

**Independent,
integrated
thinking**

***Monitoring the environmental interactions of marine
energy devices***

***Experiences to date – results of a developer
questionnaire survey***

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Contributors

Facts not perception.....

Questionnaire distributed to 16 organisations / individuals

All but 3 responded

11 questionnaires returned

Primarily tidal developers

1 company with consented project 2-3 years off deployment



DP ENERGY



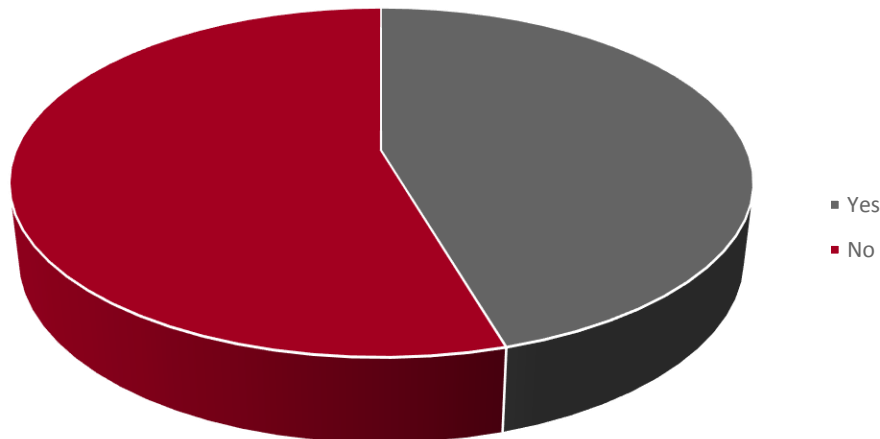
Deployment background

100% of questionnaire respondees have experience of devices in the water, some multiple deployments in different countries

Scotland (8), Northern Ireland (2), Wales (2), France (1), Canada (2)

All but two respondees have / had consent conditions that require environmental monitoring

