MONOCLE

Multiscale Observation Networks for Optical monitoring of Coastal waters, Lakes and Estuaries

Water Quality Survey of the Multiscale Observation Networks for Optical monitoring of Coastal waters, Lakes and Estuaries (MONOCLE) project

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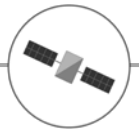


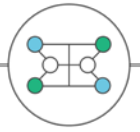


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Motivation

Research projects such as MONOCLE can expect wider uptake of results if the projects are requirement-driven.

To explore user requirements we developed a public survey and a series of webinars with panel discussions and public Q&A.

Through these activities we gathered a rich response from practitioners and stakeholders in optical water quality monitoring.

Webinar series are available to view on the project:

www.monocle-h2020.eu/Webinars

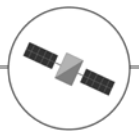
For more information please contact monocle@pml.ac.uk

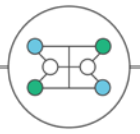
Water Quality Monitoring Survey

The survey was designed to be accessible to a wide range of experts in water quality monitoring, sensor development, research, and related stakeholder roles.

Highly technical questions were avoided, with focus given to issues of sensor and maintenance cost for different observation platforms (e.g. professionals versus volunteers).

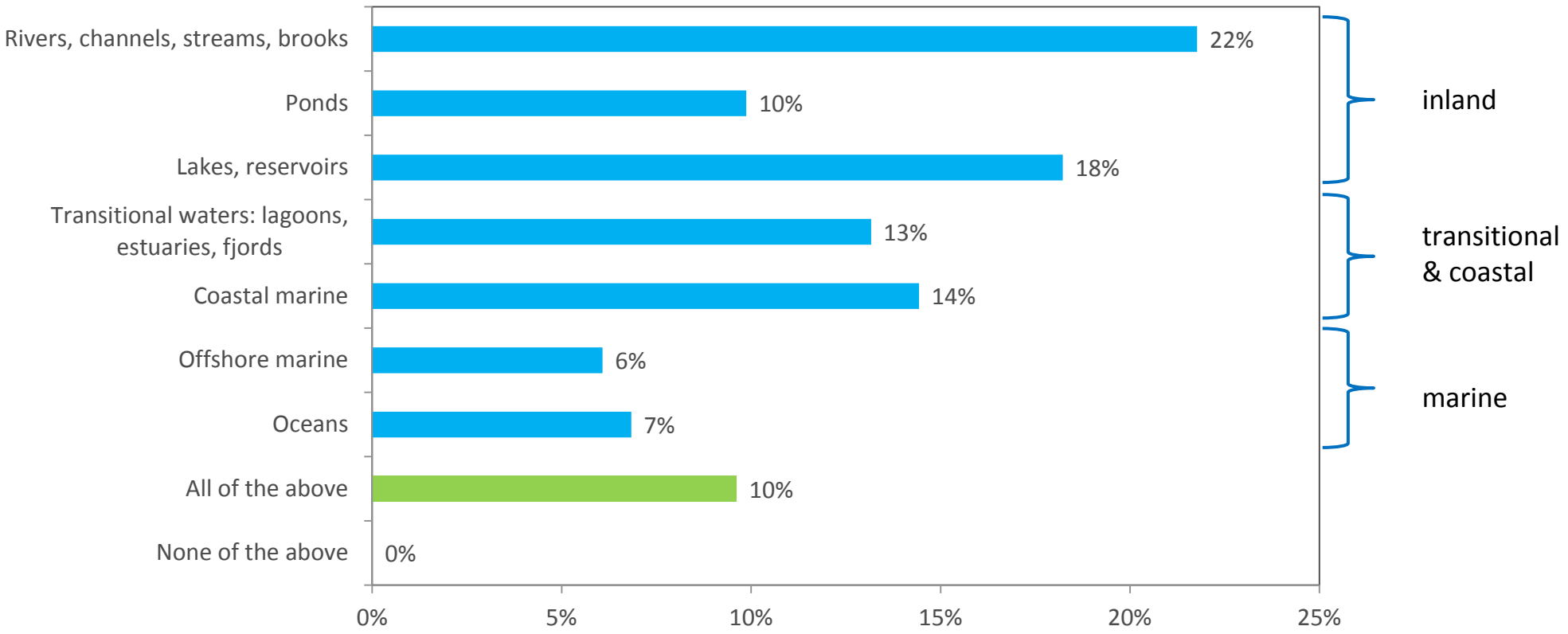
Key questions and results are provided in the following slides.


Survey results – survey sample

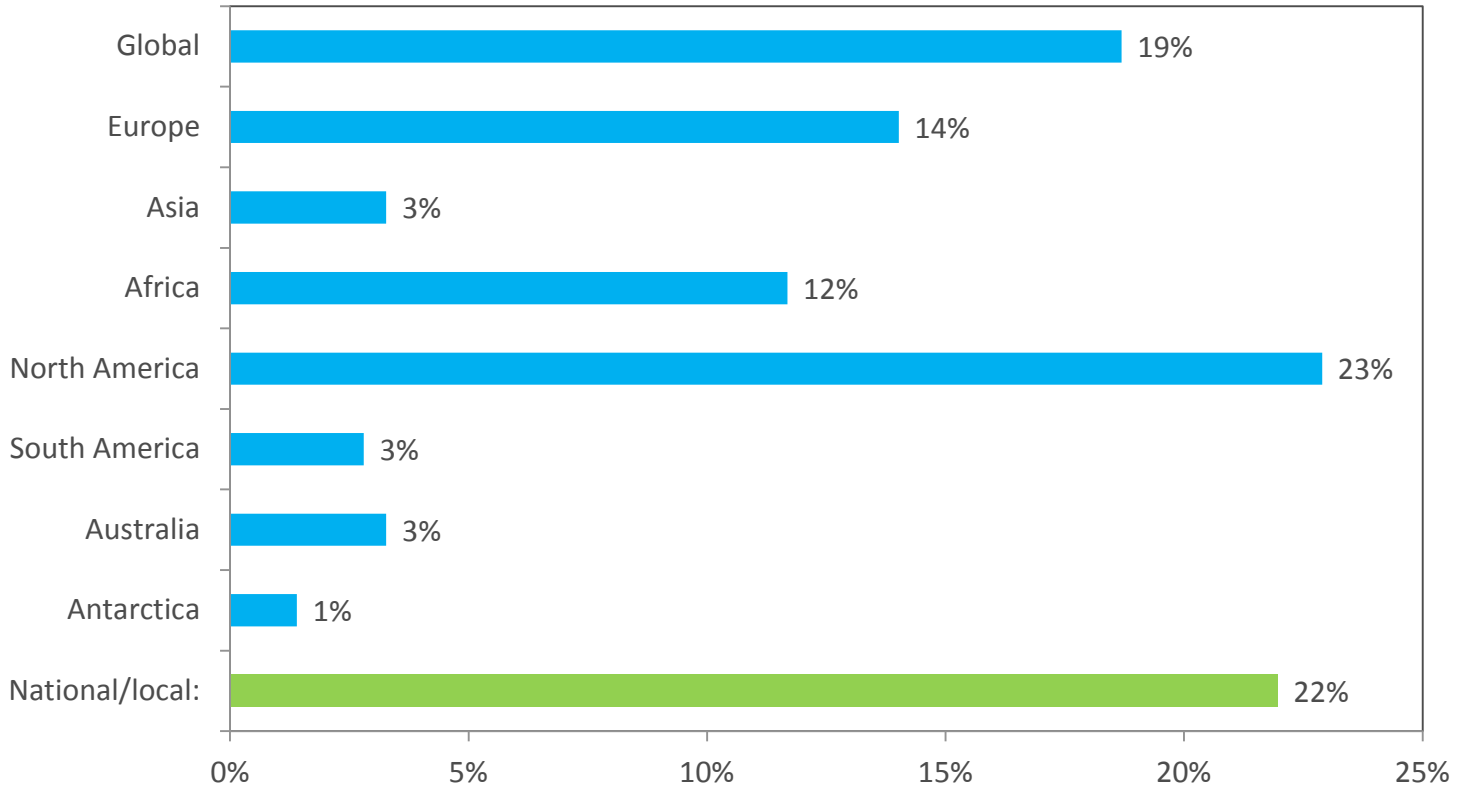
Are you interested in water quality monitoring of a specific environment?



