

Test Surface Water Drought Permit and Drought Order Monitoring Plan

Draft 20 March 2018

This document has been prepared following consultation with the Environment Agency, Natural England and the Hampshire & Isle of Wight Wildlife Trust. The Agency, Natural England the Trust have worked very hard to develop these packages of monitoring, mitigation and compensation in a very compressed time frame.

The contents are broadly agreed but, due to time constraints, are subject to further work. Specifically:

- The costs and budget arrangements which underpin this package are to be agreed.
- The scope of the monitoring packages remains incomplete with regards to the need for monitoring of the mitigation and compensation works.

The Agency and Southern Water are committed to working together and with Natural England and others to refine these documents and complete the missing information in the near future.

In the meantime, this draft document is shared on a without prejudice basis. The observations and advice of interested parties will be a valuable contribution to that process.

Introduction

This document sets out the package of measures to monitor for the possible environmental impacts on the River Test as a result of Southern Water Services Limited's ("**SWS**") abstraction from the River Test below the hands off flow ("**HoF**") of 355 MI/d (Test Total Flow) pursuant to a Drought Permit ("**the Test Surface Water Drought Permit**") or abstraction below 265 MI/d (Test Total Flow) pursuant to a Drought Order ("**the Test Surface Water Drought Order**").

This document has been prepared by SWS in respect of the matter before the Planning Inspectorate (ref. RSA/WR/00016/17/18) as part of a settlement agreement ("**the Settlement Agreement**") with the Environment Agency ("**the Agency**"). This monitoring plan has been agreed between SWS and the Agency.

This monitoring plan will be incorporated into SWS' Drought Plan Environmental Monitoring Plan.

Content of this paper

The purpose of this document is to set out an environmental monitoring plan to monitor the impact of abstraction pursuant to the Test Surface Water Drought Permit or the Test Surface Water Drought Order. This monitoring plan has been developed by SWS with advice from Natural England and the Agency.

In accordance with proposals from the Agency and Natural England, in consultation with the Hampshire & Isle of Wight Wildlife Trust, all monitoring will be funded by SWS but delivered by the following organisations:

- The Agency; and
- The Hampshire & Isle of Wight Wildlife Trust (subject to formal agreement).

Involving the Agency and the Hampshire & Isle of Wight Wildlife Trust in the delivery of this monitoring plan increases the chances of achieving the stated objectives, as those bodies can deliver work in ways and locations that SWS cannot, plus optimises budget and resource efficiencies and economies of scale.

The Agency agrees that:

- The agreed programme of monitoring measures set out below provide an assessment of the environmental baseline for a Test Surface Water Drought Permit or Test Surface Water Drought Order which will ensure that SWS is 'application ready', within the meaning of the Drought Plan Guidance for the purposes of any application for a Test Surface Water Drought Permit or Test Surface Water Drought Order; and
- These measures represent the maximum extent of monitoring to be required from SWS where a Test Surface Water Drought Permit or Test Surface Water Drought Order is implemented.

Summary of proposed measures

The aim of the proposed monitoring plan is to:

- Improve understanding of normal (non-drought) conditions on the River Test; and
- Improve understanding of the environmental sensitivity of the River Test to low flow events and the risk of drought actions.

The package consists of:

- Hydrometric and water quality monitoring;
- River Test invertebrate and macrophyte monitoring programme;
- River Test Fish monitoring programme; and
- Walkover surveys during implementation of a Test Surface Water Drought Permit or Test Surface Water Drought Order.

Hydrometric and water quality monitoring

Monitoring measure 1: Agreement of a hydrometric network to gather data for abstraction impact investigation.

