work to maintain and improve water management..." the Plan stated.

The SRA was formally launched on 31 January, 2015. It covers the whole of Somerset, not just flooded areas of the Levels and Moors.

At the SRA's first Board meeting in February 2015, members approved a budget for April 2015 – March 2016, which had previously been shared and agreed with Defra. One part of this budget covered the SRA's Enhanced Maintenance Programme (EMP), another Developing the Somerset Rivers Authority (work on a long-term funding solution, and temporary project staff costs to deliver the Flood Action Plan and develop an SRA funding solution).

This report details what the SRA has done with its 2015/16 interim funding, what this work achieved, and what is left to do and when it will be done.

Part 1: Financial Analysis

In 2015/16, Somerset Rivers Authority spent £1.285m of its £2.7m funding (shown below after rounding as £2.699m), leaving an underspend of £1.414m.

The largest element of the underspend – £608k – is in respect of dredging, which began in April 2016 and is likely to be completed by the end of July 2016.

A programme of works is in place to spend the remainder of the Enhanced Maintenance Programme money in 2016/17. These works are due, largely, to be completed by December 2016, with a few smaller projects expected to complete by March 2017.

The balance of the underspend – £219k – was set aside to assist in the development of a Long Term Funding Solution. Given the recent Government announcement about SRA precepting legislation, this provision is likely not to be needed. Once a legislative schedule is confirmed, this £219k will be put back into the SRA's programme to deliver additional works on the ground.

The SRA and IDB have spent their full staff allocation: a small overspend of £2k was estimated at year-end as a result of the need to use temporary staff.

Somerset Rivers Authority - 2015/16 Interim Funding Budget	Funding Allocation £k	Spend 2015/16 £k	Difference £k
Enhanced Maintenance Programme			
Pioneer Dredging (high level carriers - Parrett, Brue and Cripps)	1,075	467	-608
Pioneer Dredging (low land carriers)	55	25	-30
Monitoring silt build up (yearly survey)	62	0	-62
Maintaining newly dredged profiles (year 1 of 4 year cycle)	487	367	-120
Removal of vegetation and/or sediment removal - viewed rhynes & main river	45	28	-17
Local flood risk management measures	221	91	-130
Tree work	119	11	-108
FRM scheme development for 2016/17	130	6	-124
Step change in encouraging and enforcing riparian work	50	0	-50
Schemes added 2015/16	0	55	55
	2,244	1,050	-1,194
Developing the Somerset Rivers Authority			
Long Term Funding Solution	220	1	-219
Staff Costs and Overheads			
Staff costs IDB	40	40	0
SRA staff costs	70	78	8
Flood Action Plan (FAP) and SRA community engagement	30	43	13
Delivering FAP	95	73	-22
	235	234	-1
Totals	2,699	1,285	-1,414

Part 2: Somerset Rivers Authority's Enhanced Maintenance Programme of works in 2015/16

Pioneer Dredging (high level carriers)

Pioneer dredging and de-silting tasks were completed for Somerset Rivers Authority by Environment Agency teams, on both high and low level carriers, to improve channel conveyance and water management.

Increased conveyance capacity also allows dissolved oxygen in the channel to be regularised so that fish can breathe comfortably. (On heavily silted channels with reduced flow rates dissolved oxygen levels can fall to critically low levels).

A specification for de-silting tasks was developed with Natural England to minimise disruption to flora and fauna on established channel-side habitats and limit the removal of silt to that accumulated on the channel bed of watercourses.

- River Parrett

Background: After the floods of 2013/14, Environment Agency investigations indicated that de-silting certain sections of the Rivers Parrett and Tone would do more to reduce the duration and depth of flooding than any other single action in the Flood Action Plan. Consequently, in 2014, 8km of the Parrett and Tone were dredged. Recent hydraulic modelling has shown that this 8km dredge – combined with a wide range of other improvements, such as the Environment Agency's £2.5m investment in temporary pumps and pumping facilities – would make a big difference if there were to be a repeat of flooding on the scale of the winter of 2013/14. Effects would include:

- significantly cut the risk of flooding to 129 of the 142 properties reported to the Environment Agency as having flooded in Northmoor and Saltmoor
- reduce closure of the A361 to about 3 weeks instead of the 9-10 weeks experienced
- clear the Moors of water more quickly

Following the 8km pioneer dredge (*pictured below*), the Environment Agency, on behalf of Somerset Rivers Authority, investigated the effectiveness of dredging elsewhere, with input from local people and the Internal Drainage Boards.