The survey attracted attention stakeholder interested distributed approximately evenly between marine and freshwater domains.

Survey results – survey sample

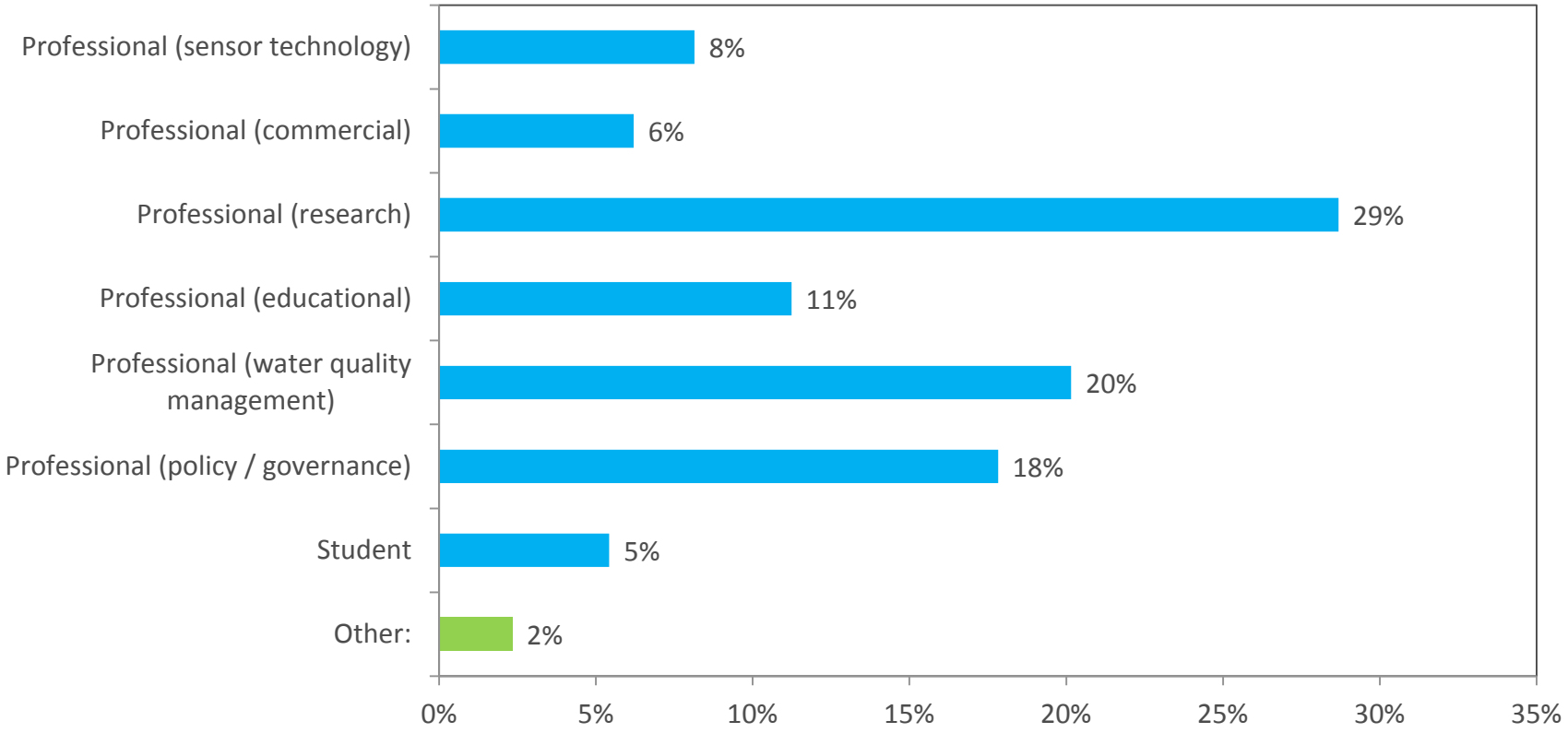
Does your interest in water quality monitoring relate to a specific region?



Geographic interest ranged from local to national and global. Interests in North America and Europe were best represented.

