

Drainage and Wastewater Management Plans (DWMPs)

Summary of the methodology for the
Baseline Risk and Vulnerability
Assessment (BRAVA) on:

Nutrient Neutrality

April 2021
Version 2



from
**Southern
Water** 

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1. Background

The purpose of this document is to provide a summary of the method for undertaking the Baseline Risk and Vulnerability Assessment (BRAVA) for the planning objective **secure Nutrient Neutrality**. This will identify wastewater catchments where there is a need or risk of needing to secure nutrient neutrality for growth in order to protect sites protected under the Conservation of Habitats and Species Regulations 2017 as amended.

The BRAVA is an important step in the development of Drainage and Wastewater Management Plans (DWMPs). It is an assessment of current and future risks for each of the planning objectives and is undertaken for the sewer catchments that were flagged during the Risk Based Catchment Screening (RBCS).

All Water and Sewerage Companies (WaSCs) were required to complete a BRAVA and report to Water UK on the following six common planning objectives:

1. Risk of sewer flooding in a 1 in 50 year storm
2. Storm overflow performance
3. Risk of WTW compliance failure
4. Internal sewer flooding risk
5. Pollution risk
6. Sewer collapse risk

We developed methodologies for conducting these six BRAVAs in accordance with the Water UK guidance and they were completed in December 2020. The methodologies and outputs are published on our website at: <https://www.southernwater.co.uk/dwmp/baseline-risk-and-vulnerability-assessment>

We identified that two additional 'bespoke' objectives would complement the six common national objectives and have included these in our DWMP:

7. Annualised Flood Risk - which is the flood risk arising from sewers as a result of different severities of rainfall
8. Wastewater Treatment Works (WTW) Dry Weather Flow (DWF) Compliance – to assess our compliance with the Environment Agency (EA) permit relating to the DWF arriving at a WTWs.

We are working collaboratively with partner organisations in the development of our DWMP. Through this collaboration we have identified 6 additional planning objectives that will help us to achieve the wider environmental outcomes that our customers expect and we want to achieve. They are:

1. Secure nutrient neutrality
2. Achieve Good Ecological Status / Potential
3. Reduce groundwater pollution
4. Improve bathing waters quality
5. Improve shellfish water quality
6. Improve surface water management

Further information on planning objectives for DWMPs can be found on our website: <https://www.southernwater.co.uk/dwmp/planning-objectives>.

1.1. Objective

The inclusion of a planning objective on securing nutrient neutrality is a significant step forward in protecting water bodies that are protected by the Conservation of Habitats and Species Regulations 2017 (as amended). In line with the National Planning Policy Statement and Government advice, all sites protected by this legislation are referred to throughout this document as Habitats sites. This includes, as a matter of Government policy, Ramsar sites. High levels of nitrogen and phosphorus in water environments can cause eutrophication and impact wildlife within Habitats sites. The nutrient inputs are mostly come from a combination of agricultural sources and from public and private wastewater systems.

Our objective is to assess the risks of our wastewater operations impacting on the nutrients entering these Habitats sites in particular where sites are currently unable or at risk of being unable to achieve “favourable conservation status”.

As part of this BRAVA assessment, we will assess the risk that population growth in the form of new development may increase the nutrient loads in the wastewater system (catchment) and our discharges to the environment.

1.2. Definitions

The Conservation of Habitats and Species Regulations, 2017, as amended (Habitats Regulations) is the legislative basis for protecting Habitats sites. Natural England (NE) is the statutory conservation body in England who provides advice on the conservation of Habitats sites. The objective of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species.

The internationally designated sites covered by the Habitats Regulations which transposes the Directive into UK legislation are:

- Special Areas of Conservation (SACs) including marine and offshore sites
- Special Protection Areas (SPAs) including marine and offshore sites
- Ramsar Sites – these are wetlands of international importance designated under the Ramsar Convention (the legislation applies to these as a matter of Government Policy)

The Habitats Regulations expects all designated sites to meet or be restored to ‘Favourable Conservation Status’, which is assessed on the condition of the site itself and the flora and fauna it supports, rather than the water quality, although some habitats such as rivers have supporting water quality attributes that if failed are considered to undermine favourable conservation status. However, to achieve ‘Favourable Conservation Status’ the water quality of the waterbody the flora and fauna depend on needs to meet the relevant targets set down in the accompanying supplementary advice to the conservation objectives. In the case of Ramsar sites the water quality targets can be taken from the Favourable Condition Tables for the underpinning Sites of Special Scientific Interest. There must be ‘no deterioration’ in the conservation status of these designated sites and no disturbance of the wild birds or flora or fauna.