Ten potential dredging sites were identified and assessed, including a section of the River Parrett immediately downstream of where the 8km dredge had finished, from Northmoor Pumping Station down towards the M5 and Bridgwater.

In October 2015, the SRA's Board voted to dredge the first 750m of this section of the Parrett, downstream from Northmoor Pumping Station. Of the 10 potential sites scrutinised, action here offers the greatest physical benefits to people and property. Dredging will help to reduce flood risk to homes and buildings, damage to agricultural land and disruption to roads and railways. It could cut peak flood levels by between 50-80mm in Northmoor and reduce the duration of a flood like that of 2014 by 3 – 5 days, in combination with the 2014 8km dredge and additional pumping.

After the Board's approval, the Environment Agency – on behalf of the SRA – awarded a 'design and build' contract to Galliford Try, Black & Veatch and Land & Water. These companies worked on the 8km dredge of the Parrett and Tone in 2014.

Work was scheduled to follow on from an interim-funded maintenance dredge of 2.2km of the Parrett, upstream of Northmoor Pumping Station, that was pioneer-dredged in 2014. (For more information about this dredge, see the section below on 'Maintaining dredged profiles').

Problem: Limited conveyance capacity of the Parrett, downstream of Northmoor Pumping Station.

Being achieved: Land & Water began dredging downstream of Northmoor Pumping Station on April 25, their work being overseen and managed by the Environment Agency for the SRA. Due to the width of the river, narrow banks, poor access, and the dangers of high-voltage overhead cables, most of the dredging (600m) will be done using a pontoon-mounted excavator on the river. It is not possible to dispose of dredged material directly to the existing banks. It has to be placed in barges, transported by tug to Westonzoyland Pumping Station, unloaded into tractor and trailer, then incorporated into adjoining farmland as a soil conditioner.



Generally, the dredging is only removing silt from one side of the river to provide the required flow area. As with the 8km dredge and the 2.2km maintenance dredge of the Parrett, the aim is to achieve a cross-sectional area of around 70m² within the constraints of maintaining existing river banks and hard defences so as not to reduce their stability, and avoiding environmentally sensitive areas and protected species.

A shorter length (150m) of dredging was undertaken from the bank adjacent to the road leading to Northmoor Pumping Station and Moorland. The road was closed for three weeks from 31 May (during weekday working hours) to allow material to be transported safely by tractor and trailer.

By 21 June, more than 9,000m³ of silt had been removed; the final total is expected to be 13,500.

This pioneer dredge should be finished by the end of the third week in July 2016.



- Cripps River

Background: The Cripps is used by the Environment Agency as a channel for moving potentially huge amounts of water from the Brue down to the Huntspill or from the Huntspill up to the Brue. Operations are controlled via sluices and Gold Corner pumping station, which dominates the junction of the Cripps, South Drain and the Huntspill.

Gold Corner and the Huntspill were built in the early 1940s. Their primary purpose was to supply the 4.5 millions of gallons of water needed daily to help produce explosives at Royal Ordnance Factory Bridgwater. However, for nearly 75 years, the combined system has also helped to prevent flooding in the Brue Valley and to maintain water levels suitable for farming and environmental benefits. Nearby are five valuable wildlife Sites of Special Scientific Interest together with the Huntspill River National Nature Reserve.

Problem: The Cripps had not been dredged for many years. Significant depths of silt were reducing its capacity for diverting flows from the Brue to the Huntspill and vice versa.

Achieved: Approximately 22,500m³ of wet silt was removed from the whole of the Cripps (2.5km) by two long-reach excavators and placed on adjacent land, under the Water Resources Act (Section 167).

The task was completed in November 2015 by Environment Agency Operations Teams (Wessex). Dredging has increased the capacity of the Cripps and helped to maintain local farming and environmental benefits.



- Brue

Background: 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. Optimising its capacity is vital for ensuring that the frequency, depth and extent of flooding are better controlled.

The aim of dredging part of the Brue is to remove accumulated sediments from the river channel and thereby improve conveyance to the extent recommended by the SRA's Dredging Strategy (which is in development, and due to be presented to the next SRA Board meeting on July 27). Work will support the implementation of existing Water Level Management Plans in the Brue Valley Catchment and contribute directly to Somerset's 20 Year Flood Action Plan. It should provide more water of better quality to help achieve and maintain favourable conditions in adjacent protected sites on the Moors (SSSIs, SPA, Ramsar Wetland of International Importance).

