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PUSH Integrated Water Management Study

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- ▶ Presenter:
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Introduction

► Overarching aims of the new IWMS were to:

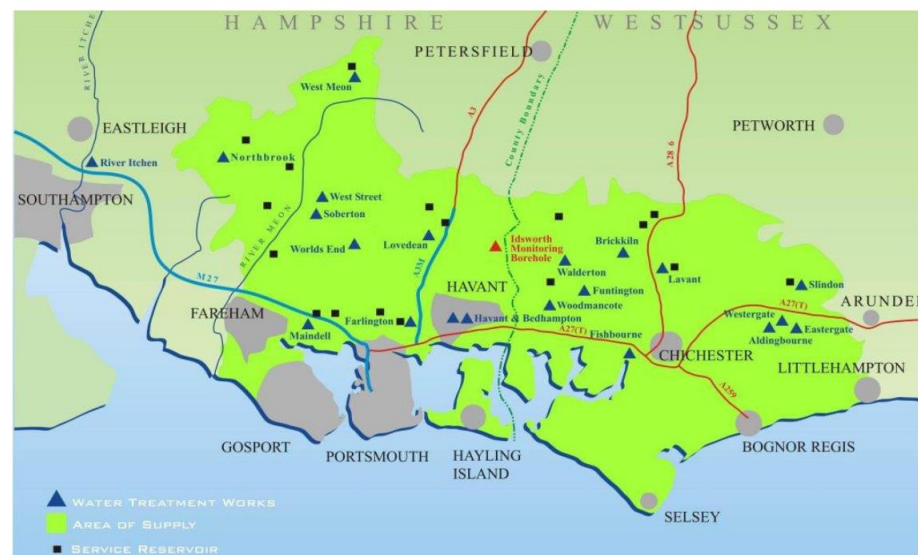
- ▶ to identify the impacts on water quality in receiving watercourses from future housing growth downstream of the Wastewater Treatment Works (WwTWs) related to the housing growth areas (i.e. from increases in discharges of treated sewage effluent from 2015 onwards);
- ▶ clarify if future housing growth will impact on the WFD objectives to:
 - ▶ Ensure no Deterioration in WFD class of any element;
 - ▶ Ensure the WFD water bodies can achieve the 2027 objectives as set out in the 2015 RBMPs;
 - ▶ Limit in class deterioration to less than 10% (an aspirational objective set by the Environment Agency);
- ▶ Ensure future housing growth is in line with the needs of the Habitat's Directive for Designated Areas and the Urban Wastewater Treatment Directive for Sensitive Areas;
- ▶ Model the potential future discharge permit standards from the WwTWs which would be required to reverse potential deterioration in downstream river quality;
- ▶ identify if there will be any significant impacts on protected areas or designated sites downstream of the WwTWs; and
- ▶ Identify if there are any cumulative impacts from increases in discharges from multiple WwTWs within the same catchment.



Methodology

► Water Resources Assessment

► Reviewed Water Resource Management Plans for Portsmouth Water and Southern Water