Description:

1. The Agency and SWS will agree a sub-set of existing permanent river flow gauging stations, ground water monitoring boreholes and rainfall gauges that will be used as the core hydrometric network for the purposes of this Monitoring Plan.
2. The Agency will share the results of a review of the existing Agency flow gauging stations on the River Test, to establish agreement between SWS and the Agency on gauged flow data confidence bands.
3. SWS will fund an independent review of the existing and proposed (Testwood Bridge) Agency flow gauging stations on the River Test, River Itchen and River Meon to establish agreement between SWS and Agency on gauged flow data confidence bands.
4. Initially, compliance with the Testwood licence flow condition will be checked by adding together the flows gauged at Conagar Bridge and Test Back Carrier with flows that will be manually measured at Testwood Bridge. This will act as a core monitoring reference.
5. The Agency will install a continuous water level recorder and, as manually measured flows accumulate across a range of water levels, a stage-discharge relationship will be developed.
6. The Agency will consider installing a continuous flow recording station if a suitable design can be developed to provide reliable measurement of the range of flows likely in a four month recession to the licensed hands off flow (355 MI/d).
7. Issues of changing river bed, weed growth and variations in downstream level control must be considered in respect of reliability of flow estimation by either means above.
8. Unless or until a continuous flow monitoring station is established, manual flow gaugings will be undertaken by the Agency at Testwood Bridge approximately monthly. Upon passing a trigger flow to be agreed with SWS, the Agency will increase these to weekly flow and, increase frequency further as the flow condition of 355 MI/d is approached.
9. The Agency and SWS will agree a method for continuously estimating Test Total Flows which can be used amongst other factors to trigger actions in relation to the Drought Plan. Initial flow estimates should be based on a summation of the continuously gauged records at:
 - (i) Ower – River Blackwater;
 - (ii) Testwood (EM)?;

- (iii) Conagar Bridge;
- (iv) Test Back Carrier.

Together with an allowance for flows in the Broadlands Fish Farm carrier which are currently measured on a monthly basis.

It is accepted that the summation of these flow records is not directly equivalent to Test Total Flows as accretion downstream of the Ower Gauging Station is not measured and the flow at Broadlands Fish Carrier is only currently measured once a month. As stated above (clause 3), compliance will be checked by measurement of flows at Testwood Bridge.

Objective: The data collected will enable informed decisions to be made during drought events and will help secure protection of water dependent environments and may also assist in informing future management of sites.

SWS will fund: SWS will fund Item 2 (independent review of gauging stations). Otherwise, the core hydrometric network will be maintained by the Agency.

Monitoring Measure 2: Installation and maintenance of three telemetered water quality monitoring stations and up to four non-telemetered water quality logger stations.

Description: SWS will, dependent on agreement for access and installation, maintain up to three telemetered water quality monitoring stations and up to four non-telemetered water quality logger stations on the River Test between the vicinity of the Test Total Flows monitoring point and the vicinity of the Kimbridge. The non-telemetered loggers are to be allocated to complementary locations, either permanently or temporarily.

The proposed parameters to be measured at each telemetered water quality station are listed below:

- Water temperature;
- Electrical Conductivity;
- pH;
- Turbidity;
- Dissolved Oxygen; and
- Water Level.

Non-telemetered stations may only provide sub-set of these.

Funding and delivery: SWS will fund and maintain such proposed telemetered and non-telemetered water quality stations as it is able to install.

Monitoring Measure 3: Installation, maintenance and monitoring of up to approximately 10 water level monitoring gauge boards.

Description: SWS will fund the Agency to install, maintain and monitor up to approximately 10 water level monitoring gauge boards, including appropriate spot flow gaugings in association with Habitats Regulation Compensation schemes and / or drought permit / order mitigation relating to Crayfish, Southern Damselfly, Chalk stream or Salmonid habitat enhancement schemes. The frequency of monitoring will be agreed between the Agency and SWS relative to main river flow triggers.

Funding and delivery: SWS will fund the installation, maintenance and monitoring of up to 10 water level monitoring gauge boards. The level of funding appropriate has been agreed with the Agency. The Agency is responsible for delivery the programme of monitoring once funding has been provided by SWS.

Ecological monitoring for the River Test

Monitoring Measure 4: River Test invertebrate and macrophyte monitoring programme.

Objective: A pre, during and post drought monitoring plan to provide an understanding of how macro-invertebrates and macrophytes on the River Test response to low flow events.

Description:

All monitoring will be performed to standard methodology as set out in the Agency's Operational Instructions:

- 018_08 Freshwater macro-invertebrate sampling in rivers;
- 024_08 Freshwater macro-invertebrate analysis in riverine samples; and
- 131_07 Surveying freshwater macrophytes in rivers.