Survey results – survey sample

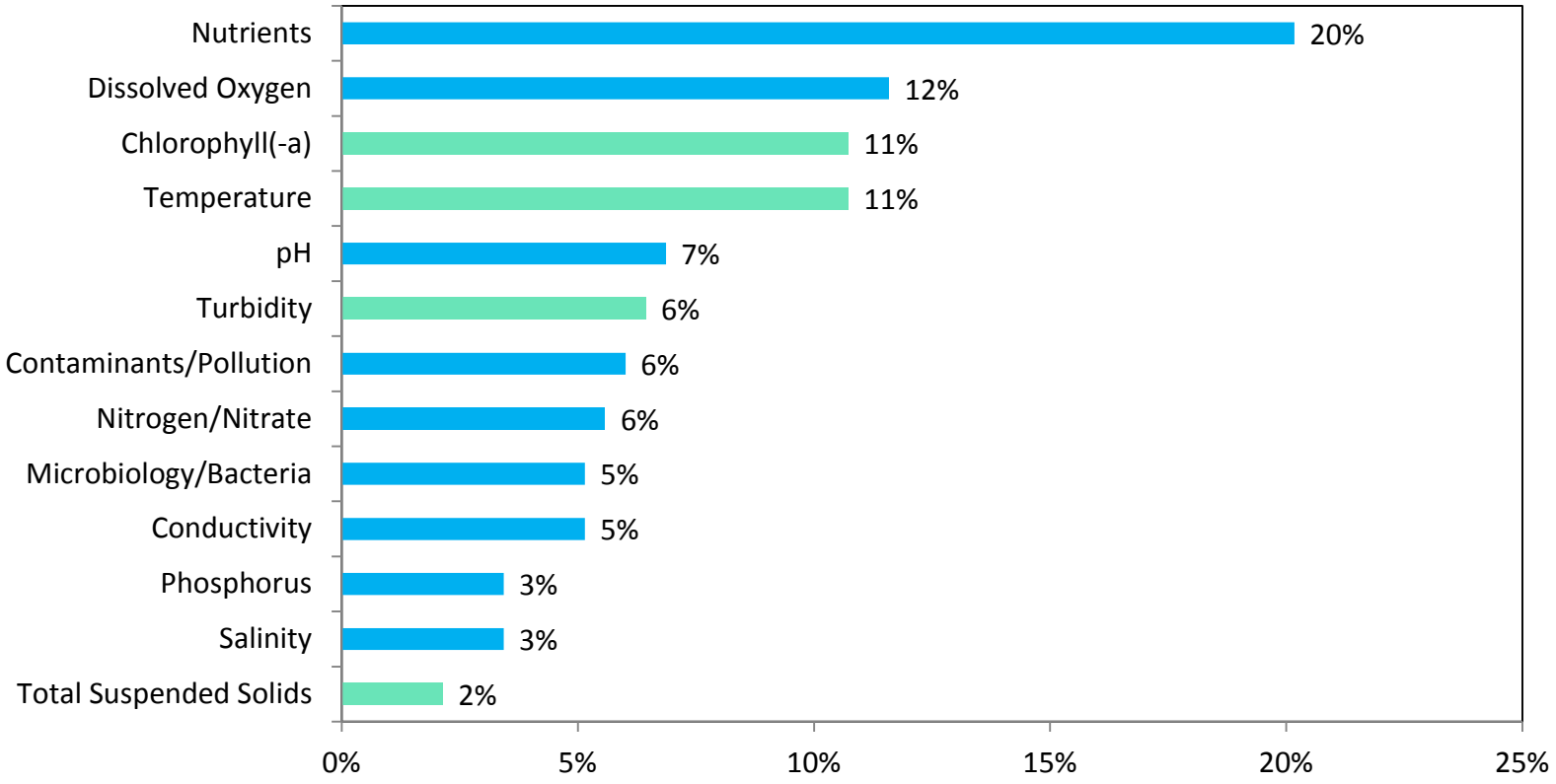
Do you have an occupational interest in water quality monitoring?



The highest response rates were from researchers and professional water quality management, policy and governance. 71% of respondents indicated to be involved with water sampling in field or laboratory.

Survey results – water sampling

Which of the water quality variables sampled in your region do you consider to be the most relevant?



Nutrients are by far the most desired water quality variables, followed by other chemical and biological variables, of which some (in green) can also be derived from remote sensor observations.

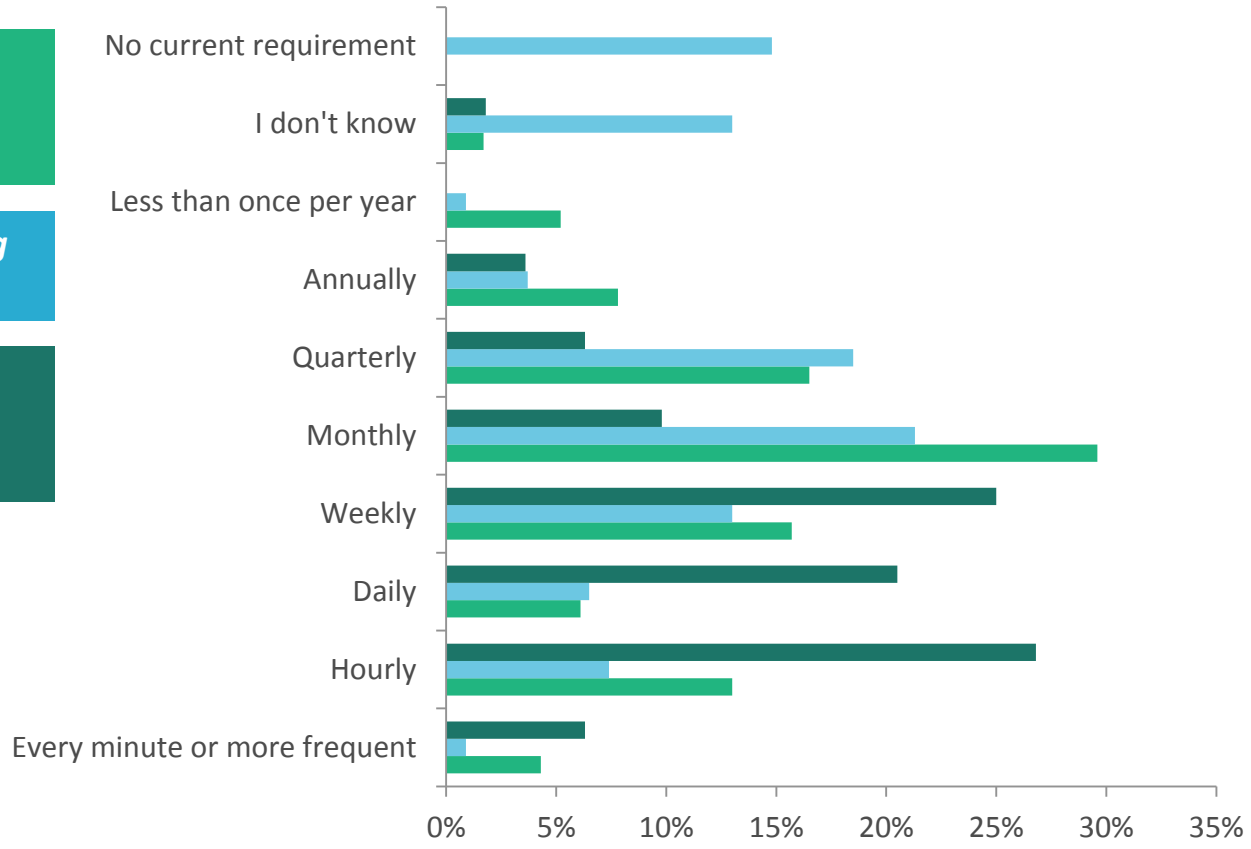
Survey results – water sampling

Sampling frequency

How frequently do you sample the variable which you consider most important?