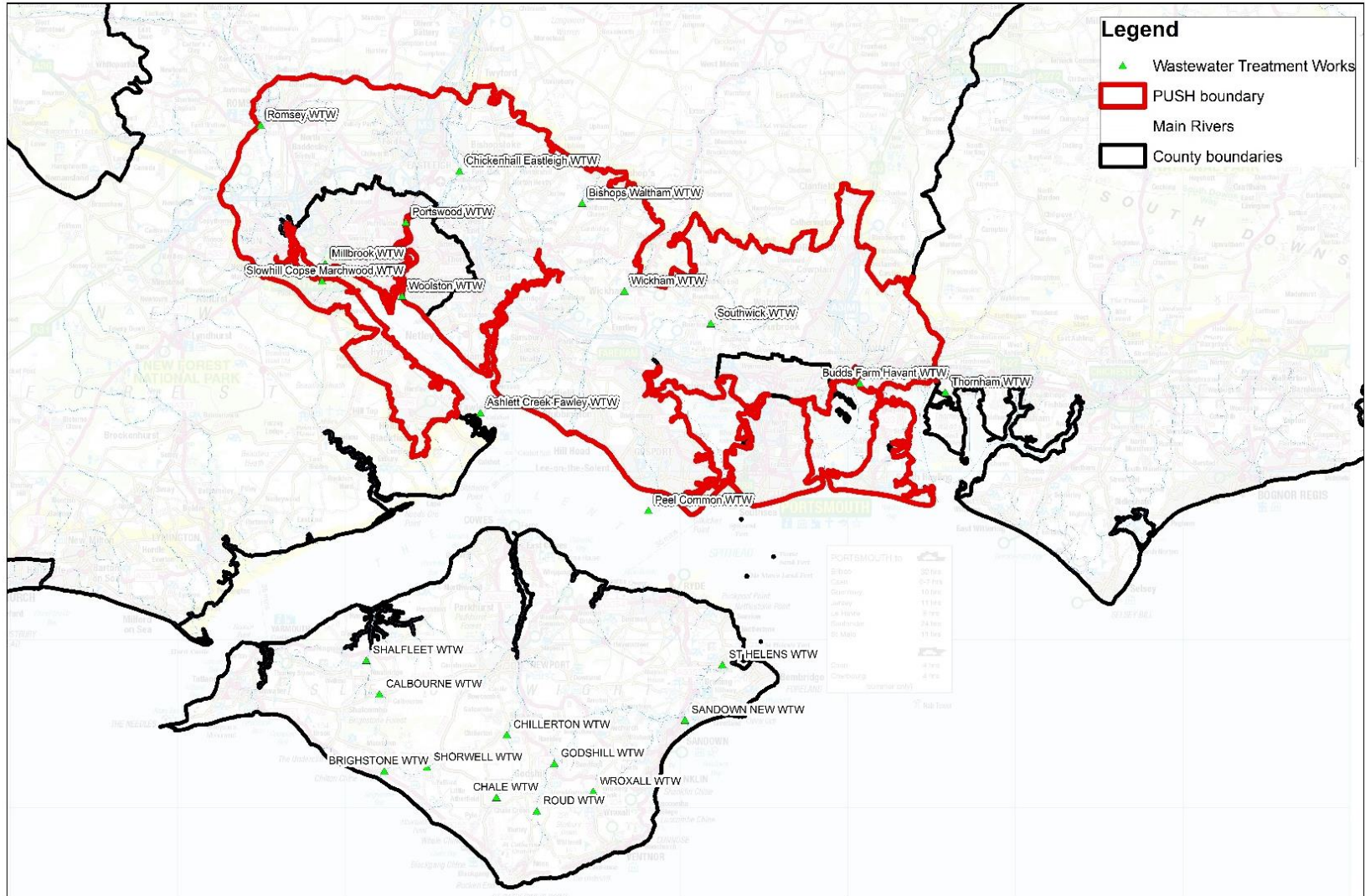


Methodology

- ▶ Water Quality Assessment
 - ▶ Identify the WwTWs
 - ▶ Existing data collation WQ data sources from EA/ Water Companies
 - ▶ Baseline monitoring of key parameters (e.g. nitrate, ammonia, phosphates etc.)
 - ▶ Clarify standards
 - ▶ Growth proposals from Councils used to model impacts of future discharges



