

Using Catchment Modelling (SAGIS) to identify the source of priority pollutants

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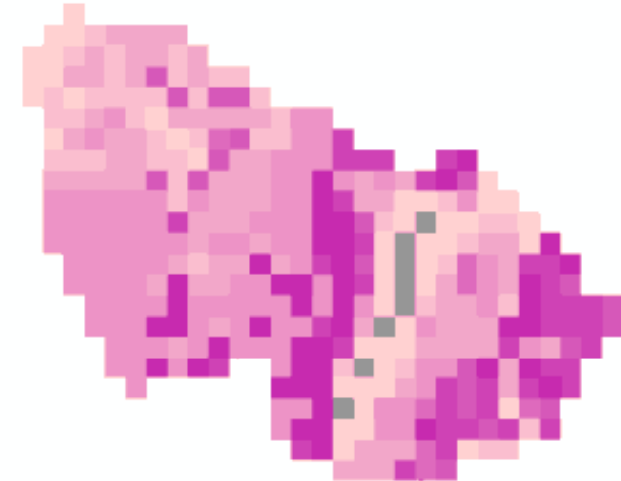
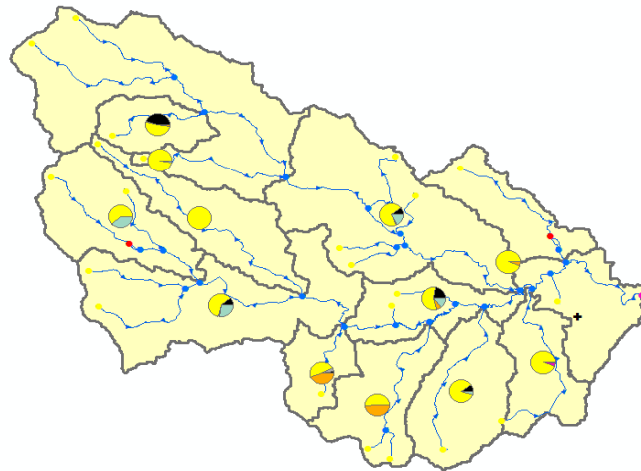
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SAGIS Modelling Platform

- UK Wide Platform – projects managed by UKWIR
- Widely used by Regulators and Water Companies
- Used for long-term water quality assessments
 - Possible to run multiple scenarios on a catchment scale
- Potential to use the modelled data in multiple projects

What is SAGIS?

- 3 constituent parts
 - River network / point source model
 - Diffuse coefficient database
 - Sector based inputs and outputs
 - ArcGIS based code
- Diffuse inputs distributed throughout the river network
- Easily updatable



SAGIS Model Stats

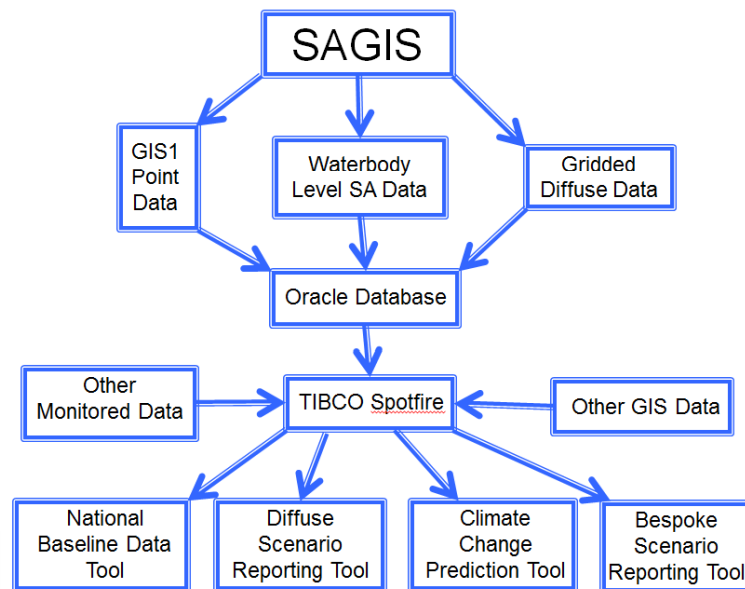
SAGIS Models	102
Modelled Catchments	148
Waterbodies Modelled	2683
River Length Modelled	35,477.56 km
Modelled Points	52,403 /d/s
Diffuse Scenarios	8
# Discharges	1553
# Monitoring Points	1226
# Abstractions	1598
# Gauging Stations	312

