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WATER INFORMATICS SCIENCE & ENGINEERING
EPSRC CENTRE FOR DOCTORAL TRAINING

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What is the optimum sampling frequency for a water quality monitoring scheme?

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Photo from https://wrt.org.uk/monitoring/

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Current water quality monitoring schemes are often inefficient.

They fail to capture the real water quality changes due to lack of spatial and/or temporal resolution.

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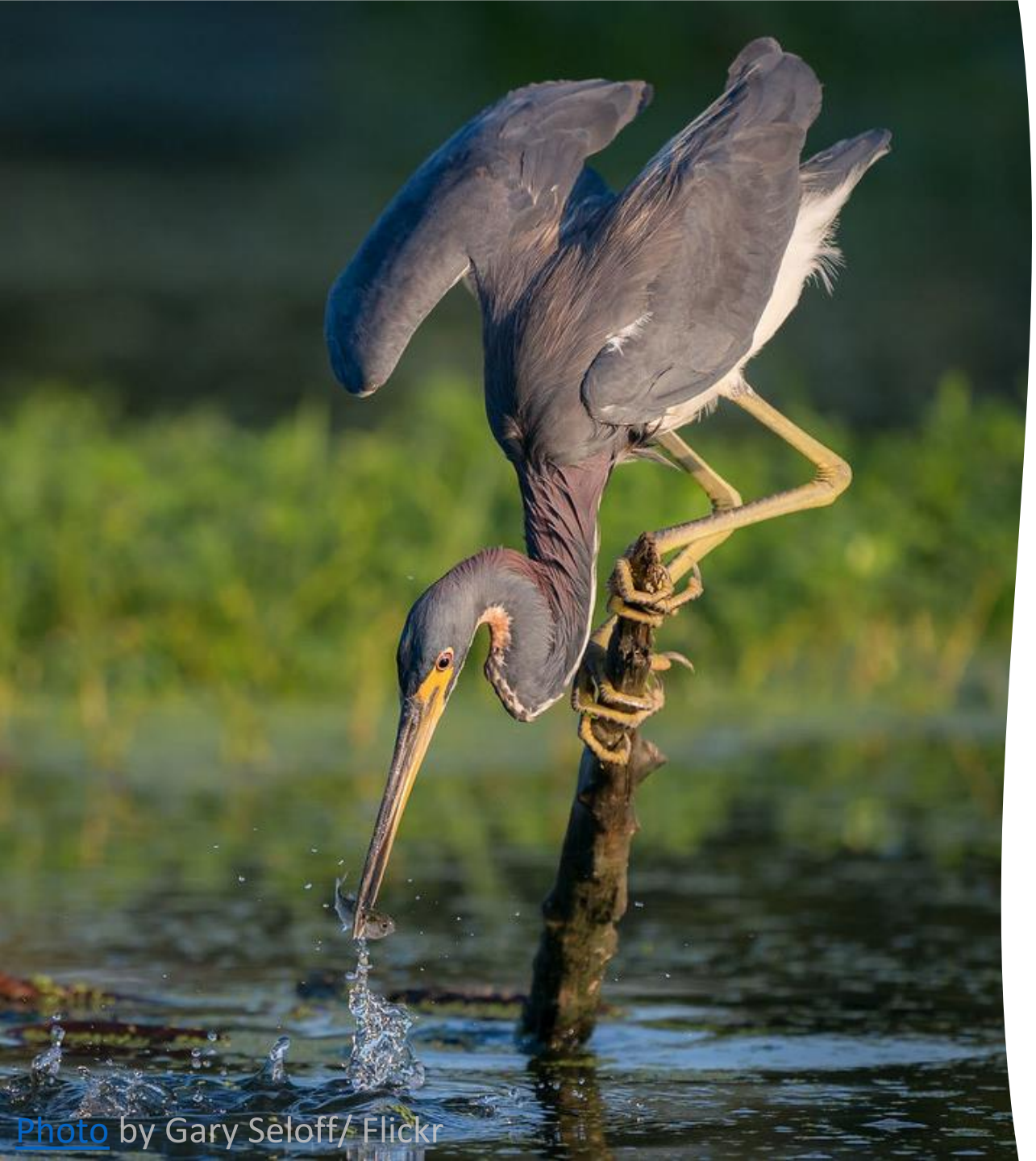

Photo by Gary Seloff/ Flickr

How do we improve the efficiency of a water quality monitoring scheme?

Deployment of high-frequency monitoring systems

How much data is needed?

How do we ensure we capture the information we need?