Case law has identified that the ability to provide additional permissions (such as housing permissions) that add to an existing impact (such as water quality) where the sites are already

failing its conservation objectives is “necessarily limited”. Wastewater from new developments that drain to Habitats sites that are not at favourable conservation status needs to be certain to not add to the existing nutrient burden to further undermine the conservation status. One way that developments can reach the certainty required is by planning is to achieve nutrient neutrality.

Achieving nutrient neutrality requires the affected catchment to demonstrate that all surface water runoff and wastewater nutrients (nitrogen and/or phosphorus) generated by new proposals must be less than or equal to the load that the existing land use and wastewater generates.

River catchments are defined as an area of land from which all surface run-off flows through a series of streams, rivers and, possibly, lakes to a particular point in the watercourse such as a river confluence or an estuary.

Appendix A contains maps and lists for the Habitats sites that are located within our sewerage supply region and believed to be water dependent (based on a list from Natural England).

1.3. Scope

The overall outcome we are aiming to achieve is to manage our wastewater systems to ensure they comply with the permits issued by the Environment Agency that specify the permitted discharge and quality limits. The EA sets these permits and consents so our WTWs are not contributing to rivers, lakes, reservoirs, wetlands and coasts failing the conservation objective whilst being consistent with fair share policies and any reviews of these. In addition, we are aiming to manage our wastewater systems to ensure that where a site’s conservation objectives are not met though water quality impacts, we manage any relevant sewerage systems in a way that they support achieving nutrient neutrality for new developments within existing permits. We are only able to go beyond the permitted levels to increase the nitrogen or phosphate removal rate at our WTWs where there is customer support for doing so and Ofwat have accepted this in our business plan. Otherwise a revised permit is required from the EA and the associated necessary investment being included by the EA in their statutory National Environment Programme.

Other industries and factors beyond a water company’s control may be contributing nutrients and preventing Habitats sites from achieving favourable condition. Total nitrogen, derived from sewage effluent, sewer outfalls, agricultural practices and road run off, and total phosphorus, primarily derived from household cleaning products, leads to a deterioration of water quality and impacts the health of wildlife in Habitats sites.

We have included the nutrient neutrality planning objective in our DWMP in order to assess the risk of our operations on the water dependent Habitats sites, described in section 1.2, and to ensure compliance of our plans with the Habitats Regulations. The latter will be formally tested through an appropriate assessment when DWMPs become statutory.

The ‘no deterioration’ condition is important. Proposed new development in areas at risk could mean additional sewage discharge into the designated areas must consider how to ensure there is ‘no deterioration’ or neutrality is achieved. This is a challenge for developers and planning authorities in our region as it has amongst the highest housing targets in the country and has a high number of water dependant Habitats sites. A legal ruling limits the ability to issue permissions for new developments that will contribute further impacts, such as nutrients, to any site that is not

meeting its conservation objectives. Developers in catchments where the advice has been issued therefore need to ensure that any new developments will be nutrient neutral.

The neutrality requirement is triggered by a review of the condition of designated sites. Much of the existing evidence is out of date and it is likely that neutrality requirements will increase as the current round of assessments is undertaken. Even where a site is in favourable conservation status (or the underpinning SSSI is at a favourable condition as a proxy) an assessment is required to understand whether the proposed growth will trigger future deterioration and to ensure the reported site condition is a real reflection of current evidence or simply out-of-date. Our risk assessment will identify the potential contributions from our wastewater systems and whether there is any headroom in treatment capacity. This will assist planning authorities and developers to deliver sustainable growth in the South-East.

We will work with NE to identify sites already failing their conservation objectives and identify the sites most at risk of changing conditions and failing their conservation objectives on water quality but not yet known mainly due to the need for new survey information. We will link our assessment to NE's site survey proposals.

1.4. Reporting Requirements

We are not required to report the BRAVA outcomes for our bespoke and additional planning objectives to Water UK. However, we will publish the results on our website for consideration by our customers and partner organisations.

2. Data Sources

The following provides a short description of the data that has been used and where it has been obtained from.

2.1. Habitats' sites

Defra's Magic Map application website (magic.defra.gov.uk) provides authoritative geographic information about the natural environment from across government. NE manages the service. The data on Habitats' sites (SACs, SPAs, and Ramsar sites) were downloaded from this website. This information has been supplemented by NE's spreadsheet of sites with water dependant interest features.

The current condition of the SSSIs that underpin the Habitats sites is provided by NE. However, this information is known to be out of date for some sites. NE shared its knowledge and local expertise on the sites of most concern and at risk of not being in favourable condition and not meeting their conservation objectives, as well as their forward programme of condition review. This enabled us to focus on assessing the risks to these sites from our wastewater operations.

2.2. Wastewater Treatment Works and Sewer Overflows

We have used our Geographical Information System (GIS) and asset database to identify the geographical location of each of our WTW outfalls and intermittent sewer overflows. This is the starting point for us to investigate where we may be contributing nutrients to the Habitats sites in our region.