Available Parameters

Ammonia	BOD	Phosphate	Nitrate	Cadmium
Copper	Lead	Mercury	Nickel	Zinc
Anthracene	Benzo-A-Pyrene	Benzo-B-Fluoranthene	Benzo-K-Fluoranthene	Benzo-ghi-Perylene
DiEthylHexyl Phthalate	Fluoranthene	Indeno-123cd-Pyrene	Naphth	

SAGIS Outputs

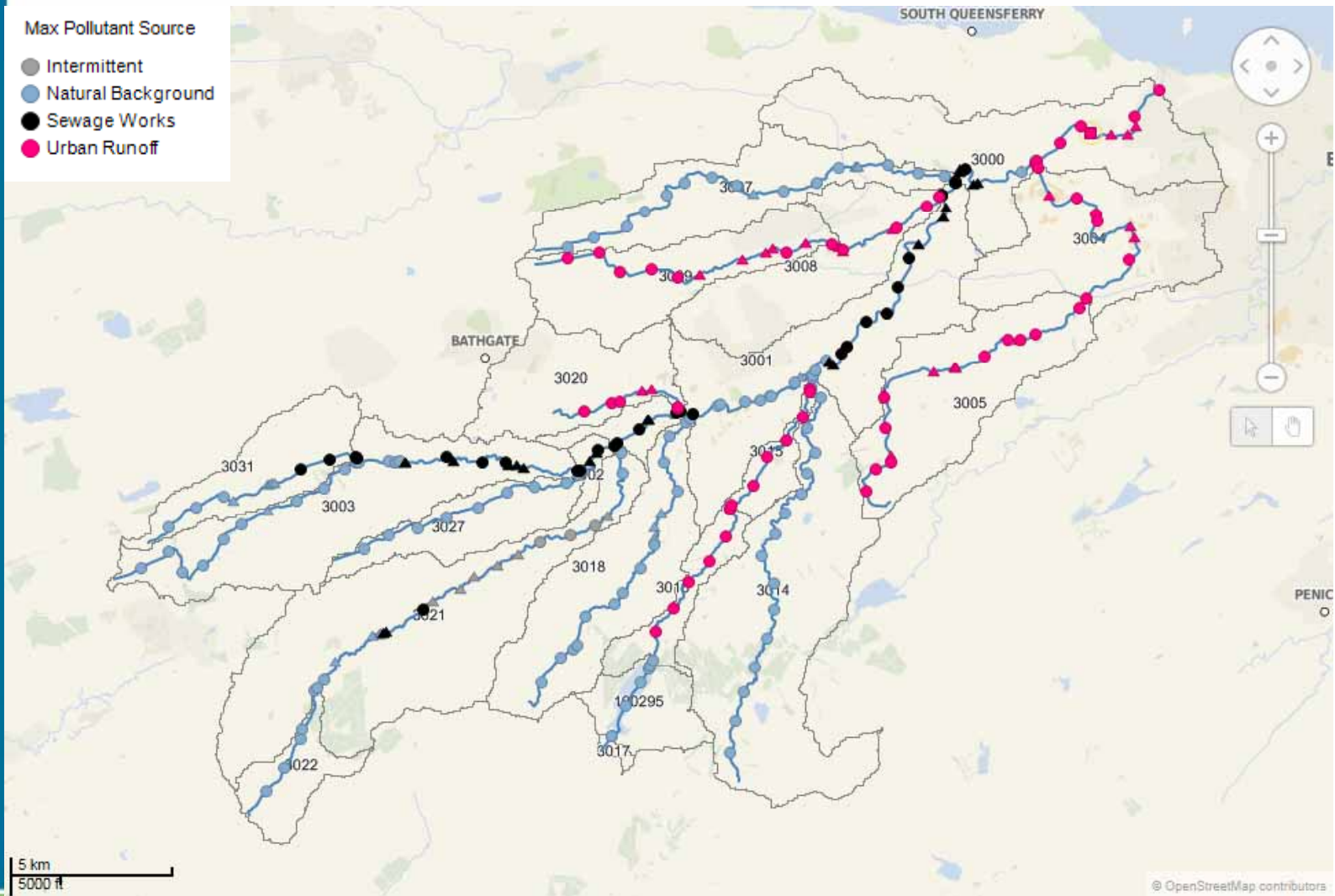
- In-river concentrations with Source Apportionment
- Summary model statistics
- Waterbody level loadings by sector
- Information is being conveyed by Spotfire tools
 - Available via intranet page and ESIU Informatics Hub
- Training will be available on tools and model outputs.