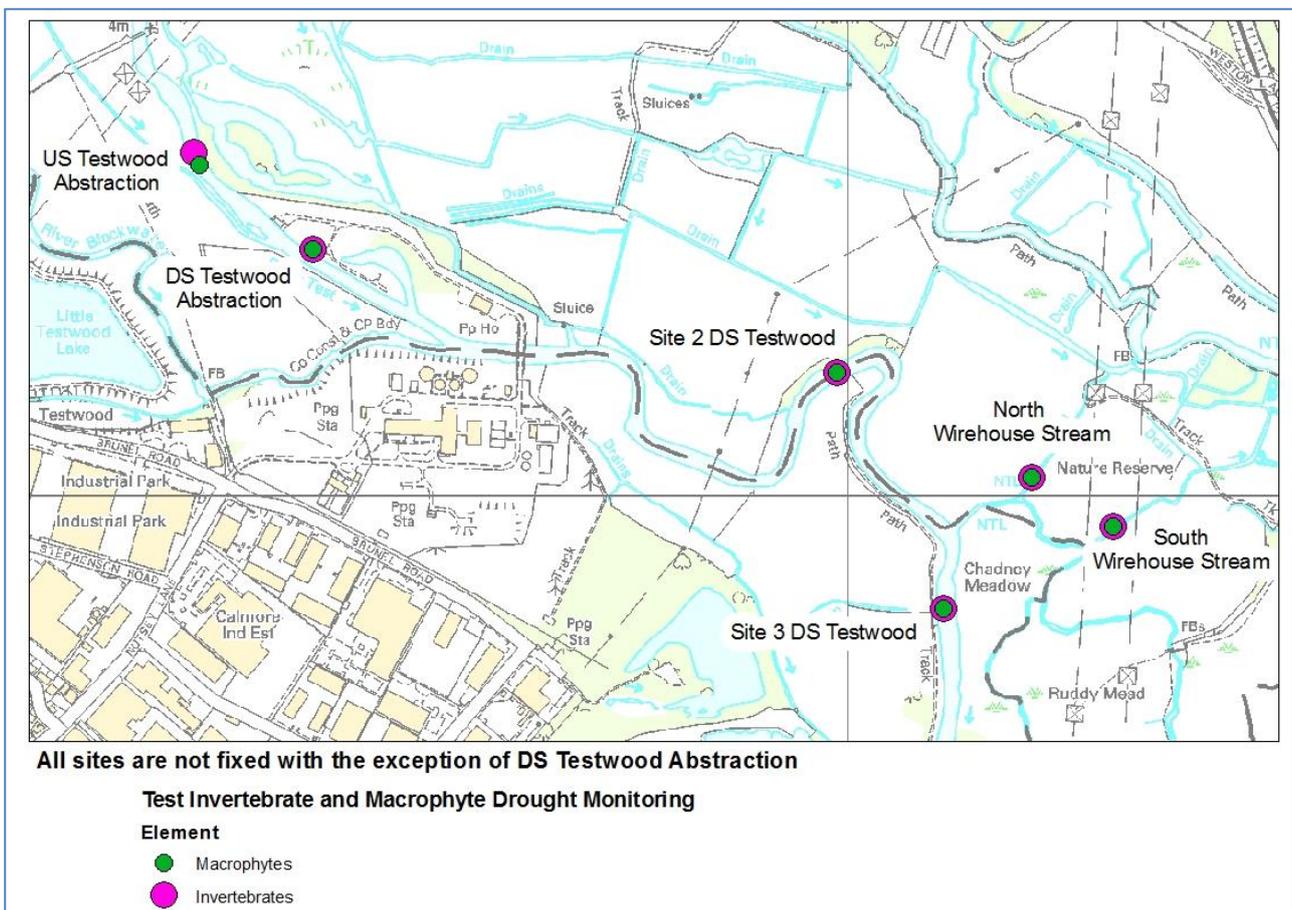
Any deviation from standard methodologies will be stated in the following tables and on any site sheets that are completed during surveying. The package of monitoring measures is set out in the table below. It will be carried out three times a year, in Spring, Summer and Autumn. For the stages of in-drought and post-drought, this monitoring should continue at these sites to enable assessment of impact and recovery.