Methodology



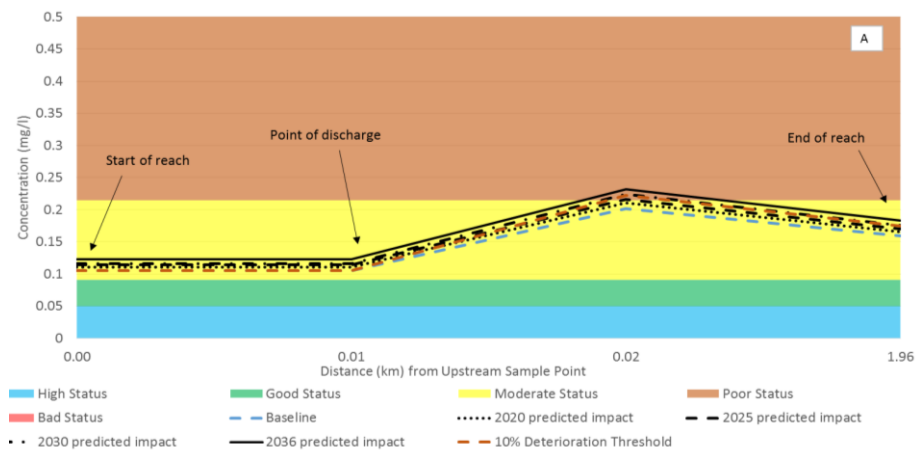
Methodology

- ▶ Water Quality Assessment
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Methodology

▶ Water Quality Assessment

- ▶ Impacts identified for each period of growth, WFD class along river reaches



- ▶ Cumulative assessment
- ▶ Review of capacity of the WwTWs and public sewerage networks

Methodology

▶ Water Quality Assessment

- ▶ A single dwelling has an occupancy of 5 people (this follows national guidance but represents a worst case scenario compared to the national average of 2.5) ;
- ▶ There has been no consideration of future climate change within the modelling itself, however consideration is included in discussion of the results (Section 3);
- ▶ 120l /per person/per day residential waste water flow loading to a WwTW (e.g. based on Southern Water consumption guide of approximately 500l/p/d for a house with 5 people plus a 20% addition to provide a worst case scenario); and
- ▶ Where data were not available water quality modelling was based on predicted flow and quality estimates for growth on top of current mean discharge volume.

Methodology

- ▶ Mitigation measures assessment
 - ▶ End of pipe treatment (e.g. tertiary nutrient stripping);
 - ▶ Decrease water abstractions (e.g. to increase flow and dilution in the receiving waters);
 - ▶ Catchment management to reduce upstream concentrations of pollutants; and
 - ▶ Effluent reuse or water efficiency measure.

Methodology

- ▶ Designated Area Assessment
 - ▶ Bathing waters;
 - ▶ Shellfish waters;
 - ▶ SAC's, SPA's and RAMSAR sites; and
 - ▶ SSSI's

Findings

- ▶ Water Resource Assessment
 - ▶ Portsmouth Water have indicated that they will be in surplus by 2040
 - ▶ Assessments by Southern Water of the four main Water Resource Zones show that:
 - ▶ Hampshire South WRZ - will be in deficit;
 - ▶ Isle of Wight WRZ - will be in deficit;
 - ▶ Hampshire Kingsclere - will have a small deficit; and
 - ▶ Hampshire Andover – will not be in deficit.
 - ▶ Work ongoing between water companies and the Environment Agency

Findings

► Water Quality Assessment

- ▶ 20 WwTWs will provide negligible (<1%) or minor (<5%) proportion of catchment Nitrate sources towards designated sites during future growth;
- ▶ Diffuse agriculture pollution a dominant source of nitrate (e.g. 24 – 67%);
- ▶ No WwTW were identified for improvements to nitrate loadings due to direct impacts from growth.
- ▶ Cumulative impacts: Southampton Water;
 - ▶ Eastern Yar;
 - ▶ Medina Estuary;
 - ▶ Brightstone Streams/Bay;
 - ▶ Newtown Harbour; and
 - ▶ Portsmouth Harbour.

Findings

▶ Upgrades

- ▶ 7 WwTWs require improvements to reduce Phosphates, 11 to reduce Ammonia to ensure no deterioration;
- ▶ 13 WwTWs will require standstill for Nitrate once existing permit flow is reached (by 2036) (based on 5 people per household);
- ▶ 6 WwTWs potentially require future network upgrades.