SAGIS Outputs Demo

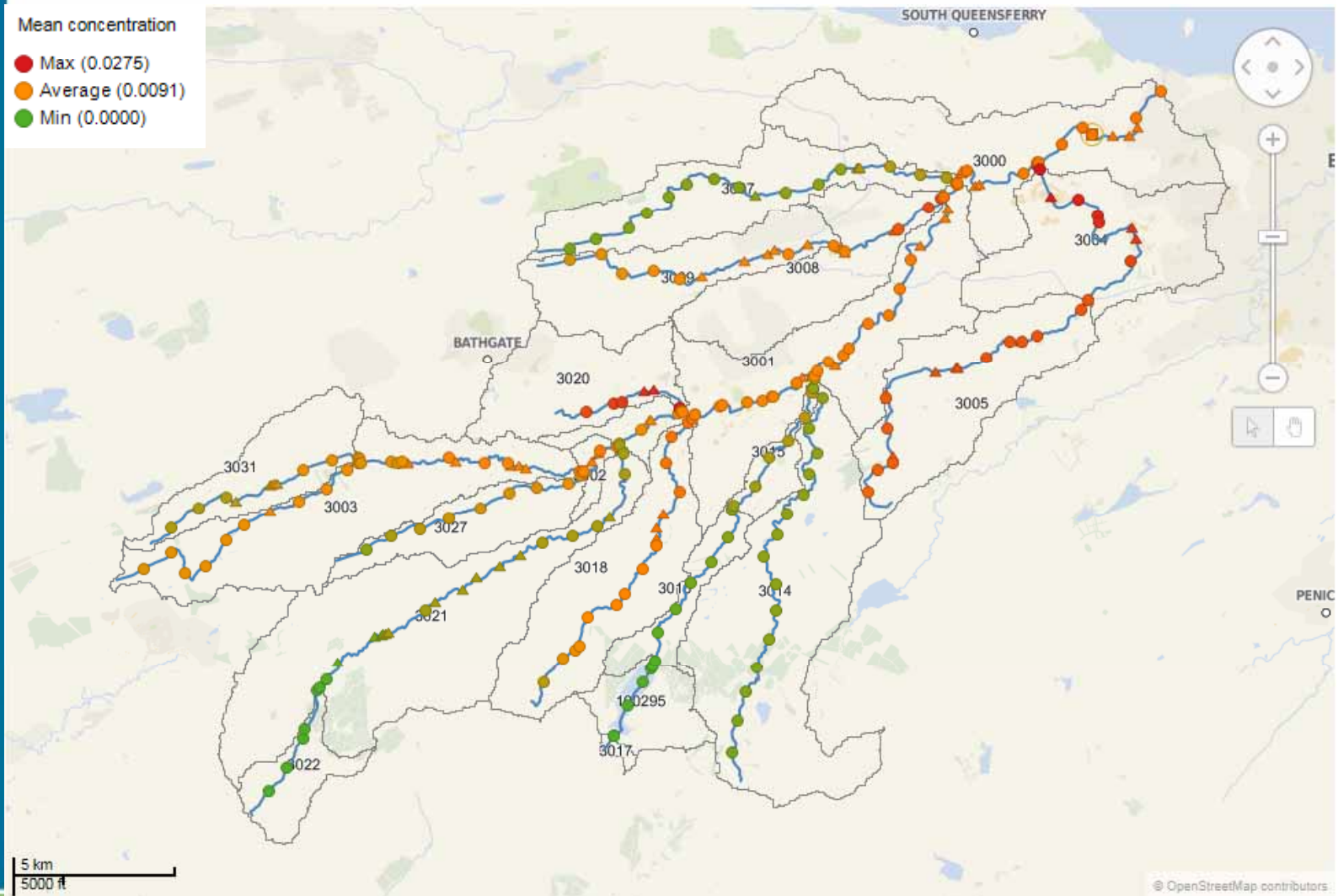
Max Pollutant Source

- Intermittent
- Natural Background
- Sewage Works