2.3. Wastewater Treatment Works Tertiary Treatment

We have installed tertiary treatment plants in a number of our WTWs to achieve stringent water quality standards by removing inorganic compounds and substances, including phosphorus and nitrogen. The final effluent from a WTW with a tertiary plant is likely to have less impact on the environment when compared with a WTW without a tertiary plant. We obtained tertiary plant data from AM410 – a database where we capture information about our works current and future capacity. This information is used in the risk assessment process.

2.4. Water Industry National Environment Programme

The Water Industry National Environment Programme (WINEP) represents a set of actions that the Environment Agency (EA) has requested all water (sewerage) companies operating in England to complete in order to contribute towards meeting their environmental obligations. In Asset Management Plan 6 (AMP6), the funding period between 2015 and 2020, we delivered several schemes that were designed to reduce our impact on the environment. This data is used to identify issues which may have already been resolved.

In AMP7 (2020 – 2025) we are embarking on several WINEP schemes which will further reduce the impact from our wastewater systems. This information on AMP7 schemes will be considered in the problem characterisation stage of the DWMP to determine if risks identified for the 2020 baseline will be resolved during AMP7.

However, even where we upgrade the works to reduce impacts to Habitats sites from existing nutrients, there will still be a requirement on new developments to be nutrient neutral.

2.5. Water Framework Directive (WFD)

The WFD River Water Body Catchments are a polygon dataset collated as defined for the implementation of the Water Framework Directive. The most recent dataset is in its second cycle (Cycle 2) and is available from the EA's [Catchment Data Explorer website](#).

Each River Water Body Catchment is linked to a unique river which has been given an identification number according to the WFD. This helps us to identify the link between the location of our discharges with the water bodies defined under the WFD and Habitats sites. It is important to note that not all water dependant Habitats sites are WFD water bodies. We compared the list of water dependent sites identified through Catchment Data Explorer (CDE) with list of water dependant Habitats sites provided by NE and added any sites missing from the CDE list.

Many water bodies that are Habitats sites are not water bodies in WFD, hence there is not always good alignment of the WFD 'Good Ecological Status' (GES) water quality standards with the targets for favourable conservation status. For lakes such as the Stodmarsh SAC and the Pevensey Levels SAC, these targets have been aligned, but for other locations the targets to support conservation objectives have not been aligned to the standards for GES. For example, the water quality targets for the River Itchen SAC are much more stringent than the threshold for GES, therefore the River Itchen could be at GES for water quality but the SAC could still be failing its conservation objectives for water quality and may require nutrient neutrality to be applied. In addition there is not always alignment of the distribution of the special wildlife with the water bodies of WFD water body boundaries. For example, in Chichester Harbour the WFD status is assessed at the whole harbour scale but the wildlife features are not evenly distributed, and the wide variety of water quality across the Harbour means the WFD water body classification is not a good indicator of whether our wastewater assets are impacting the Harbour nor of the Harbours condition. Therefore, even where the targets and standards for water quality are aligned – as in Chichester Harbour – the spatial scale and precise way the standards are implemented affects the assessment of conservation status.

In addition, many of the Habitats sites can be impacted by excessive nitrogen in freshwater. For freshwaters the EA has only recently agreed nitrogen standards and its 'Reasons for Not Achieving Good' (RNAG) under the WFD will not yet reflect these.

NE has added nitrogen targets to the national standards for ditches and still and slow flowing waters and aquatic plant sites. It is in the process of adding these targets to the supplementary advice for relevant ditch and wetlands sites such as Pevensey Levels, Arun Valley and all the marshes in Kent, Hampshire and Isle of Wight.

To allow for this, the results of the hydrological connectivity assessment were discussed with NE and we have included sites where one of the above issues had led to a Habitats site being excluded. For this reason, the nutrients for which targets relate to Habitats sites conservation status are listed in table 1 at the end of this document along with Threats and Adverse Condition reasons related to water pollution from NE's Conservation Management System (CMSi) database, which has been supplemented by NE's expert officer judgement.

3. Method of Assessment

The following methodology has been developed and will be used for the Nutrient Neutrality risk assessment.