What is the minimum required sampling frequency to meet regulations?

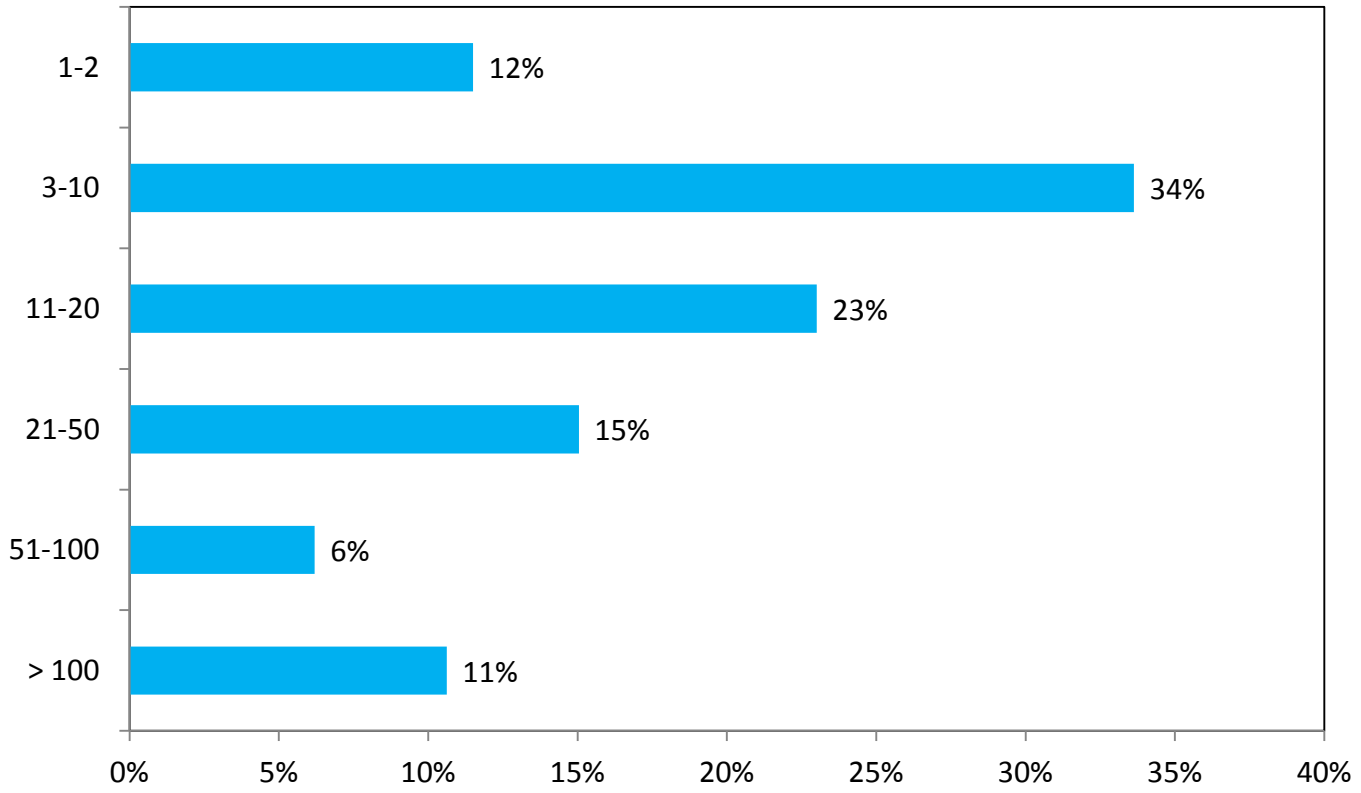
What do you consider an adequate sampling frequency to capture variability?



Monthly sampling is most common and corresponds to the sampling frequency required by regulations. However, hourly to weekly sampling is considered required to adequately capture natural variability.