Achieved: Preparatory work has been carried out for dredging 4km of the Brue from North Drain Pumping Station to Westhay. Ecological and environmental constraints, and hydrological advantages, have been examined. Plans for works on the Brue are being shaped by the findings and proposed recommendations of the SRA's nascent Dredging Strategy, which has involved extensive work by consultants from HR Wallingford.

Pioneer Dredging (low land carriers)

- Mark Yeo (near Tarnock)

Problem: Channel silt was limiting the conveyance capacity of the Mark Yeo (a main river) opposite residential properties (*pictured below*). For 1km, significant silt depths worsened issues with excessive weed growth and de-oxygenated water in the channel.

Achieved: Approximately 2,000m³ of wet silt was removed from the channel by a tracked excavator and placed on adjacent land under the Water Resources Act (Section 167). The task was completed in November 2015 by Environment Agency Operations Teams (Wessex).



- Hixham Rhyne (near Cheddar)

Problem: Significantly deep channel silt on the upper reach of the Hixham Rhyne towards Rodney Stoke Moor diminished the effectiveness of 2.2km of the main river channel in draining the moor.

Achieved: Approximately 4,400m³ of wet silt was removed from the channel by a tracked excavator and placed on adjacent land under the Water Resources Act (Section 167). The task was completed in November 2015 by Environment Agency Operations Teams (Wessex).

- Haymoor Main Drain

Problem: Significantly deep silt deposits were reducing the conveyance capacity of Haymoor Main Drain, decreasing its effectiveness in transporting water towards Currymoor Pumping Station.

Achieved: Approximately 8,600m³ of wet silt was removed from 4.3km of channel with a tracked excavator and placed on adjacent land under the Water Resources Act (Section 167). The task was completed in March 2016 by Environment Agency Operations Teams (Wessex).

- Tank Rhyne

Problem: Significantly deep silt deposits were reducing the conveyance capacity of Tank Rhyne, decreasing its effectiveness in transporting flow towards Currymoor Pumping Station. Spoil and rubble were also in the channel, following emergency repairs to a ring bank defence around a property next to Tank Rhyne.

Achieved: Approximately 520m³ of wet silt was removed with a tracked excavator and placed on adjacent land under the Water Resources Act (Section 167). The task was completed in March 2016 by Environment Agency Operations Teams (Wessex). Rubble removed from the channel has been re-used as crushed material in other construction projects in Somerset.

Monitoring silt build-up (yearly survey)

Background: Somerset Rivers Authority has been working to identify places where silt builds up – how silt builds up – and what type of silt it is – so that maintenance work can be better targeted and dredging activities optimised. Collecting data that better illustrates the relationship between fluvial and tidal deposition also helps the SRA and its partners to better understand the impact of other potential flood risk solutions (for example, in the upper catchment).

Problem: Lack of accurate up-to-date information about fluvial and tidal deposition of silt to guide effective dredging and river management.

Achieved: Six-monthly surveys have been carried out on 160 cross-sections of the Rivers Parrett and Tone. These show where silt is accumulating – and how much – or where it is being removed by dredging or erosion. Findings were used to target most effectively the recent maintenance dredging of the Parrett and they will be used again to further enhance more maintenance dredging this year. Regular monitoring should be continued, so that it can help to develop and improve the SRA's – and its partners' – understanding of natural processes.

Pictured opposite: maintenance dredging on the River Parrett (described on page 10)



Maintaining newly dredged profiles (year 1 of 4-year cycle)

Background: As discussed above in 'Pioneer dredging (high level carriers) – River Parrett', 8km of the Rivers Parrett and Tone was dredged in 2014. Once costly pioneer dredging has been completed, it makes sense to monitor and to maintain. This preserves the benefits of the initial work. It also avoids the substantial capital costs that could be incurred by not doing enough maintenance and then having to repeat the initial work.

Problem: The benefits of restored flow capacity, and of the reduced risk of serious flooding, can be quickly lost as silt is re-deposited through natural processes in rivers.

Achieved: The Parrett Internal Drainage Board, on behalf of the SRA, used interim funding to specify and supervise maintenance dredging upstream of Northmoor Pumping Station, along part of the Parrett and Tone that was pioneer-dredged in 2014. A 2.2km reach was identified, where the most significant loss of channel cross-section had occurred and where the greatest benefits from maintenance dredging would therefore be accrued.

The main technical aim was to ensure that the design profiles achieved by the 2014 pioneer dredge were retained. Work largely followed the dredging methods used then. Material removed was placed on the back of the river banks under a 'D1 Waste Exemption' or incorporated into neighbouring fields using a 'Standard Rules SR2010No4 Mobile plant for land spreading permit', so reducing the need to haul material along the road and thereby avoiding disruption.