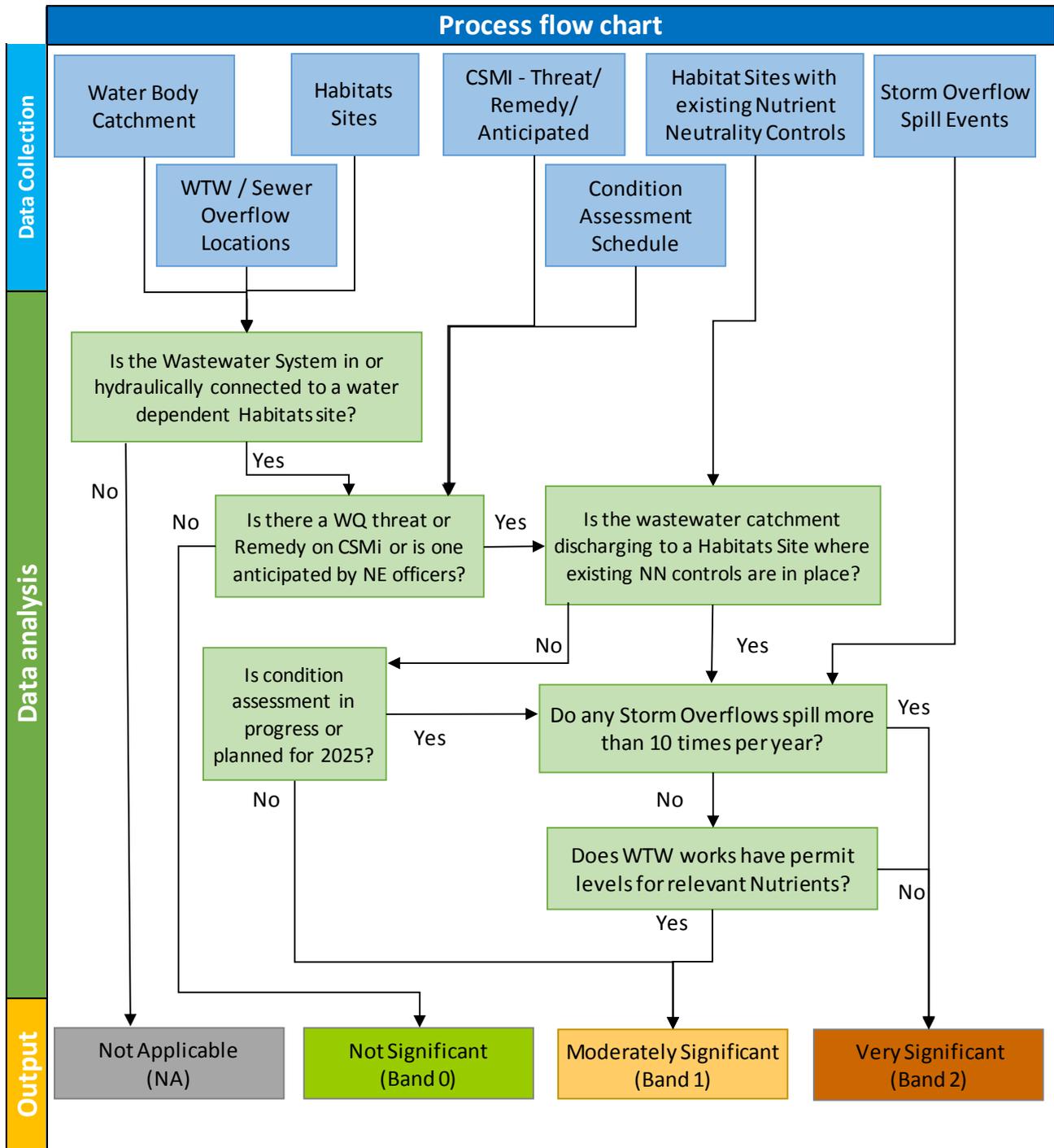
3.1. Process – Baseline 2020 Assessment

The process for completing the risk assessment for nutrient neutrality has been developed with experts from Natural England. The main steps in the process are as follows:

- (a) **Hydrological connectivity assessment.** The first step is to determine if there is a hydraulic connection between our wastewater systems and the Habitats sites. We used our GIS system to identify where Habitats Sites overlap or are hydraulically linked to the WFD water body catchments. Then we determined where we have any WTW or storm overflows discharging into the WFD water bodies.
- (b) **WQ threat or Remedy.** This step is to assess whether there is a water quality threat to a Habitats site or whether it has been identified needing remedy on Natural England's CSMi database. A table has been provided by Natural England with this information (see table in Appendix B). Habitats have also been identified where a threat or a remedy assessment is anticipated by NE officers.
- (c) **Existing Nutrient Neutrality controls.** This step assesses whether nutrient neutrality controls (methodology) already exists for the hydraulically linked Habitat Site. Where controls are already in place, there is a known risk from our wastewater systems. If these systems have more than 10 spills a year from any of the storm overflows then the risks are very significant. If there are less than 10 spills/year then if the WTW has set permit levels for the relevant nutrients then the risks are moderately significant.
- (d) **Apply Moderation.** The final step is to apply a moderation to the results based on where our WTWs have been upgraded in the last 5 year investment period to reduce nitrate and phosphate. For these wastewater systems the BRAVA score has been reduced to band 0 for the baseline 2020 assessment. We will consider any proposed investment to reduce nitrate and phosphate within the current 5 year investment period (AMP7) as part of the next stage of the DWMP to determine whether it will be sufficient to reduce the risk. A second moderation is applied to reduce the risk band by 1 category for any wastewater catchments in band 2 or 1 where there the Population Equivalent (PE) is less than 1000. The purpose of this second moderation is to take into account the size of the WTW and impact on the environment. This will ensure that the first round of the DWMPs focuses on the larger systems with the most impact on habitat sites.