- Urban Runoff



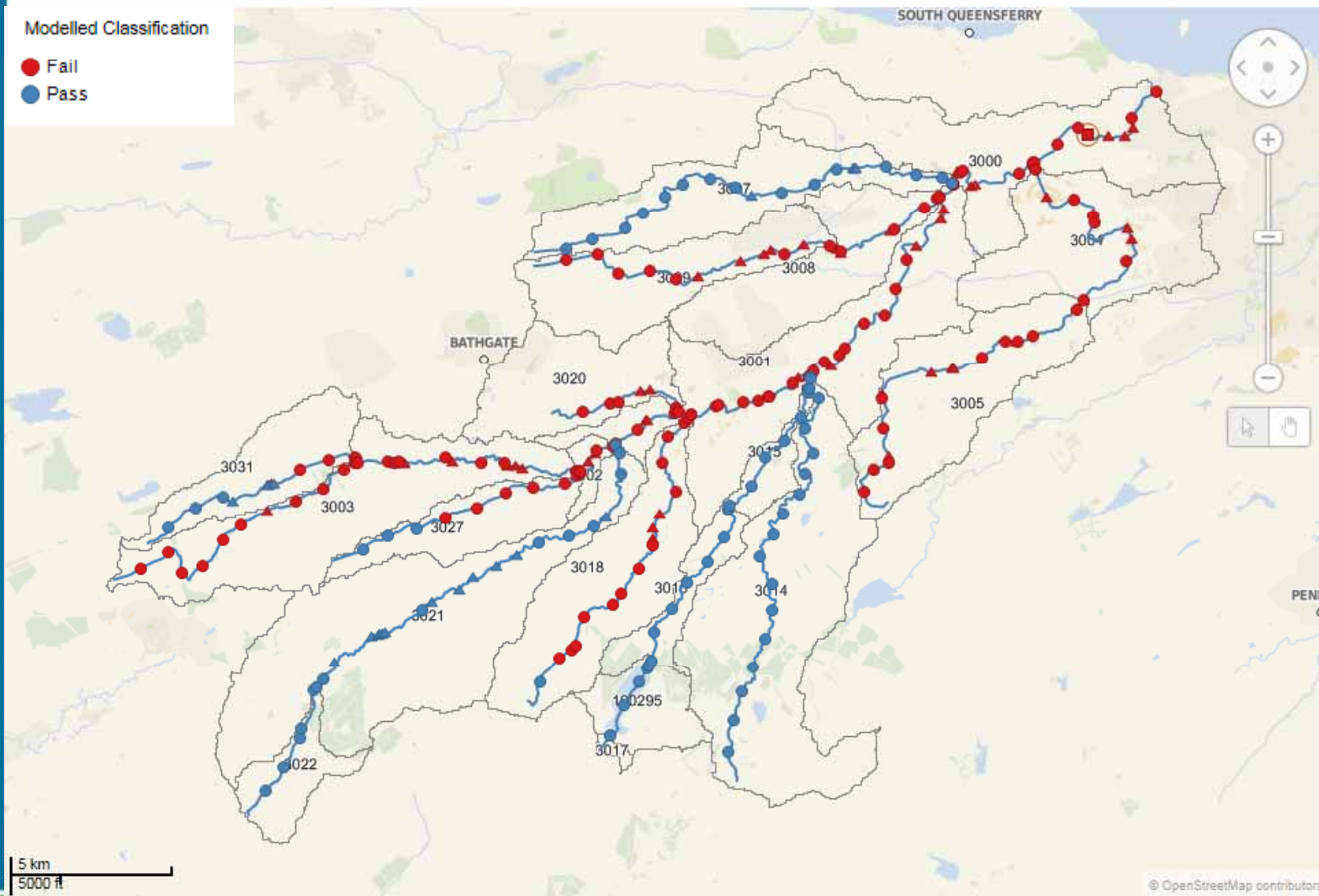
Mean concentration

- Max (0.0275)
- Average (0.0091)
- Min (0.0000)