The dredge was the biggest ever done by the Parrett IDB. Work began in late November 2015 and finished just before Easter 2016.

Four weeks of work was done from floating platforms near Westonzoyland Pumping Station, as access from the banks is severely restricted there. A 300-tonne crane was used to lift a tug boat, hopper barges, floating pontoons and a 20t excavator onto the river, whilst a further six excavators including two 45-tonne units, each with a reach of 22 metres, carried out works from the banks. In total, 21,234m³ of silt was removed.

Removal of vegetation and/or sediment removal – viewed rhynes and main river

- Ilchester Town Bridge Bank Realignment

Problem: Significant silt deposits on the River Yeo were reducing the conveyance capacity of the arches of Ilchester Town Bridge.

Achieved: The bank immediately upstream of Ilchester Town Bridge was set back landward creating a two-stage channel. Approximately 200m³ of accumulated silt and soils was removed. Downstream improvements included vegetation clearance along 100m of raised defences, plus the diminution of a silt bar in the centre of the River Yeo. The work was completed in October 2015 by Environment Agency Operations Teams (Wessex).

- West Sedgemoor and Aller Moor

Problem: Previous funding regimes restricted maintenance on these moors, mostly to every other year, resulting in reduced flow capacity of the channels and land recovering more slowly from flooding.

Achieved: Weed clearance and sediment removal programmes are now yearly, with around 37,500m of additional channel maintenance.

Local flood risk management measures

Problem: Local cases of property and/or highway flooding from surface water and ordinary watercourses.

Achieved: Somerset County Council as the Lead Local Flood Authority was asked by Somerset Rivers Authority to deliver 18 local flood risk management schemes in 2015/16.

Works have been completed at:

- Wembdon (Church Road surface water improvements)
- Laverton (ditching & drainage improvements)
- Lower Henlade (watercourse bed lowering to improve flow and reduce flood risk to road and properties)
- Washford (Huish Lane spillway into watercourse)
- Minehead (A39 Hopcott Road drainage improvements & Periton Lane grill)
- Wigborough (drainage upgrade, inspection chamber & trash screen)
- Holford (Perry Farm lane drainage improvements & Dyche Road carriageway-raising)
- Sampford Brett (Capton Road drainage improvements)
- Wootton Courtenay (Burrow Road drainage upgrade)
- Bicknoller (Dashwoods Lane drainage improvements - *part-pictured below*)

Studies and investigations were also done at Ilminster (discovering cause of road and property flooding, cause being inadequate culvert downstream under railway) and Washford (CCTV survey) to identify problems and opportunities for future schemes.

Not yet achieved: Due to problems such as landowner disputes, raw sewage outflows, the need for a road closure and other factors outside of our control, it was not possible to complete four schemes in 2015/16. These have been reprogrammed for construction in 2016/17, subject to negotiations with landowners. They are:

- Old Cleeve to Blue Anchor Road (drainage improvements)
- Combe Florey (culvert upgrade / new trash screen)
- Enmore (Frog Lane interception of surface water)
- Exton (Week Lane drainage improvements)





Tree work

Background: In areas covered by Internal Drainage Boards, the water-conveying capacities of around 67km of main river channels may be increased by removing trees and woody vegetation. Necessary work has not previously been carried out by the Environment Agency because of higher priority projects and limits on existing funding.

Problem: If work is not done then channels' capacity will go on getting smaller, thereby increasing flood risk to local areas. Access for routine maintenance will also continue to become more difficult and costly.

Not yet achieved: The IDB initially modelled the impact of improved channel efficiency on the Brue to ensure the effective targeting of work and some bankside inspection and prioritisation was completed, but seasonal environmental constraints then delayed further activity. Work which will deliver the biggest improvements in drainage, and reductions in flood risk, is now due to take place in autumn 2016/17.

FRM scheme development for 2016/17 + technical engineering, ecological and licensing work for 2015/16 & 2016/17 schemes

Problem: To get some specific parts of the SRA's Enhanced Maintenance Programme work done cost-effectively and efficiently, extra, expert help was needed.