Figure 1 illustrates the above process for the nutrient neutrality risk assessment for the 2020 baseline.

Figure 1 - Process flow chart for the 2020 baseline assessment



3.2. Process – Future 2050 Assessment

An increase in population numbers in a given catchment is likely to lead to an increase in nutrients. Therefore, the future 2050 assessment is carried out by assessing the potential growth in population within the wastewater catchment.

Any wastewater catchment currently in band 0 is because it is hydraulically linked to a Habitats site that is not currently under threat or in need of remedy. If there is more than 2000 homes planned for these catchments by 2050 then the risk band will increase by 1 category to band 1. This indicates that the development, if it were allowed to progress without being nutrient neutral, would increase the risk that the Habitat site becomes under threat due to wastewater discharges.

Any wastewater catchment currently in band 1 is because it is under threat or remedy, but is not being impacted by more than 10 spills per year and has permit levels for all relevant nutrients. Climate change and growth is likely to increase the risk from our wastewater systems without further investment to reduce any increase in spills and to enable tighter permits. Hence, where more than 2000 new homes are planned for these catchments by 2050 then the risk band will increase by 1 category to very significant (band 2).

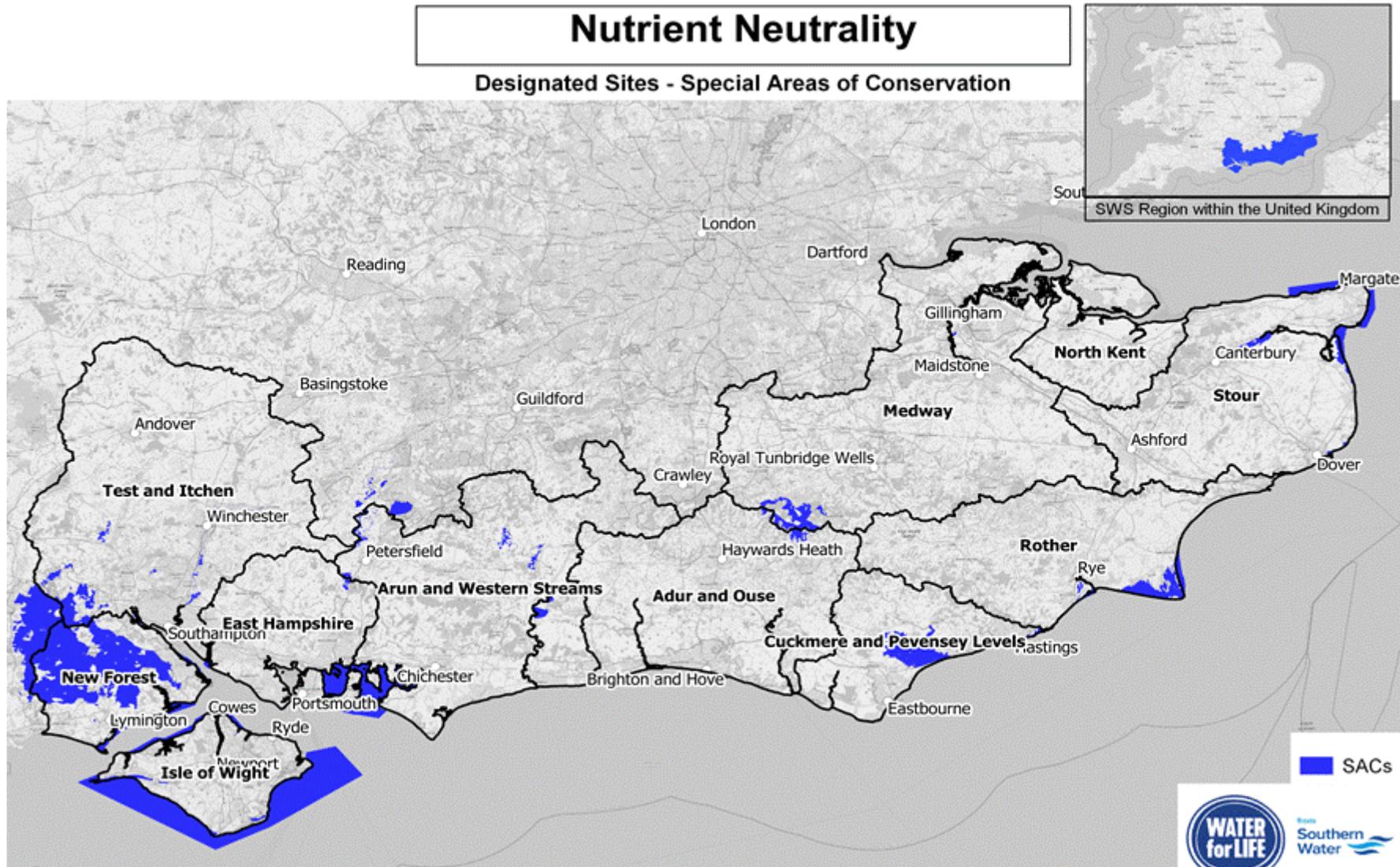
4. Next Steps

We recognise that this BRAVA assessment for securing nutrient neutrality is at a very high level at this stage. However, it provides an important first step and a baseline from which the risk assessment can be further developed and improved.