Modelled Classification

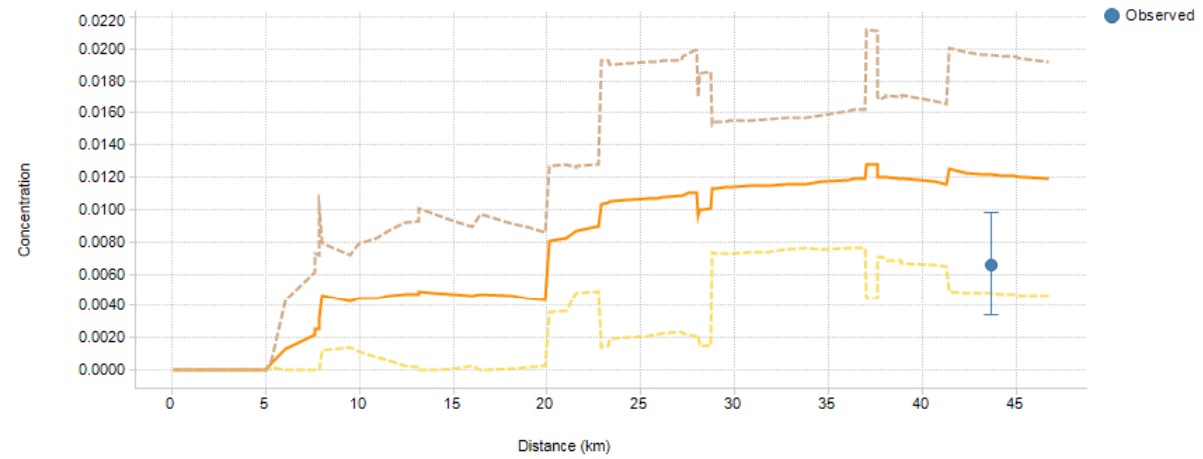
- Fail
- Pass



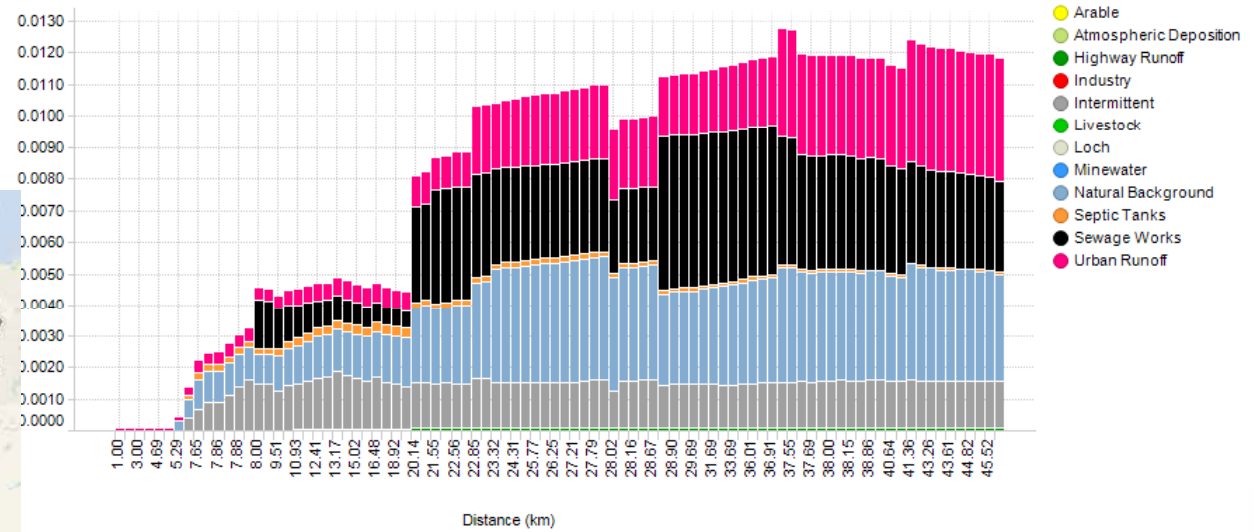
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