Deployment at Already Consented Site

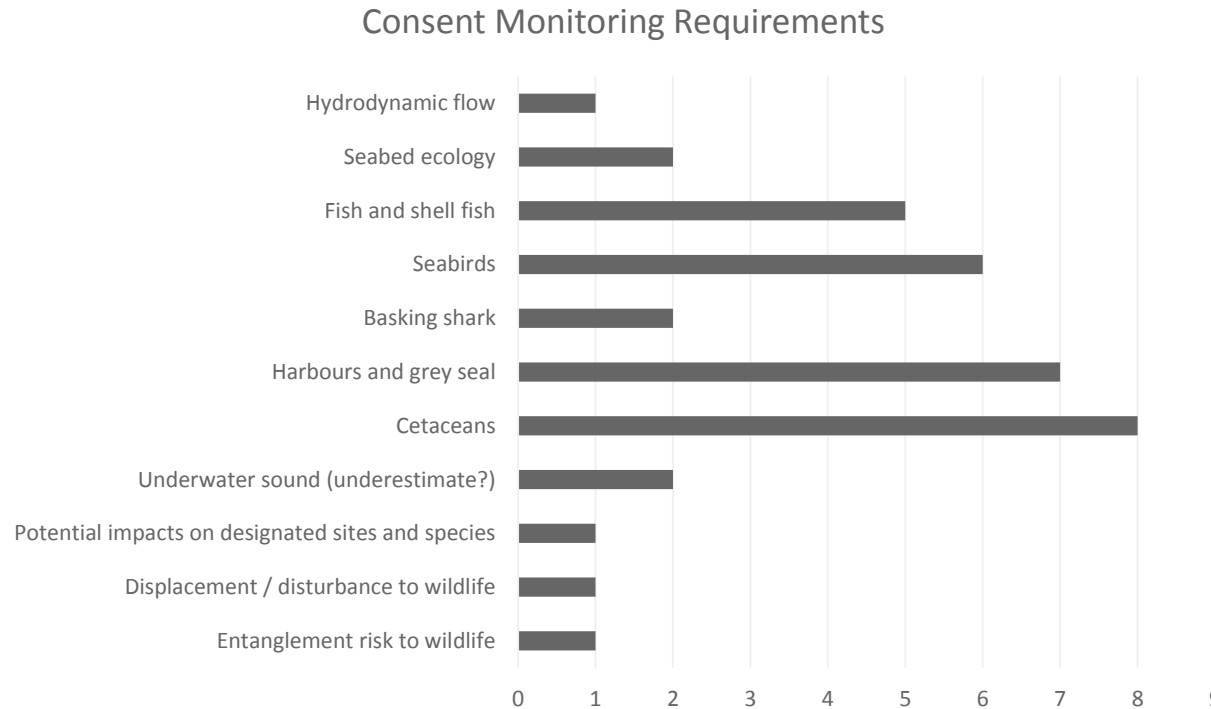


Single devices

Arrays

Monitoring requirements

Consent conditions require monitoring of the following receptors:



**Majority of companies had at least 3 receptors to monitor
Array projects – 5 receptors**

Monitoring programme design

Vague monitoring conditions – not clear if monitoring to manage risk, or validate impact predictions

Learning phase – uncertainty around survey methodology, considerable effort, cost, most effective equipment

Challenging to procure and implement cost effective monitoring systems

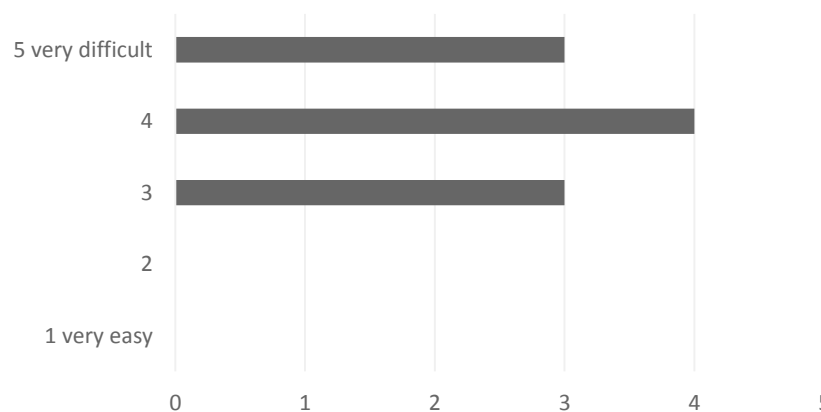
Some requests impossible to deliver and not proportionate to HRA (AA) results

Continuous real time monitoring not possible

Health & Safety issues

Engage with regulators early and feed into consent condition requirements with an understanding of what data feasible

Ease of Designing Monitoring Programme



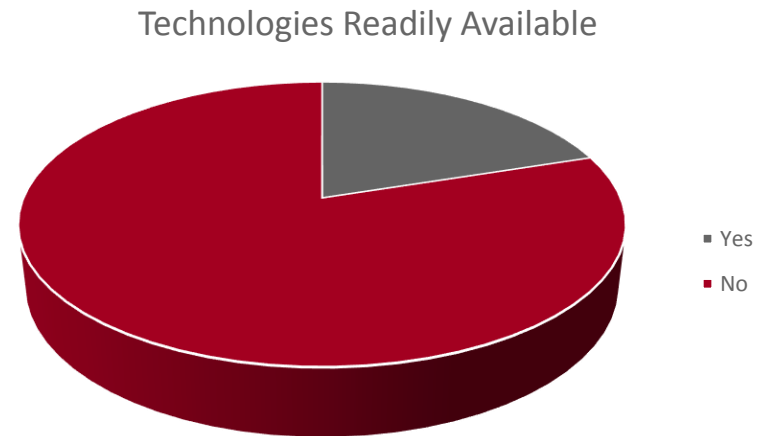
Monitoring technologies

Yes and No – previous application of same technology, but not in the way we were using it

Technology exists but lack of suitable supporting software

Technology not appropriate for harsh environment / needs to be 'marinized'

Issues with data transfer (in rural / remote environment)



Monitoring success - deployment

Equipment successfully deployed and operated as expected

Technology worked extremely well – redundancy to ensure reliability – but complex system of hardware & software

Not all devices operational / operational issues / incorrect installation / incorrect position / incorrect set up