Appendix A: Designated Site Locations

Nutrient Neutrality

Designated Sites - Special Areas of Conservation

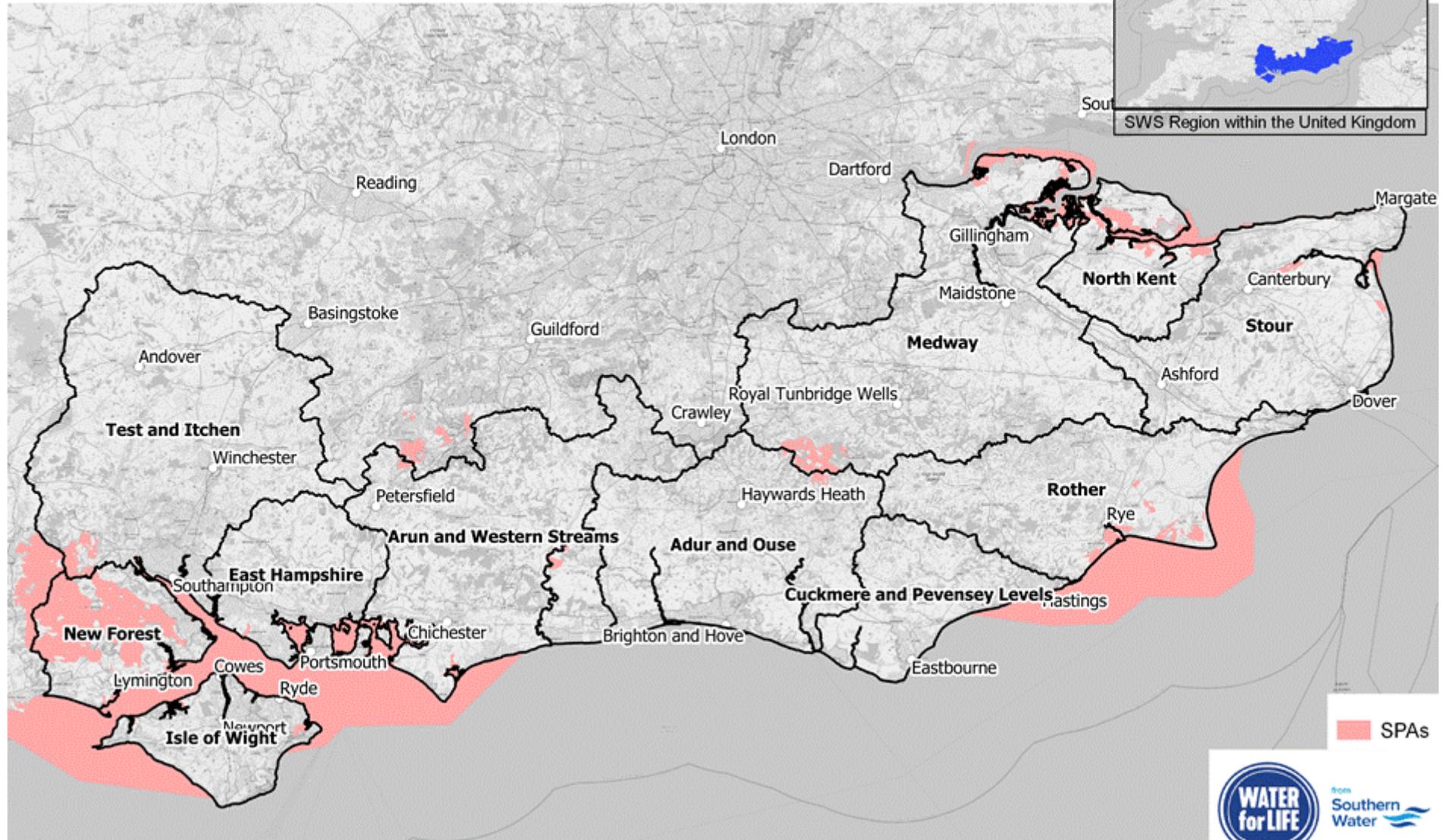


■ SACs



Nutrient Neutrality

Designated Sites - Special Protection Areas



SPAs