Biosys River Name	BiosysID	Site	NGR	Element	Method	Spring			Summer			Autumn			Annual Frequency	Funding	Notes
						March	April	May	June	July	August	September	October	November			
River Test	157258	US Testwood Abstraction New Method	SU3520415419	Invertebrates	Area restricted 3-min kick	x			x			x			3	Both	Site needs to move due to deep silt bank created by falling trees
River Test	157259	DS Testwood Abstraction New Method	SU3535015300	Invertebrates	Area restricted 3-min kick	x			x			x			3	Both	
River Test	New	Site 2 DS Testwood	SU3598715150	Invertebrates	3-min kick	x			x			x			3	SW S	Method may be airlift if permission secured or dredge if more acceptable
River Test	New	Site 3 DS Testwood	SU3611714861	Invertebrates	3-min kick	x			x			x			3	SW S	Method may be airlift if permission secured or dredge if more acceptable
Wirehouse Stream	New	South	SU3632414962	Invertebrates	3-min kick	x			x			x			3	SW S	Needs access permission
Wirehouse Stream	New	North	SU3622415022	Invertebrates	3-min kick	x			x			x			3	SW S	Needs access permission

River Test	1572 59	DS Testwood Abstraction New Method	SU353501 5300	Macrop hytes	MTR	x	1	SW S	
River Test	1550 24	U/S Testwood Abstraction MTR Site	SU352121 5404	Macrop hytes	MTR	x	1	SW S	
River Test	New	Site 2 DS Testwood	SU359871 5150	Macrop hytes	MTR	x	1	SW S	Needs access permission
River Test	New	Site 3 DS Testwood	SU361171 4861	Macrop hytes	MTR	x	1	SW S	Needs access permission
Wirehouse Stream	New	South	SU363241 4962	Macrop hytes	MTR	x	1	SW S	Needs access permission
Wirehouse Stream	New	North	SU362241 5022	Macrop hytes	MTR	x	1	SW S	Needs access permission

Information in red font represents sites that require permission from the Lower Test parties and are not fixed to the stated map grid references until a site visit is completed.

The proposed monitoring sites for the Lower Test are shown on the plan below.



The site locations and monitoring frequency were chosen by following guidance in the Agency's Operational Instruction 776_15 Hydroecological monitoring for flow pressure assessment.

Funding and delivery: SWS and the Agency will jointly fund the Lower Test invertebrate and macrophyte monitoring programme. The level of funding appropriate has been agreed

with the Agency. The Agency is responsible for delivery of the programme of monitoring once funding has been provided by SWS.

Fish monitoring for the River Test

Monitoring Measure 5: River Test eel monitoring.

Objective: Adult eel and elver entrainment monitoring at the Testwood abstraction intake during the period that a DP or DO is implemented.

Description:

1. It is assumed that both adult and young eels (elvers) are likely to be present (subject to seasonality). Adult eels are present year-round.
2. Adult eel sampling
 - a. Sampling location – Monitor the intake for adult eels by interception of the washed-off debris from the intake screens.
 - b. Sample timing - Eels generally are more active at dusk and dawn, so are more likely to be observed by sampling during hours of darkness. Sampling frequency proposed for two nights, once a month, for a 2 month period.
3. Elver entrainment sampling
 - a. On-site elver sampling would be carried out from mid March until XXXXX to coincide with the start of the elver migration period. Samples would be taken within and adjoining the intake structure using a coarse-meshed net consisting of 1.5 mm mesh. The net would be installed into a cylindrical plastic tank, fitted with an overflow pipe to return overflow from the sampler to the river.
 - b. The entrainment sampler would be set up on day one. Staff will return to the site after a period of 168 hours (7 days) to collect the sample and immediately re-deploy the entrainment net for the next sample. In the event that fish are caught, subsequent daily checks will be carried out to ensure fish are returned to the river.

Funding and delivery: SWS will fund and deliver the eel monitoring programme. SWS will deliver such monitoring as can be secured within its landownership, and any that is deliverable with the consent of landowners and lessees. Where consent is withheld, monitoring will not be undertaken.

Monitoring Measure 6: River Test Fish monitoring programme.

Objective: SWS will fund a drought monitoring plan for River Test fish that has been devised and will be implemented by Dominic Longley, the Agency's Solent & South Downs Senior Environmental Monitoring Officer, with input from Dr Adrian Fewings and Dr Nigel Milner.