Survey results – water sampling

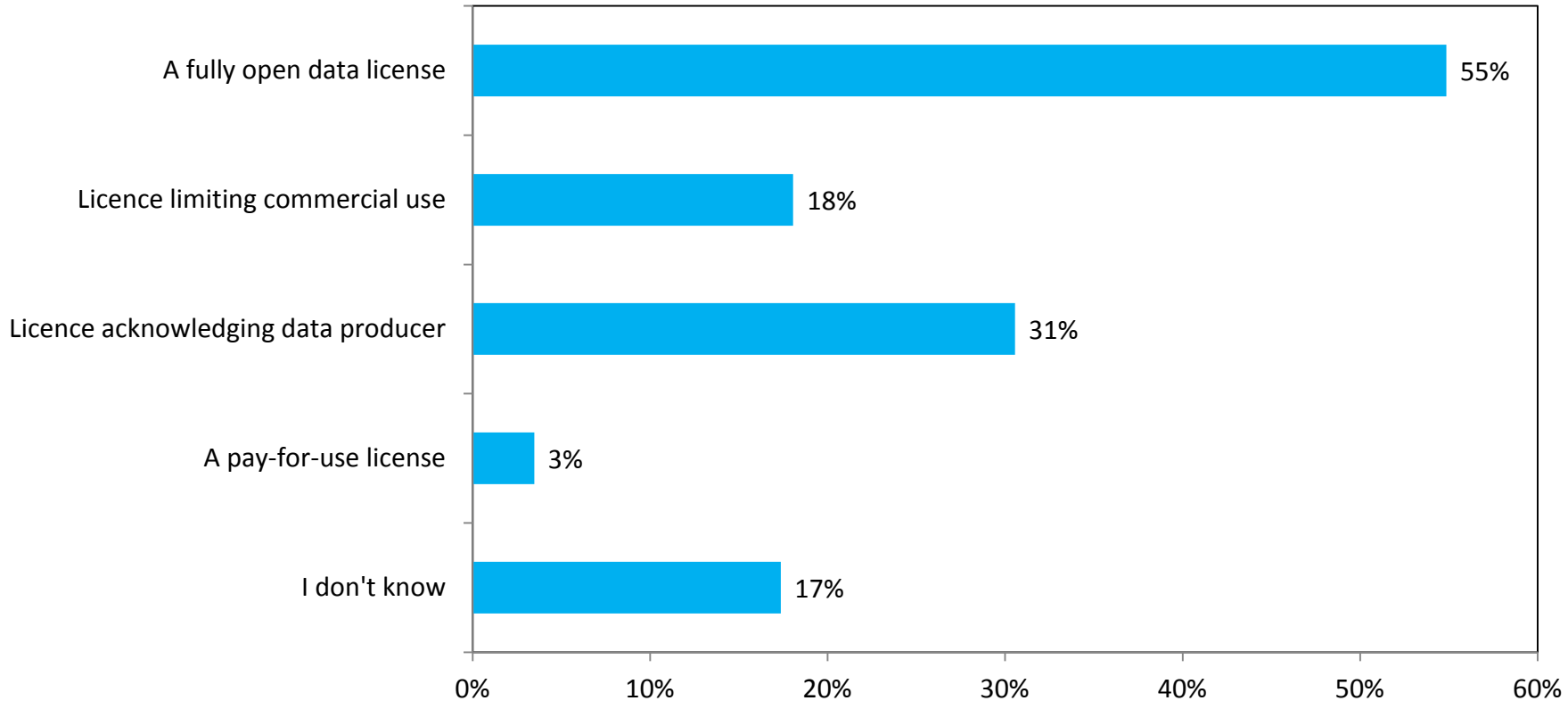
At how many locations do you sample the variable that you consider most important in your region of interest?



Most respondents are responsible for 10-20 sampling locations.

Survey results – data sharing

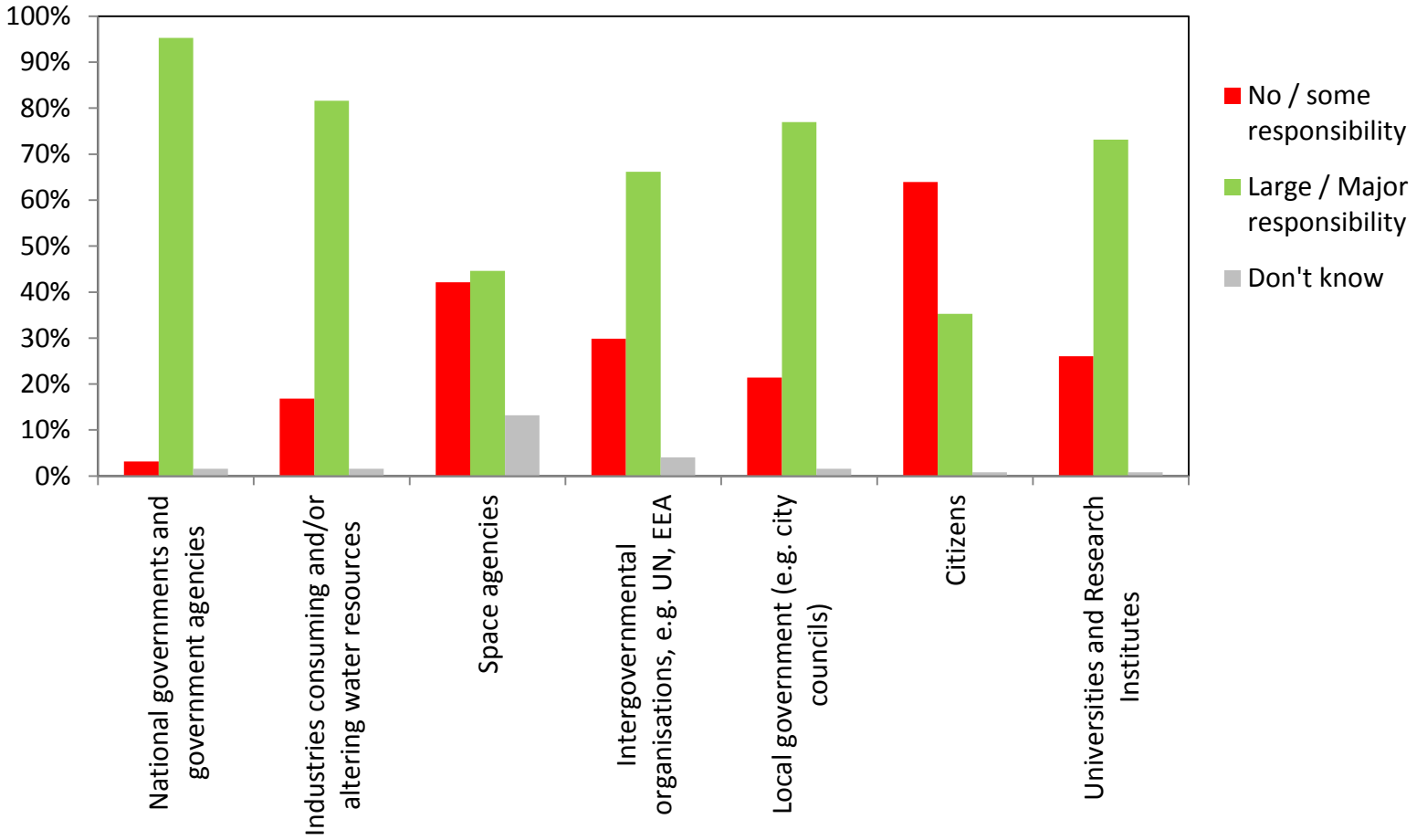
Which license(s) do you consider most suitable for sharing water quality measurements in a (global) observation network?



There is strong support for fully open sharing of in situ data and very little support for pay-for-use. This means that funding for in situ activities needs to be guaranteed to have sustainable operations.