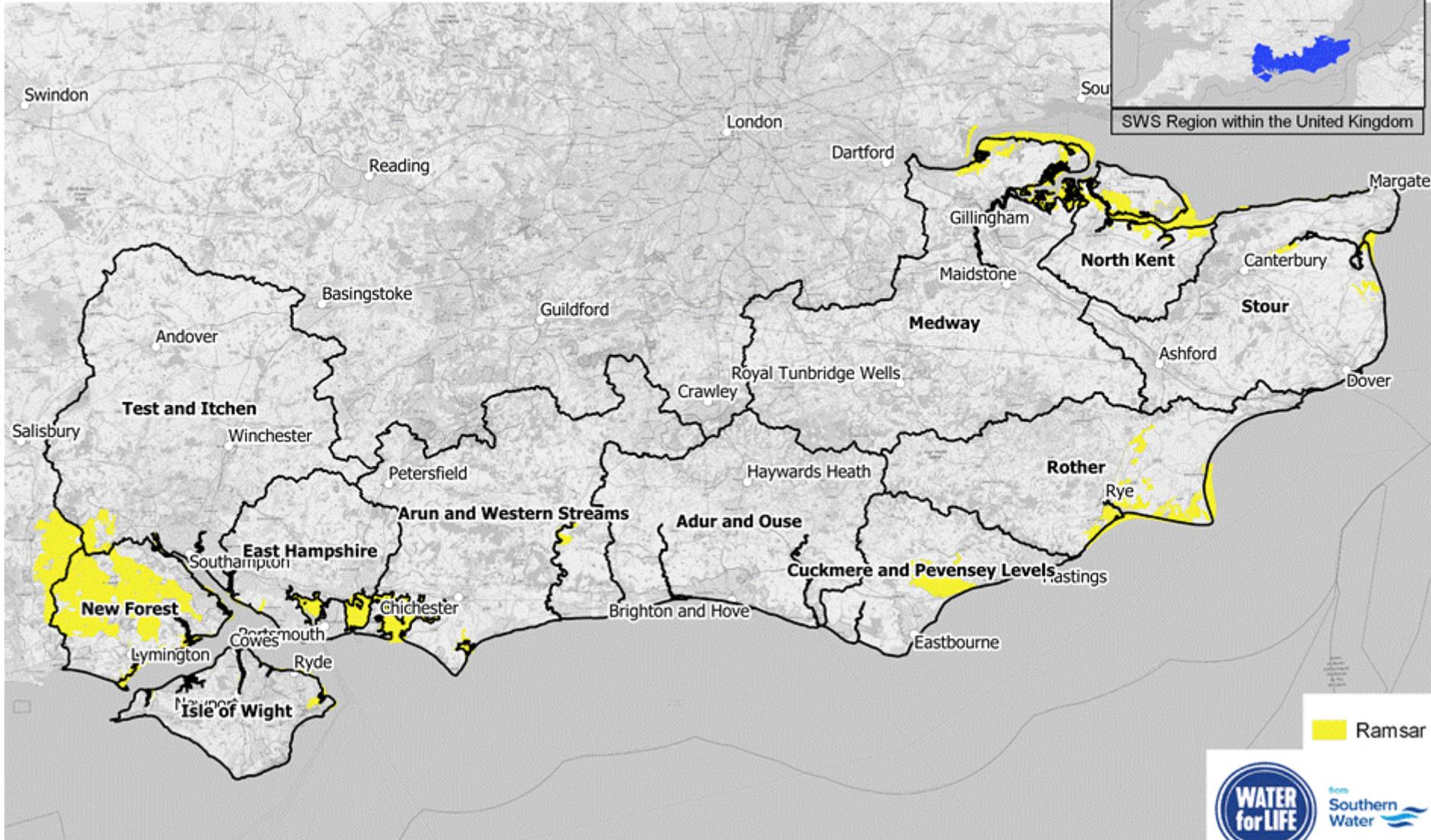
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Nutrient Neutrality

Designated Sites - Ramsar



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Appendix B: Water Dependent Habitats Sites