Achieved: The Parrett Internal Drainage Board was tasked by the SRA with commissioning maintenance of the 2014 8km pioneer dredge of the Rivers Parrett and Tone. Early Contractor Involvement (ECI) provided an assessment of post-2014 deposition in the river sections, and the condition and stability of the banks, plus a summary of the consequent maintenance requirements. ECI considered in particular:

- Pre- and post- dredge information from the 2014 dredging campaign
- Determination of likely locations and volumes of accretion
- Scope for river sediment sampling
- Sampling, and laboratory analysis of specified sediment samples
- Discussion of de-silting methodologies
- Review of licences, permits, exemptions and other restrictions
- Budget estimates for various de-silting options

Silt samples from the rivers were subjected to chemical analysis in order to establish whether they contained any significant contaminants which would affect their treatment under waste management regulations and also to determine whether the silt would provide 'agricultural benefit', making it suitable for depositing and incorporating into fields.

For EMP work taking place in, or near, environmentally sensitive areas, close liaison with Natural England has provided advice, support and guidance.

Step change in encouraging and enforcing riparian work

Background: The Environment Agency has the power to police and enforce riparian ownership responsibilities on main rivers. Within Internal Drainage Board areas, the IDBs have this power on ordinary watercourses. Outside of IDB areas, on ordinary watercourses, this power sits with Local Flood Authorities. All of these powers are permissive powers: relevant authorities and agencies are entitled to use their discretion. Flood Risk Management Authorities all seek to encourage riparian owners to understand and carry out their responsibilities. Enforcement action is taken if need be

in Somerset, but it can be costly and time-consuming, and it is better initially to seek to get work done by habitual consent.

Problem: In the wake of the floods of 2013/14, 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 therefore a need to be more pro-active.

Not yet achieved: A Community Engagement and Enforcement Officer is not yet in post, but recruitment is underway. To ensure the necessary geographical coverage, the postholder will be shared between the Internal Drainage Boards and Somerset County Council. He or she will seek to work pro-actively with communities and landowners in flood risk areas to highlight the responsibilities of riparian owners and the important role that maintenance plays in managing flood risk. This work will be backed up with the threat and use of enforcement where negotiation fails and the risk of flooding necessitates action. The county council and the IDBs are also exploring ways this work could be integrated with other community resilience activities.

Schemes added 2015/16

- Wirral Park Pumping Station, Glastonbury

Problem: Worn-out pipes and flow control valves, plus silted-up inlet channel, at Wirral Park balance pond and pumping station, built in 1989 to protect homes and businesses in Glastonbury against flooding.



Achieved: Works procured by Mendip District Council and paid for by interim funding involved replacing life-expired one-way flap valves and gate valves, and removing two skips full of silt and debris from the inlet channel.

This was Phase 1 of a scheme designed to ensure that Wirral Park pumping station continues to protect more than 200 homes and four hectares of industrial estate. (The SRA intends to fund Phase 2 in 2016/17: upgrading the dated electrical control system to meet current regulations and giving the facility for remote monitoring should the need arise.)

- West Somerset Streams

Background: A high proportion of watercourses in West Somerset are classified as Rapid Response Catchments, meaning they can fill up and flow dangerously quickly when it rains. It is important to maintain the capacity of these watercourses to convey and discharge safely as much flood water as possible.

Problem: Build-up of fallen and woody debris in the channel causing a potential risk of blockages on bridges adjacent to properties at risk of flooding, and businesses such as tea-rooms and a popular caravan and camping site. Work had to be done sensitively for environmental reasons: Horner Water, for example, is a National Nature Reserve so there was careful liaison with the National Trust about the specification for the paring-back by hand of trees and bushes.

Achieved: A contracting team managed by an Environment Agency Operations project manager undertook in-channel blockage clearance and debris removal to reduce the local flood risk on small upper catchment channels. In total, 6,950 metres were targeted on the following watercourses; Doniford Stream 1,550m, Horner Water 750m, Traphole Stream 2,700m, Washford Stream 1,950m. The task was completed in November 2015 by Environment Agency Framework Contractors.

Such work is strongly supported by the award-winning West Somerset Flood Action Group; they said they were “delighted” with the jobs done in 2015. (More maintenance work is planned in 2016/17).



- Wick Lane culvert, Brent Knoll

Problem: Poor drainage badly affecting land between Wick Lane and the main Taunton-Bristol railway line. Very high water levels regularly experienced during times of heavy rainfall, causing: saturated ground; flooded road; low-lying properties nearby threatened with inundation.

Achieved: A new culvert has been installed beneath Wick Lane near Brent Knoll, north of Highbridge, to protect the road and nearby properties from flooding. The scheme was funded by interim funding, and carried out by the Axe Brue Drainage Board with a local contractor.

As soon as the culvert was installed, IDB staff noted that water levels dropped significantly, as land can now drain effectively into a network of maintained rhynes (ditches) to the west.