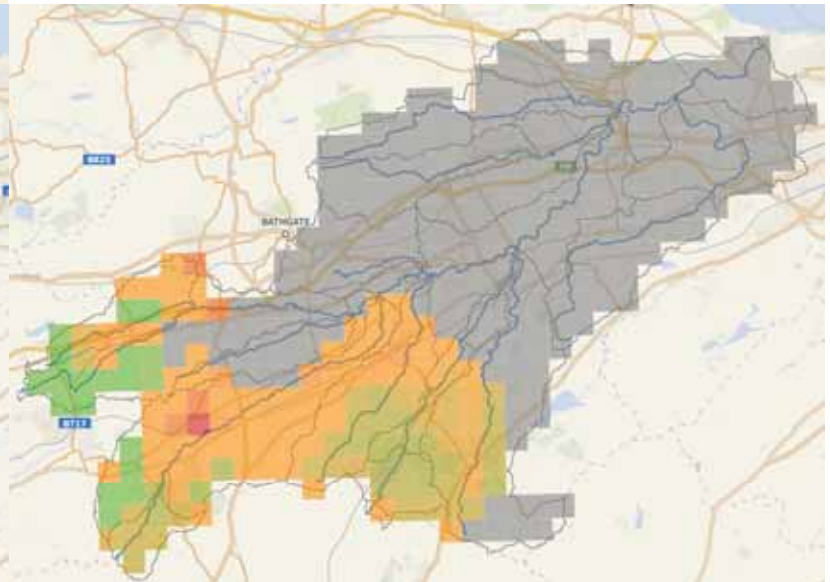
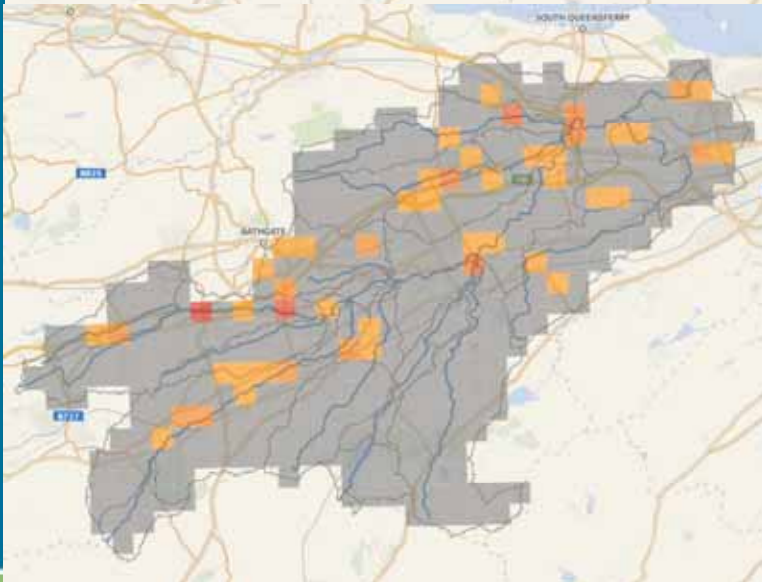
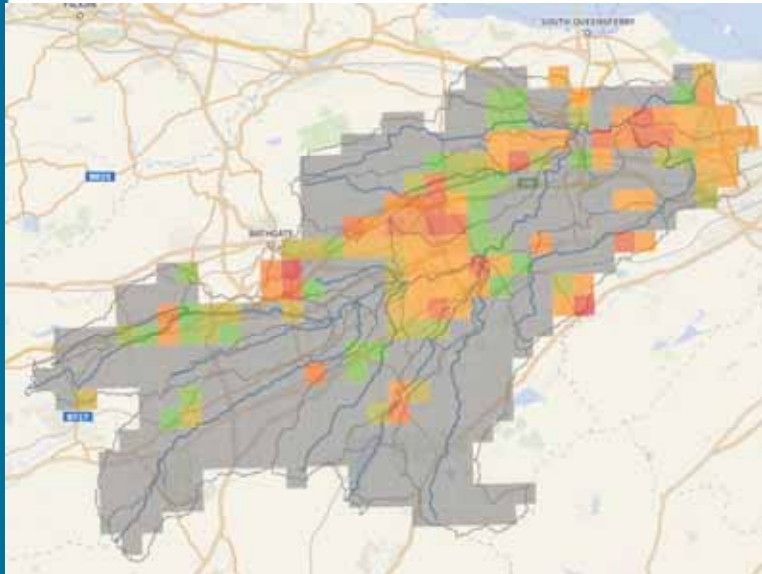