Site (if the site already has a nutrient neutral advice, this is highlighted in yellow)	River Catchment	Designation			Nutrients ⁱ		Water Quality impacts or risks to site condition from NE site data base		Condition Report date Marked as anticipated unless Current or confirmed as started
		Ramsar	SAC	SPA	Nitrogen (usually TP)	Phosphorus (TP or SRP)	WQ Threat (risk)	WQ ACR (impact)	
Arun Valley	Arun and Western Streams	X	X	X	X	X	X	OJ	2022
Ashdown Forest	Medway		X	X	X	X			Anticipated after 25
Butser Hill	East Hampshire		X		SSSI only	SSSI only			
Chichester and Langstone Harbours	Arun and Western Streams, East Hampshire	X		X	X		X	X	Current
Dover to Kingsdown Cliffs	Stour		X		X	X			Anticipated after 2025
Dungeness	Rother		X		X	X	OJ		Anticipated 2024
Dungeness, Romney Marsh and Rye Bay	Rother	X		X	X	X	OJ	X in part ¹	Anticipated 2024
East Hampshire Hangers	Arun and Western Streams		X		SSSI only	SSSI only			Anticipated after 2025
Ebernoe Common	Arun and Western Streams		X		(?)	(X)			Anticipated after 2025
Emer Bog	Test and Itchen		X		X	X		X	Anticipated after 2025
Hastings Cliffs	Cuckmere and Pevensy Levels		X		?				Anticipated after 2025
Isle of Wight Downs	Isle of Wight		X		X				Anticipated after 2025

¹ Added for SSSI in 2021 for unit 18 - freshwater - invasive freshwater species

Medway Estuary & Marshes	Medway, North Kent	X	X	X	X	X	X in part ²	Anticipated after 2025
Mottisfont Bats	Test and Itchen		X		(?)	(X)		Anticipated after 2025
New Forest	New Forest	X	X	X	X	X	X in part X in part	Anticipated after 2025
Pagham Harbour	Arun and Western Streams	X	X		X	(X)	X	Anticipated 2023
Peters Pit	Medway		X		X	X		Anticipated after 2025
Pevensey Levels	Cuckmere and Pevensey Levels	X	X		X	X	X	Anticipated after 2025
Portsmouth Harbour	East Hampshire	X	X		X		X	Current ³
River Itchen	Test and Itchen		X			X	X	Anticipated after 2025
Rook Cliff	Arun and Western Streams		X			SSSI only		Anticipated after 2025
Sandwich Bay	Stour		X		X	X	X	Anticipated after 2025
Shortheath common			X		X	X in part		Anticipated after 2025
Solent & Dorset Coast	East Hampshire, Isle of Wight, New Forest			X	X	X in part	X in part X in part	Current
Solent & Isle of Wight Lagoons	Arun and Western Streams, East Hampshire, Isle of Wight, New Forest		X		X	X	X in part	
Solent & Southampton Water	East Hampshire, Isle of Wight, New Forest,	X	X		X	X in part	X	Current

² Added for SSSI in 2017 for unit 100 - freshwater pollution - water pollution - agriculture/run off

³ 2018 study changed condition for the majority of units - revises and updates the condition assessment of 2014 for estuarine water quality in relation to the interest features of the designated sites

	Test and Itchen								
	Isle of Wight, New Forest, Test and Itchen, Arun and Western Streams		X			X	X in part	X	Current
Solent Maritime									
Stodmarsh	Stour	X	X	X		X	X in part	X in part	Current but update due 2022
	Tankerton Slopes and Swalecliffe		X			X in part			Anticipated after 2025
	Thames Estuary & Marshes		X		X	X	X	OJ in part	Anticipated 2023/24
	Thanet Coast				X	X		X in part	Anticipated after 2025
	Thanet Coast & Sandwich Bay		X		X	X	(X)	X in part	Anticipated after 2025
	The Mens				X		(x)		Anticipated after 2025
	The Swale		X		X	X	X	OJ	2023
	Woolmer Forest (Wealden Heaths Phase II)				X	X	X in part	X in part	

ⁱ The nutrients referred to either have numeric or other targets, are known to be limiting or are of most concern to the interest features of the designated sites. In some cases, nutrient is only of concern to parts of the designated sites (e.g. Medina Estuary is co-limited in the Solent maritime SAC so phosphorus is a concern in this part of the Solent SAC and Solent and Southampton Water SPA). In other cases the targets are for supporting habitat outside of site in which case X is in brackets or for habitat that is supporting but not critical to the sites conservation objectives in the sites. If the features sites nutrient tolerance is unknown or has no relevant target it is provided a ?. 'SSSI only' refers to water dependant features in the underpinning SSSI but are not supporting for SAC or SPA features and therefore not applicable for nutrient neutrality. This usually only applies to sites designated as sac or woodland type with streams running through them. Officer judgement = NE OJ –threat to be added and adverse condition reason likely at end of condition review that has already started.