Findings

► Designated Area Assessment

- **Solent Maritime SAC** – Bishop Waltham, Millbrook, Southwick, Peel Common, Godshill, St Helens, Wroxall, Roud, Chillerton, Calbourne Romsey, Slowhill Copse, Shalfleet and Chale WwTWs and/or their associated catchments in order to support future housing growth.
 - **South Wight Maritime SAC** – no improvements required
 - **Portsmouth Harbour SPA** – Southwick and Peel Common WwTWs and/or their associated catchments in order to support future housing growth.
 - **Solent and Southampton Water SPA** – Bishop Waltham, Millbrook, Southwick, Peel Common, Godshill, St Helens, Wroxall, Roud, Chillerton, Calbourne Romsey, Slowhill Copse, Woolston Shalfleet and Chale WwTWs and/or their associated catchments in order to support future housing growth.
 - Improvements required now to some areas.
 - Low confidence for improvements to agriculture sources
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Conclusions & Recommendations

WwTW	Ammonia (new permit limit required)	BOD (new permit limit required)	Phosphate (New permit limit required mg/l)	Nitrate % increase from growth to nearest marine waterbody	Existing Nitrate permit	Nitrate standstill required immediately	Nitrate standstill required when WwTW capacity reached (year)	Nitrate diffuse catchment measures required	WwTW capacity increase required (year)	Sewer capacity required
Ashlett Creek				<1%	No upgrades required					
Bishops Waltham				<2%	yes	No	Yes(2020)	Yes	Yes(2020)	No
Budds Farm				<1%	Yes	No	Yes(2030)	Yes	Yes(2030)	Yes
Chickenhall Eastleigh				<1%	No	No	No	Yes	No	Yes
Millbrook				<1%	Yes	No	Yes(2025)	Yes	Yes(2025)	No
Peel Common				<1%	Yes	No	Yes(2025)	Yes	Yes(2025)	Yes
Portswood				<1%	Yes	No	No	Yes	No	Yes
Woolston				<1%	Yes	No	No	Yes	No	No
Romsey				<1%	No	No	No	Yes	No	Yes
Slowhill Copse				<1%	Yes	No	No	Yes	No	No
Southwick				<1%	No	No	No	Yes	No	No
Wickham	10		2	<1%	No	No	Yes (2025)	Yes	Yes(2025)	No
Sandown				<1%	No	No	Yes (2020)	No	Yes(2020)	Yes
Calbourne			5	<1%	No	No	Yes (2016)	Yes	Yes(2016)	No
Shalfleet	1.3		1.7	<5%	No	No	Yes (2025)	Yes	Yes(2025)	No
Shorwell			2.8	<1%	No	No	Yes (2016)	No	Yes(2016)	No
Brightstone			4.5	<1%	No	No	Yes (2020)	No	Yes(2020)	No
Wroxall			3.2	1%	No	No	No	Yes	No	No
Roud	4.4		2.8	1%	No	No	No	Yes	No	No
Godshill	2		3.5	1%	No	No	No	Yes	No	No
St Helens			2.3	1%	No	No	Yes (2016)	Yes	Yes(2016)	No
Chale			3	1%	No	No	Yes (2016)	Yes	Yes(2016)	No
Chillerton			3.2	<1%	No	No	Yes (2016)	Yes	Yes (2016)	No

Conclusions & Recommendations

- ▶ The 4 WwTW have been predicted to require new permits for Ammonia – requirements feasible and can be achieved through onsite treatment
- ▶ 11 WwTWs predicted to require new permits for Phosphates – feasible and deterioration can be avoided
- ▶ Solent catchment management measures (e.g. Catchment Sensitive Farming) required now to tackle large % of diffuse agricultural Nitrogen sources;
- ▶ CSF (EA/ NE) programmes underway – typical monitoring lags in delivering results
- ▶ 2014/2015 Habitat Directive review of WwTW consents – too early to record macroalgae improvements
- ▶ A load standstill approach will be carried out where consented flow/ nitrate once permit conditions are exceeded
- ▶ Opportunities to enhance treatment technologies (e.g. Air Stripping, Ion exchange, Membrane separation)

Considerations

- ▶ Water Resource discussions between water companies and regulator
- ▶ Water Quality modelling provided worse case scenario
- ▶ N budget based on nitrate loading from WwTW. Not sources already in environment or ammonia
- ▶ Localised specific impacts
- ▶ Flood risk and climate change