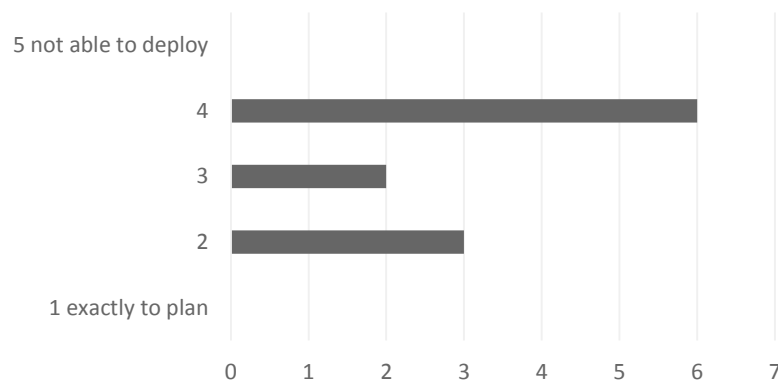
Camera system – marine growth issues; daylight hours only

Observer monitoring – not cost effective; daylight hours only; vantage point surveys (usual issues)

Intermittent data retrieval

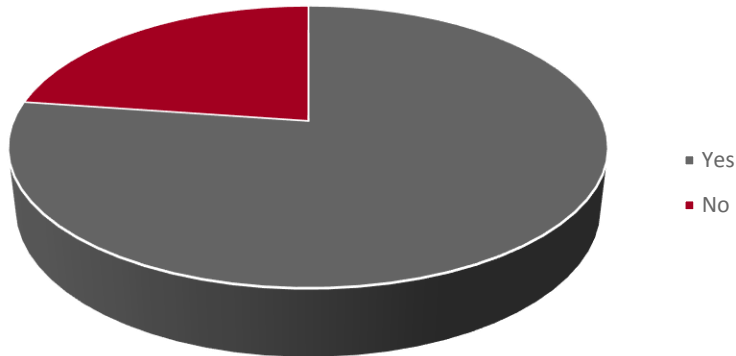
Lack of remote access to data – problems not identified immediately

Deployment went to Plan



Monitoring success - data

Monitoring Generated Data it Intended to



Video footage over 8 month period – no interactions indicated

Monitoring of marine wildlife around wave energy device – over 2 year period. Good dataset, but not fully analysed

Excellent data generated, inc further understanding of marine wildlife use of the site

Much evidence gathered during the time the device was operational (and has recently been published)

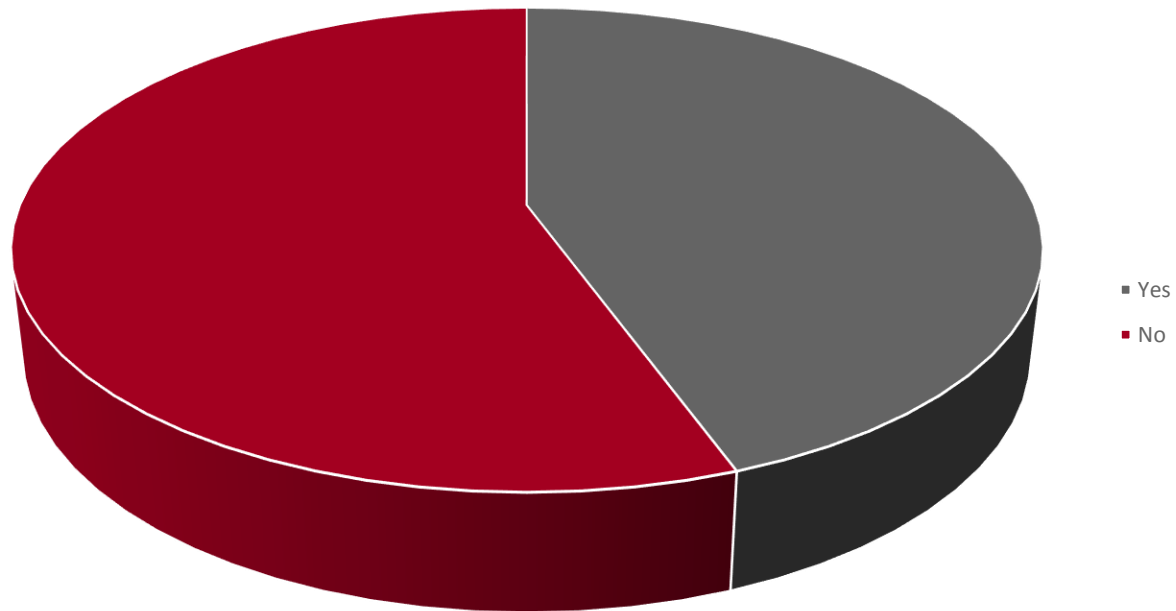
Advance in monitoring technology and associated software programmes

