

# Bacterial and Other Loads to Coastal waters

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# Relevant Issues for Coastal Waters

- Nutrients (predominantly N, based on perceived wisdom)
- Chemicals (both metals and organics)
- Sanitary parameters (BOD, COD, and suspended solids)
- Bacteria (*Escherichia coli* and intestinal enterococci)

# Relevant drivers

	Nutrients	Chemicals	Bacteria
Dangerous Substances Directives		Y	
Bathing Water Directives			Y
Shellfish Waters Directive		Y	Y
Nitrates Directive	Y		
UWWTD	Y		
OSPAR Convention	Y	Y	
Natura 2000 sites (Habitats Directive)	Y	Y	
WFD	Y	Y	Y
Drinking Water Safeguard Zones		Y	
MCZs	Y ?	Y ?	

# Nutrients

- NVZ Reviews
  - For coastal waters (PW(E)s) need source apportionment of catchment loads
  - 17% contribution from agriculture 'not insignificant' (ECJ 2005)
  - NEAP-N data used for agricultural contribution
  - Point source contribution generally estimated from existing data
  - SIMCAT/SAGIS output for N loads to coastal waters also used for some sites
- Other targets (HD, WFD)
  - P targets in freshwater catchments and use of SIMCAT/SAGIS and 'fair share'
  - Has a 'not insignificant' point source contribution been defined?

# Chemicals

- HD Review of Consents
  - For estuarine SACs and SPAs relative contribution of freshwater loads and discharge loads was needed
  - The loads for freshwater inputs and direct discharges were estimated using mean flow and available concentration data as well as permitted concentrations
  - Best available methodology at the time (early to mid 2000s)
  - Allowed relative contributions and historical changes in loadings to be assessed
  - A load less than <1% of the total load 'insignificant' – depending on EQS compliance
- WFD RBM Plans 2015
  - Some work was done using SIMCAT/SAGIS output
- Other aspects
  - Input from CIP1 and CIP2 output useful for refining point source loadings?
  - Need a consistent methodology for source apportionment for coastal waters
  - Again what is a 'not insignificant' contribution from a source?

# Bacteria

## Present Work – PR19 BW and SFW Investigations

- 31 investigations – 26 Bathing Waters and 5 Shellfish Waters
- Relative scale of the issues at each site very variable
- Varies from very localised inputs and aspects to catchment-scale inputs
- Need to define source apportionment for poor water quality ‘events’ for targeting improvements
- Source apportionment in this context can be as simple as point source contribution v. non-point source contribution