Survey results – funding

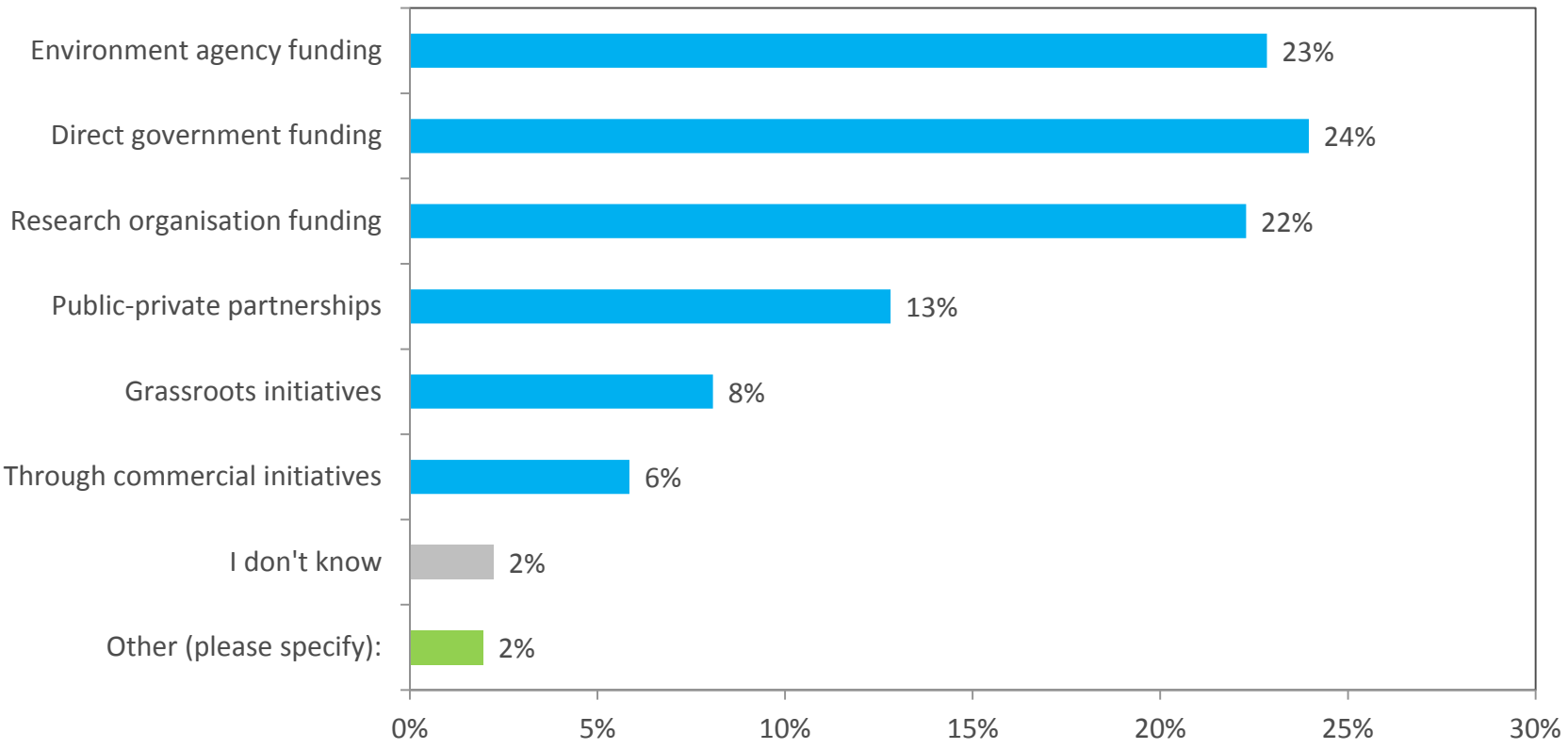
Which organisations and stakeholders are responsible for organizing / carrying out environmental water quality monitoring?



Local and national bodies, industries, research institutes and intergovernmental organisations are expected to lead monitoring efforts, as opposed to citizens and (to some extent) space agencies.

Survey results – funding

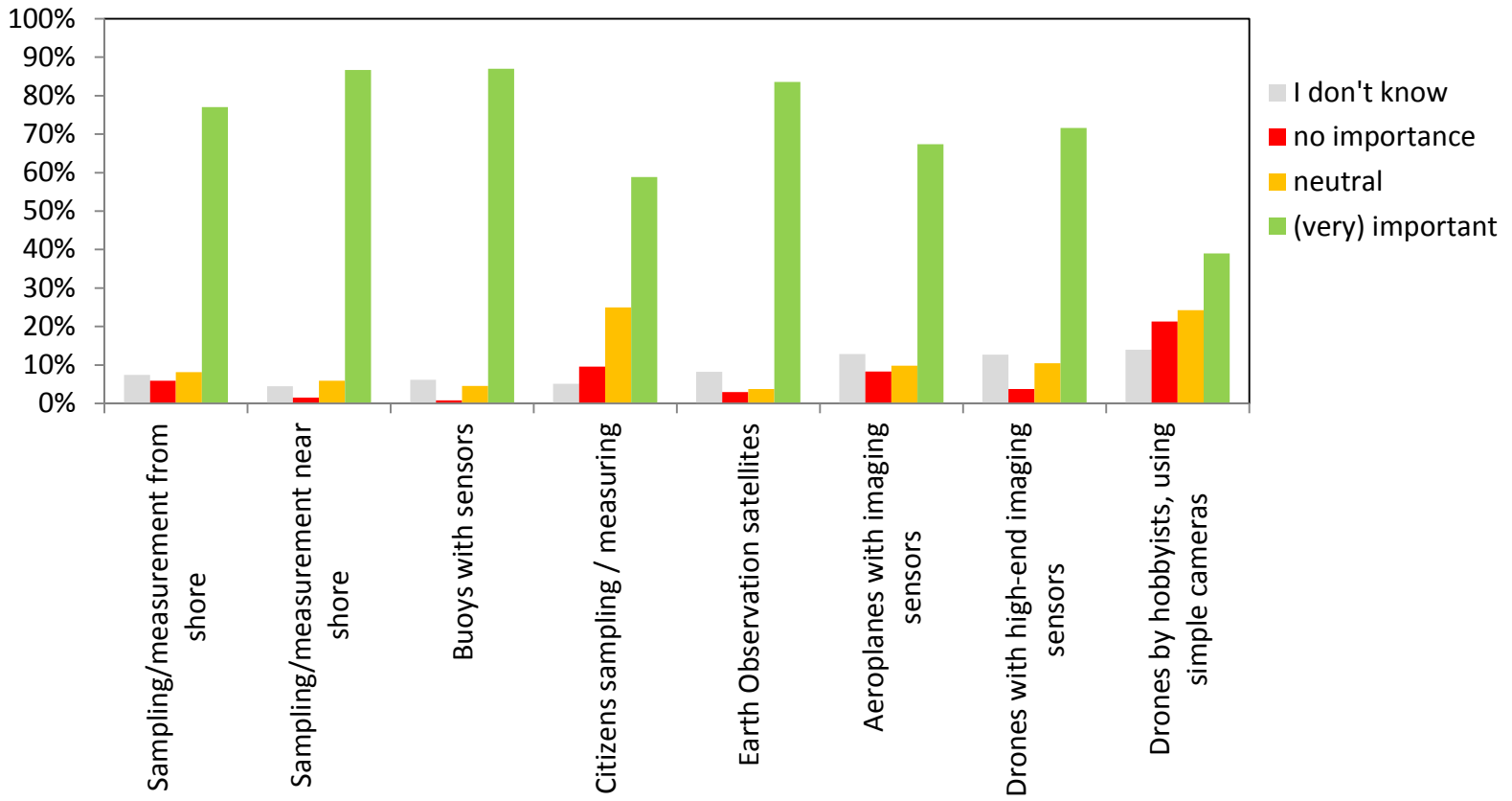
How are monitoring activities funded in your region?