Questionable methodologies:

- > Sonar & hydrophone not able to generate data to a species level
- > Value of vantage point surveys

Interference with the Project

Any Issues with Energy Generation / Project Design



Use to future consent applications / EIA

It should do! wealth of data gathered, although some loss of knowledge as company in administration

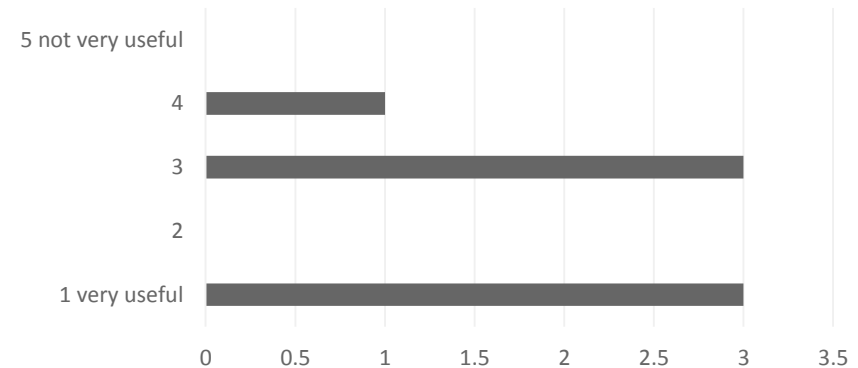
Environmental monitoring data is key to unlocking future phases of arrays

Depends on whether regulators (and advisers) accept findings are transferrable; unfortunately precaution usually triumphs pragmatism

Hard to say....a risk monitoring systems will be required by consent, even if early monitoring shows not required

Shut down policy reduced data acquisition; not as useful as could have been

Data Useful to Inform Future Consent Applications



Other developers views

Deploy and monitor policy has been welcomed as allows devices to get in the water

Lack of policy consistency between different jurisdictions

Don't believe consent conditions unreasonable

- > Support trialling of systems & environmental monitoring from first deployments
- > Company x implemented a cost effective monitoring programme
- > Would welcome additional funding be to enable more ambitious monitoring

Reduce financial burden on developers

Heavy post consent monitoring burden more palatable if pre-application burden was less

Compliance with protected species legislation important

Establishing a working group with regulators essential to allow for adaptive environmental management / monitoring



Other developers views

Monitoring technologies

- > Testing phase still - industry still trying to understand and explore best way to gather meaningful data
- > Number of technologies could be deployed to understand receptor behaviour sonar; hydrophone clusters; echosounders BUT cost prohibitive in both set up and running costs
- > Some advantages of placing devices in turbines – but difficulties in adjustment and replacement of devices
- > Use of novel technologies to prove no interaction issues, should ultimately lead to being able to operate with no monitoring requirements

Monitoring at test sites (where multiple activities) not representative of other deployment locations

Monitoring data not used to full potential – companies went into administration

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My personal take home messages

Differing developer views on usefulness of monitoring to date

- > Need to work towards a consensus

There is useful data – how do we combine findings for all to benefit?

- > Learning from different jurisdictions

Early deployments being expected to monitor too much

Prioritise focus issues

- > What is/are they 'key' issue(s)?
- > Consent monitoring requirements *versus* research agenda
 - Not a research thesis
 - Better distinction required?
- > Developers are not a bottomless money pot!
- > As industry evolves focus issues will shift

Legislative requirements (restrictions)

- > BREXIT an opportunity?

Regulators need to be clear in what asking in their consent conditions

Delay in large scale deployments is an opportunity

My personal take home messages

Monitoring methodologies / technology

- > Need cost effect, practical monitoring techniques
 - Marine wildlife interactions / collision
 - Need considered early in project design
 - Experiences to date highlight many issues to address e.g. installation, set up, operational issues

- > How many different technologies needed?
- > Are we working towards a consensus?
- > Does monitoring methodology / technology development / consensus on suitable methods have enough priority?

Minimise lost data

- > Data sets in companies no longer operational
- > Loss of personnel experience



Thanks to the contributors