# PR19 BW and SFW Investigations - SWW

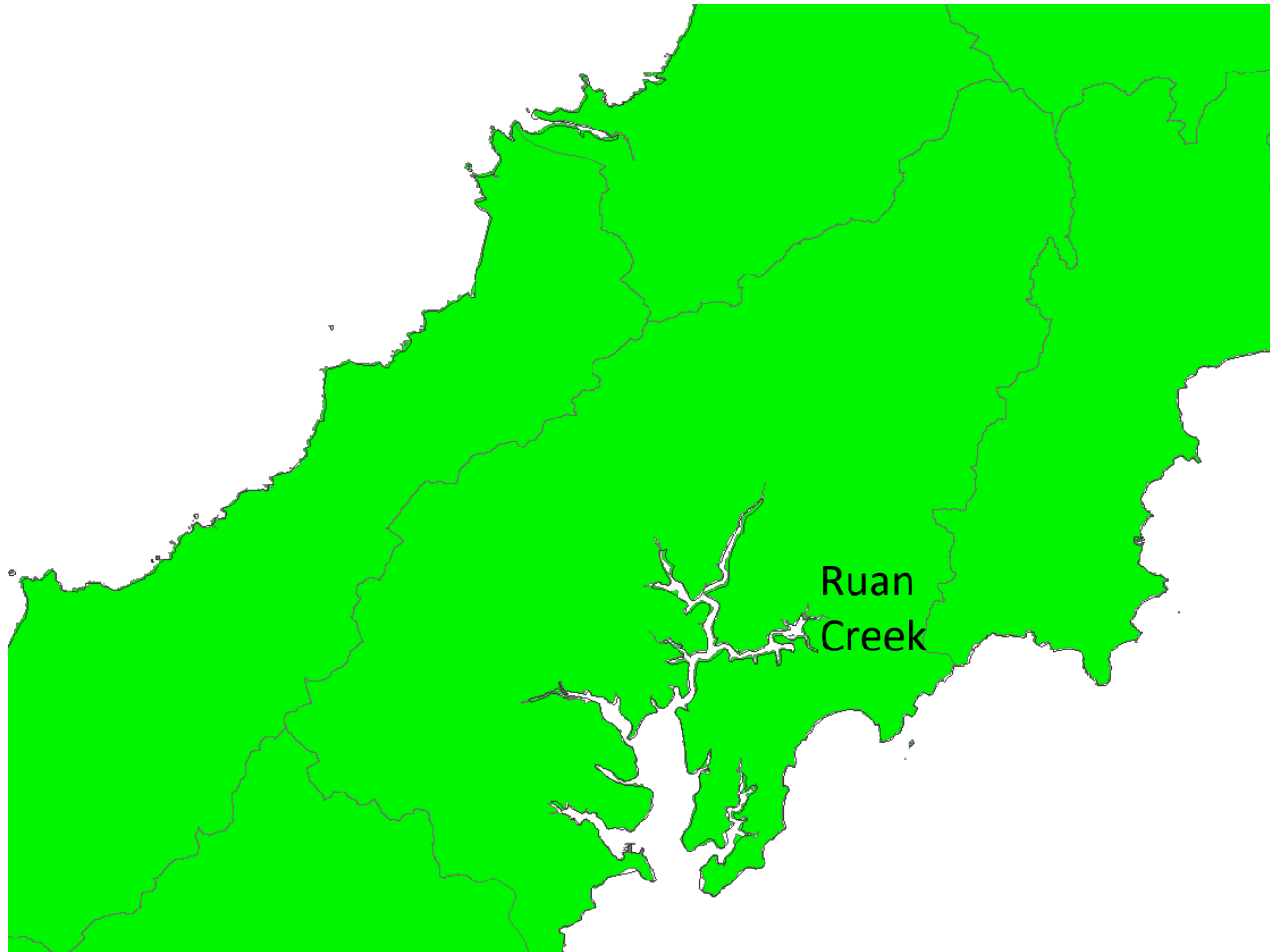
		Main Freshwater Catchments	Catchment Size ha
Bathing Waters	Lyme Regis	River Lim	1,800
	Budleigh Salterton	River Otter	24,200
	Shaldon	River Teign, River Lemon	52,600
	Bantham	River Avon	15,000
	Mothecombe	River Erme	10,500
	Wembury	River Yealm	13,000
	Seaton	River Seaton	5,600
	East Looe	East and West Looe Rivers	10,700
	Readymoney	River Fowey, River Lerryn	27,600
	Polkerris	Par River	7,200
	Marazion	Red River	3,370
	Porth	Porth River	3,650
	Bude Summerleaze	River Strat (or Neet)	8,870
	Ifracombe Wildersmouth	Wilder Brook	980
	Combe Martin	River Umber	1,500
Shellfish Waters	Exe	River Exe, River Clyst	150,600
	Start Bay	River Dart, The Gara, Blackpool Stream	54,000
	St Austell Bay	Par River, St Austell River, Crinnis Stream	14,000
	Ruan Creek	River Fal, River Allen, River Kenwyn, Tresillian River	30,000

# Bantham Beach





# Fal Operational Catchment and Ruan Creek



# Supporting Information on Poor Water Quality and More Significant Inputs

- Monitoring Data and Investigative sampling
- Microbial source tracking analysis of higher bacterial counts
- Event duration monitoring of storm discharges
- Pollution risk forecasting analysis
- Land use export coefficient modelling
- Marine modelling of the impact of discharges

# Some Thoughts

- It is known that rainfall is a major cause of poor water quality at most bathing waters and shellfish waters
- The inputs from freshwater catchments often significant
- Time of travel for rainfall-driven events mostly <1 day to 2 days, only biggest catchments >2 days
- Bacterial decay limited in this time
- Input of bacteria from soil – can be large
- Need a consistent approach and method to assist in defining source apportionment for inputs to coastal waters including those from freshwater catchments
- SIMCAT/SAGIS modelling looks to be a useful additional tool in this
- Need to look at source apportionment for both base flow conditions and rainfall ‘event’ situations
- How to make best use of the model and the output given the nature and variability of bacterial sources?
- What is ‘fair share’ for bacterial inputs?
- Historically improved water quality mainly driven by improved treatment at WwTWs and reduced spill frequencies at storm overflows

Thank you