Current monitoring activities are primarily achieved through national / agency and research organisation funds.

Survey results – techniques

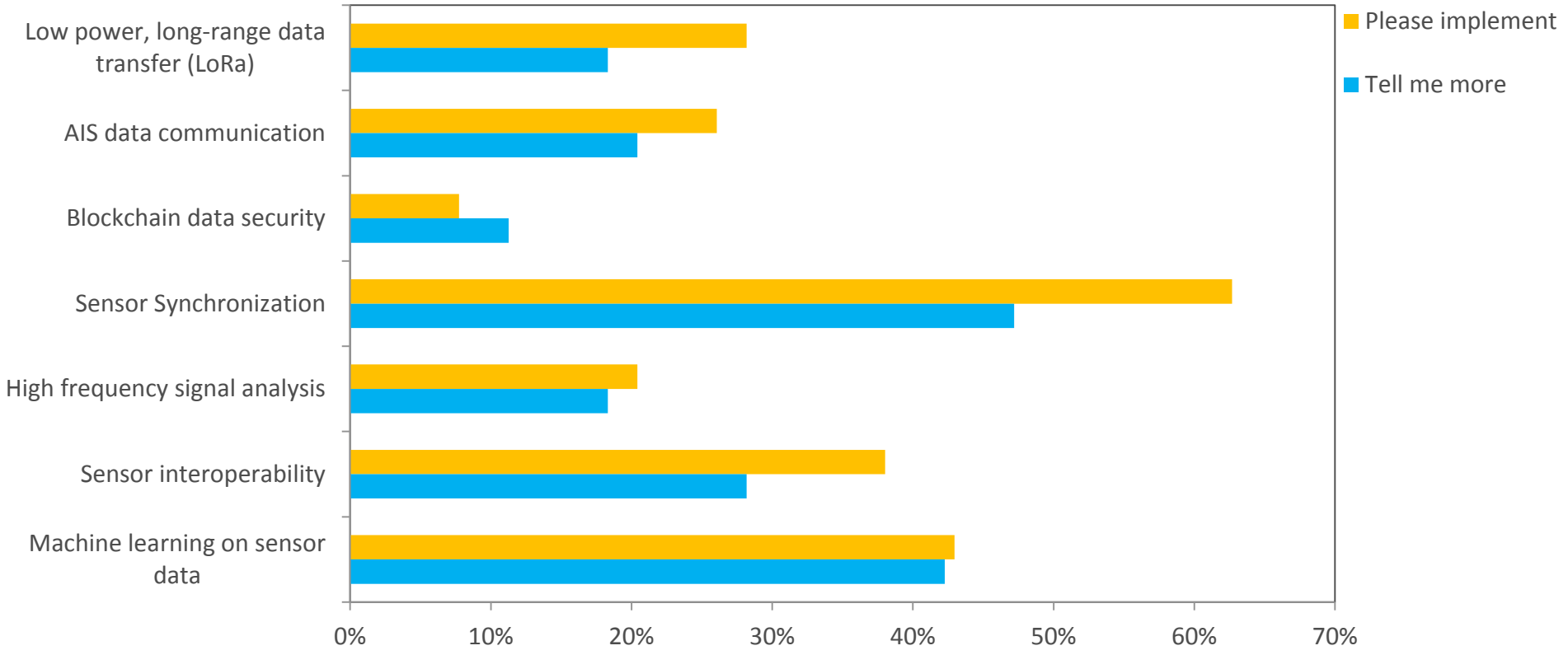
Please rate the (potential) importance of the following methods/platforms for water quality monitoring:



In situ water sampling (manually and buoys) and satellite observation are considered more important than airborne observation and citizen involvement.