Description: The Agency's proposed River Test Fish Drought Monitoring Plan expands on existing Agency fish monitoring programmes in order to optimise spatial coverage and temporal frequency.

A draft of the River Test Fish Drought Monitoring Plan is attached to this monitoring plan. In summary, fish monitoring will comprise:

- CPUE fish surveys;
- Single catch electric fishing;
- Juvenile lamprey sampling by quadrat; and
- Standardised winter salmon / sea trout spawning redd surveys.

Funding and delivery: SWS will fund the River Test Fish Drought Monitoring Plan monitoring programme. The level of funding appropriate has been agreed with the Agency. The Agency is responsible for delivering the programme of monitoring once funding has been provided by SWS.

Monitoring for River Test SSSI and NERC habitats and species

These monitoring measures are proposed to address those SSSI and NERC habitats and species at risk of impact from the Lower Test abstractions and not already addressed by the above measures, namely:

- Water Vole

Monitoring Measure 7: River Test SSSI water vole monitoring.

Objective: Assess the impact of the Test Surface Water Drought Permit and Drought Order on the water vole population in the River Test SSSI.

Description: The exact status of water voles in the Lower Test downstream of Testwood is largely unknown and most of the reach, being subject to tidal variations in water level, are not sensitive to the changes in water levels caused by the abstraction. However, water voles in the reach upstream of the Blackwater Confluence are potentially vulnerable to changes in water levels, such as may occur in drought conditions and exacerbated by abstraction.

Natural England have requested that water vole are included in the monitoring plan. The monitoring will comprise annual / biannual monitoring of the 300m stretch of river downstream of the abstraction and upstream of the Blackwater confluence. This is one of two methods recommended by the Hampshire & Isle of Wight Wildlife Trust. The monitoring proposals are subject to landowner access/agreement and walkover to confirm whether the proposals are appropriate or require refinement.

Funding and delivery: SWS will fund the package of water vole monitoring in the River Test SSSI. The level of funding appropriate has been agreed with the Agency. The Hampshire & Isle of Wight Wildlife Trust (subject to formal agreement) will be responsible for delivering the programme of monitoring once funding has been provided by SWS.

Monitoring during implementation of drought permit and drought order

Monitoring Measure 8: Walkover surveys during implementation of a Test Surface Water Drought Permit or Test Surface Water Drought Order.

Description:

SWS will fund the Agency to carry out walkover surveys to assess and monitor the impact of the abstraction throughout the duration of a Test Surface Water Drought Permit or Test Surface Water Drought Order and post Test Surface Water Drought Permit or Test Surface Water Drought Order on a range of habitats and species in particular those designated under the SAC, SSSI and NERC priority habitats and species.

Walkover surveys will be carried out focus on the following features:

- Flowing waters - Type III: base-rich, low-energy lowland rivers and streams, generally with a stable flow regime;
 - Identify any key sources of nutrient loading exacerbating low flow effects;
 - Carry out additional water quality sampling particularly Soluble Reactive Phosphorus (SRP);
 - Consider addressing nutrient loading sources;
 - Consider in-stream measures or adjustments to improve habitat conditions during drought conditions.
- Atlantic salmon
 - Targeted salmon habitat walkover surveys focussing on spawning and holding areas;
 - Consider any measures to improve depth/velocity over spawning habitat e.g. temporary in stream flow deflectors;
 - Additional water quality sampling to check temperature, conductivity and dissolved oxygen levels in key spawning and holding areas;
 - Consider any measures to improve temperature and dissolved oxygen levels e.g. aerators and temporary shading.
- Other fish community
 - Targeted walkover surveys in areas known to contain high densities of fish – not already covered by salmon areas identified above;
 - Additional water quality sampling to check temperature, conductivity and dissolved oxygen levels in key spawning and holding areas;
 - Consider any measures to improve temperature and dissolved oxygen levels e.g. aerators and temporary shading.

Funding and delivery: SWS will fund this package of walk over monitoring on the Lower Test on a fortnightly basis for the duration of a Drought Permit and on a weekly basis for the duration of a Drought Order. The level of funding appropriate has been agreed with the Agency. The Agency is responsible for carrying out walk over monitoring once funding has been provided by SWS.