Current: Concentration (ug/l)

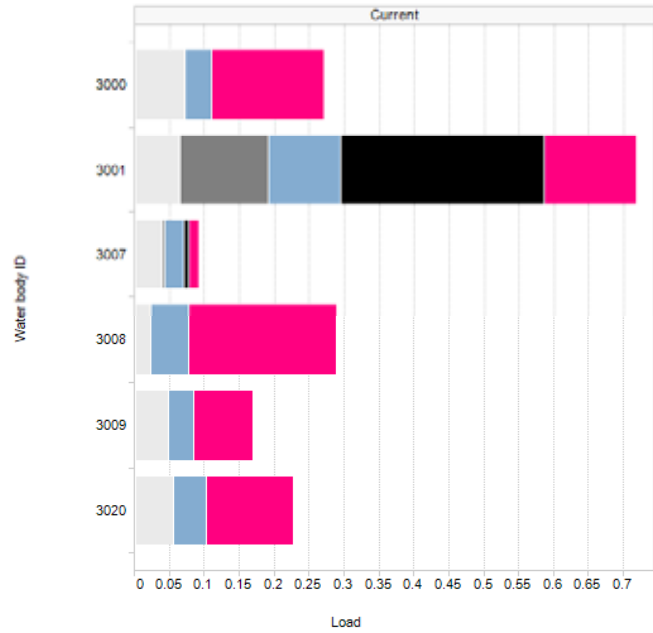


Current: Fluoranthene Concentration (ug/l)

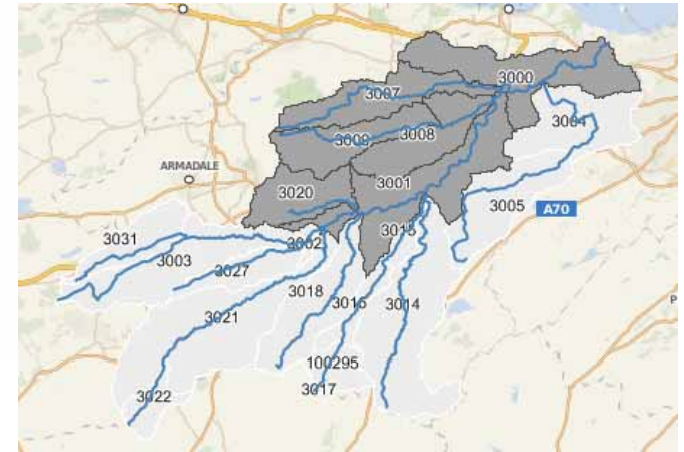




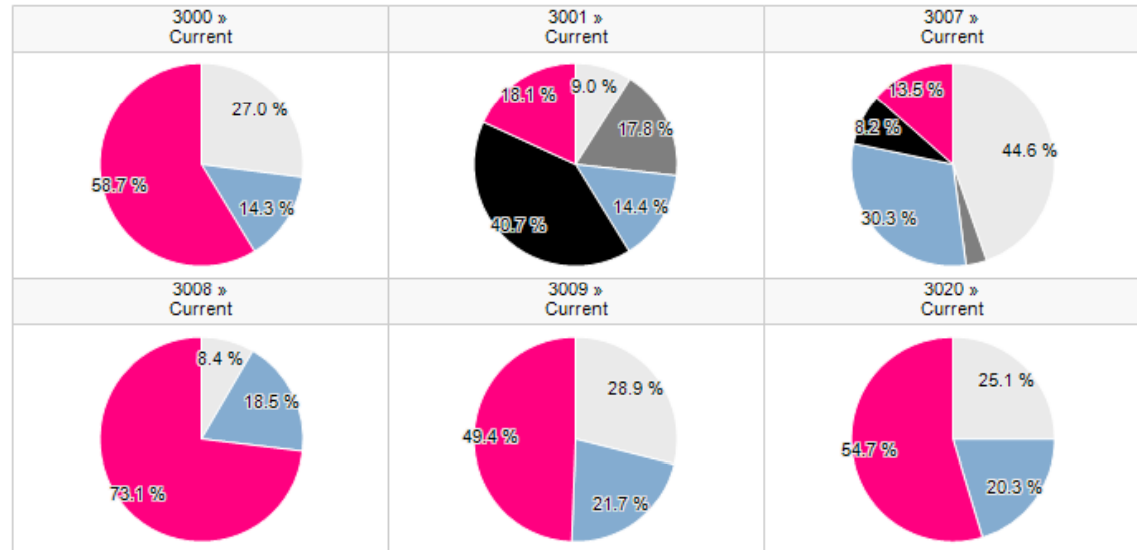
Fluoranthene (WB specific)