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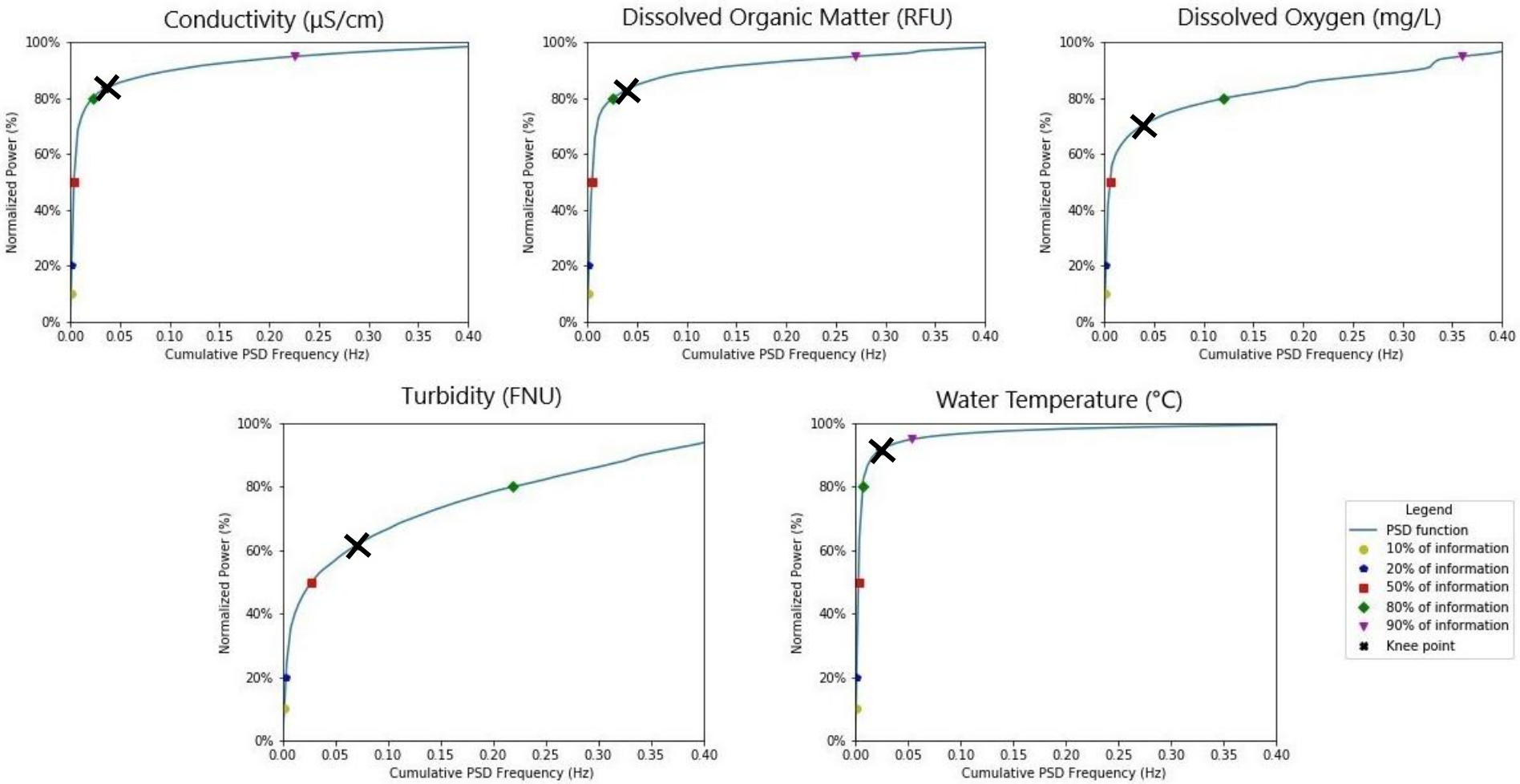
The knee point of the Power Spectral Density cumulation plot represents the optimum sampling frequency



	Sampling intervals				
	Conductivity	fDOM	DO	Turbidity	Temperature
Knee point	6 hrs	5 hrs	5 hrs	3 hrs	9 hrs

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The sampling frequency that optimises the costs/benefits ratio depends on the purpose of the monitoring network

Power content	Sampling intervals				
	Conductivity	fDOM	DO	Turbidity	Temperature
10%	11 days	10 days	9 days	5 days	14 days
20%	6 days	5 days	5 days	3 days	7 days
50%	2 days	2 days	1 days	7 hrs	3 days
80%	9 hrs	8 hrs	2 hrs	1 hrs	1 days
95%	11 mins	9 mins	7 mins	6 mins	4 hrs
Knee point	6 hrs	5 hrs	5 hrs	3 hrs	9 hrs

This table shows the link between sampling intervals and information content (%)

Further work:

- understanding the optimum sampling frequency for machine learning water quality prediction models

SCAN ME for more information

Thank you!
Any questions?
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