- Arable
- Atmospheric Deposition
- Highway Runoff
- Industry
- Intermittent CSO
- Intermittent Storm Tanks
- Livestock
- Minewater
- Natural Background
- Septic Tanks
- Sewage Works
- Urban Runoff



Fluoranthene (WB specific)



Scenario	Water body ID	Units	Arable	Atmospheric Deposition	Diffuse Intermittent Discharges	Diffuse Small Sewage Works	Highway Runoff	Industry	Intermittent	Livestock	Loch	Minewater	Natural Background	Septic Tanks	Sewage Works	Urban Runoff
Current	3000	%	0.00	0.00	0.00	0.00	0.92	0.00	12.23	0.00	0.00	0.00	29.30	0.50	24.28	32.77
Current	3001	%	0.00	0.00	0.00	0.00	0.78	0.00	11.21	0.00	0.00	0.00	29.15	0.67	31.44	26.74
Current	3007	%	0.00	0.00	0.00	0.00	0.63	0.00	29.14	0.00	0.00	0.00	43.80	0.00	13.34	13.08
Current	3008	%	0.00	0.00	0.00	0.00	1.06	0.00	8.89	0.00	0.00	0.00	28.69	0.00	0.00	61.35
Current	3009	%	0.00	0.00	0.00	0.00	1.11	0.00	14.51	0.00	0.00	0.00	33.98	0.00	0.00	50.40
Current	3020	%	0.00	0.00	0.00	0.00	1.45	0.00	12.17	0.00	0.00	0.00	35.27	0.00	0.00	51.11



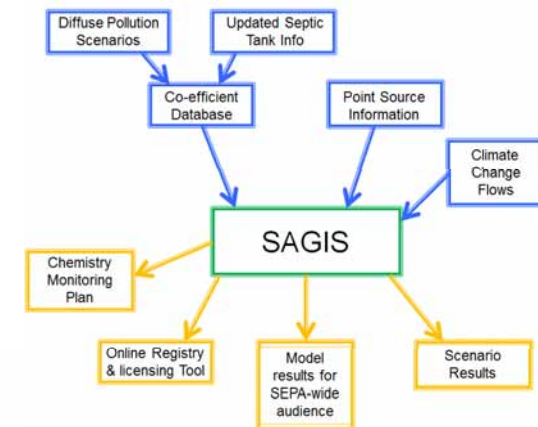
SAGIS : Science and Regulation

- ❖ End goal of all SEPA's work is to protect and improve the environment
- ❖ Much of this is in the way of regulation

- ❖ SAGIS outputs are formidable tool in aiding these goals
 - ❖ Online Registration / Licensing Tool
 - ❖ Outputs available for licensing investigations

- ❖ SAGIS used as a basis for scientific investigation
 - ❖ Climate Change (Future Flows Data)
 - ❖ Effectiveness of Measures (Multiple Diffuse Scenarios - ADAS)

- ❖ SAGIS also used to improve understanding of environment
 - ❖ Chemistry Monitoring Plan
 - ❖ Running catchment scenarios



With Thanks To . . .

Environmental & Spatial Informatics Unit

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WRc Plc

ADAS

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