Survey results – techniques

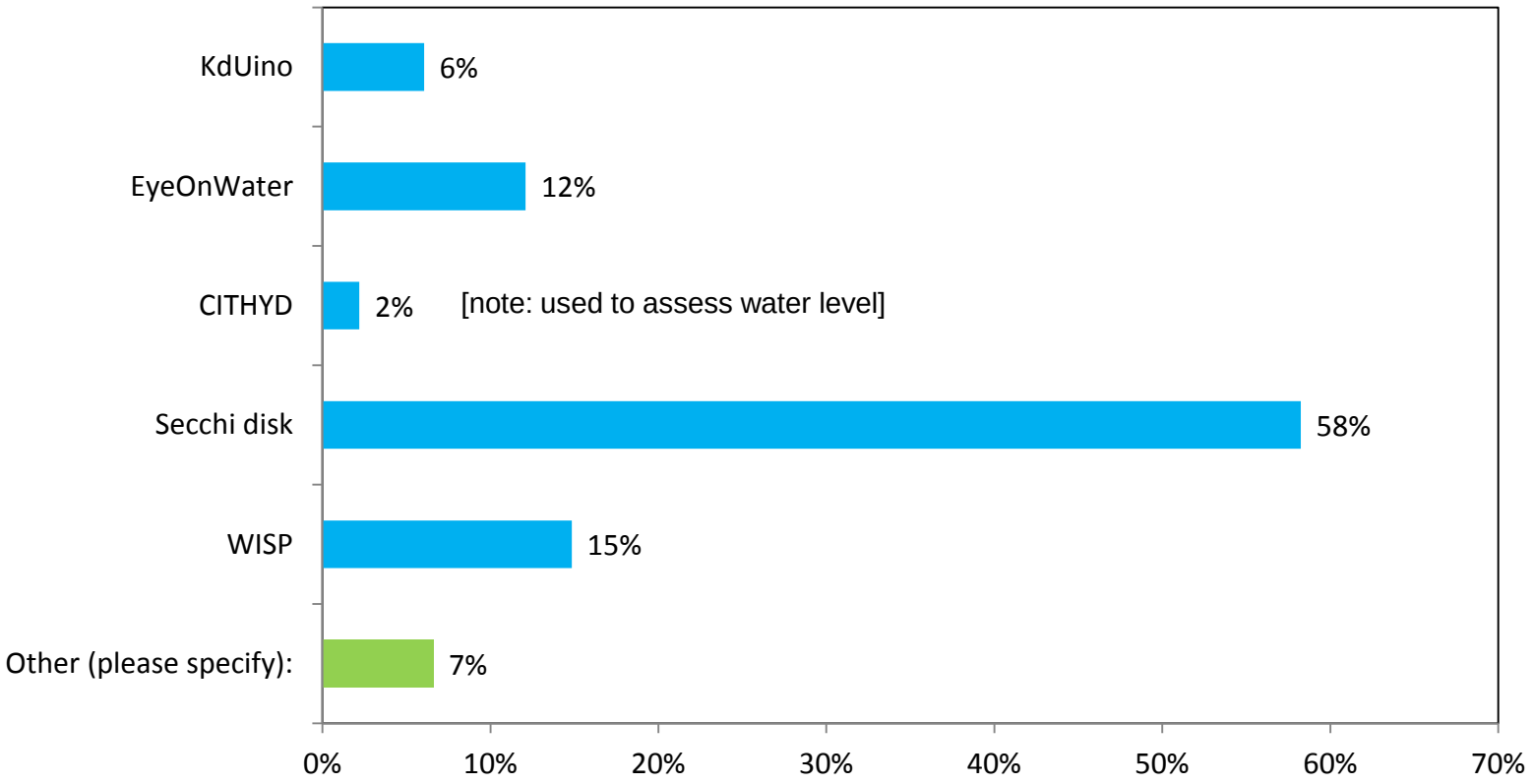
Which of the following techniques would you like to see demonstrated and/or implemented in monitoring networks?



There is particularly strong interest in implementation and demonstration of sensor synchronization within observation networks

Survey results – techniques

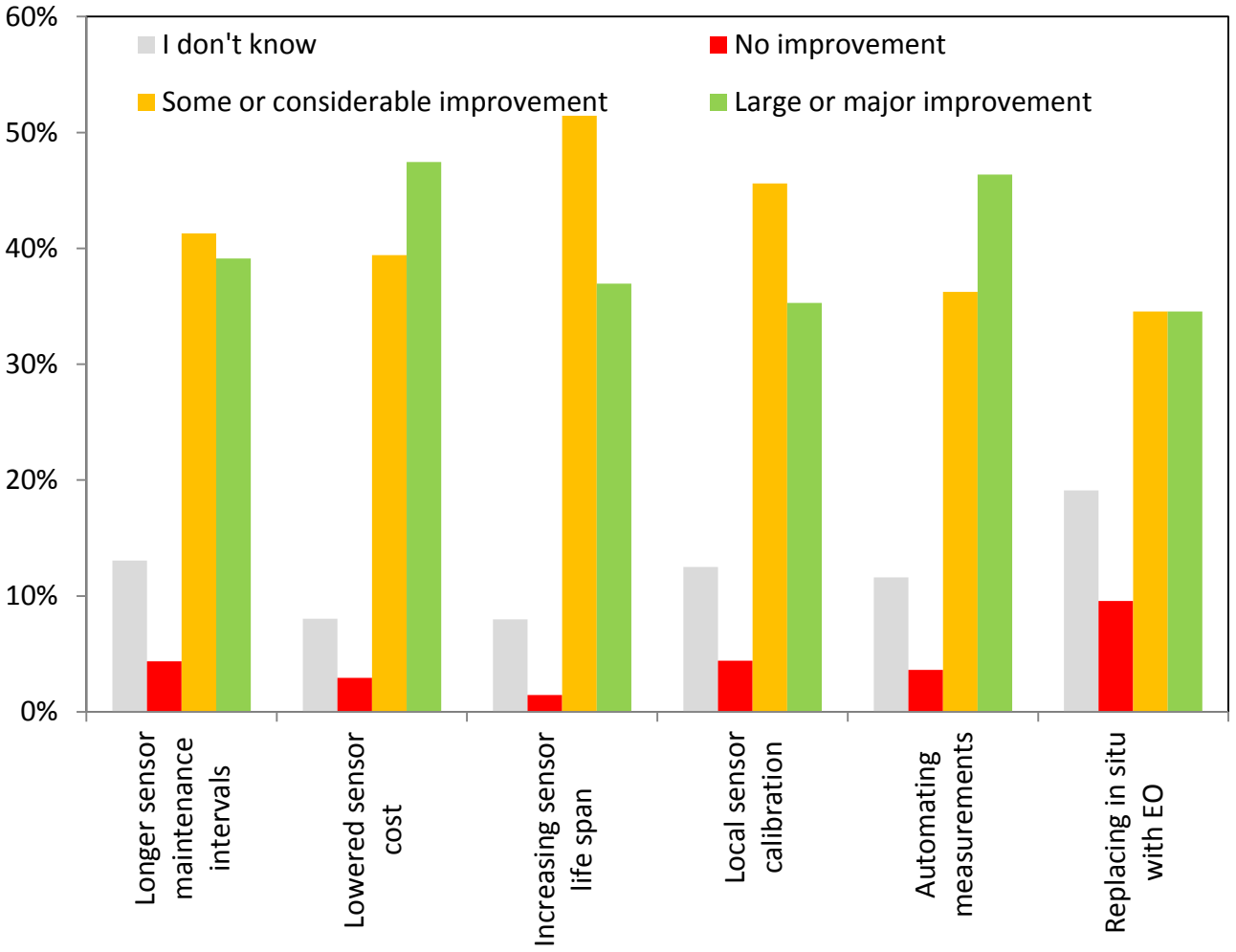
Are you familiar with the following low-cost solutions related to measuring water colour and transparency?



Familiarity with currently available hand-held solutions to measure water colour and transparency is still low compared to the Secchi disk.

Survey results – monitoring cost

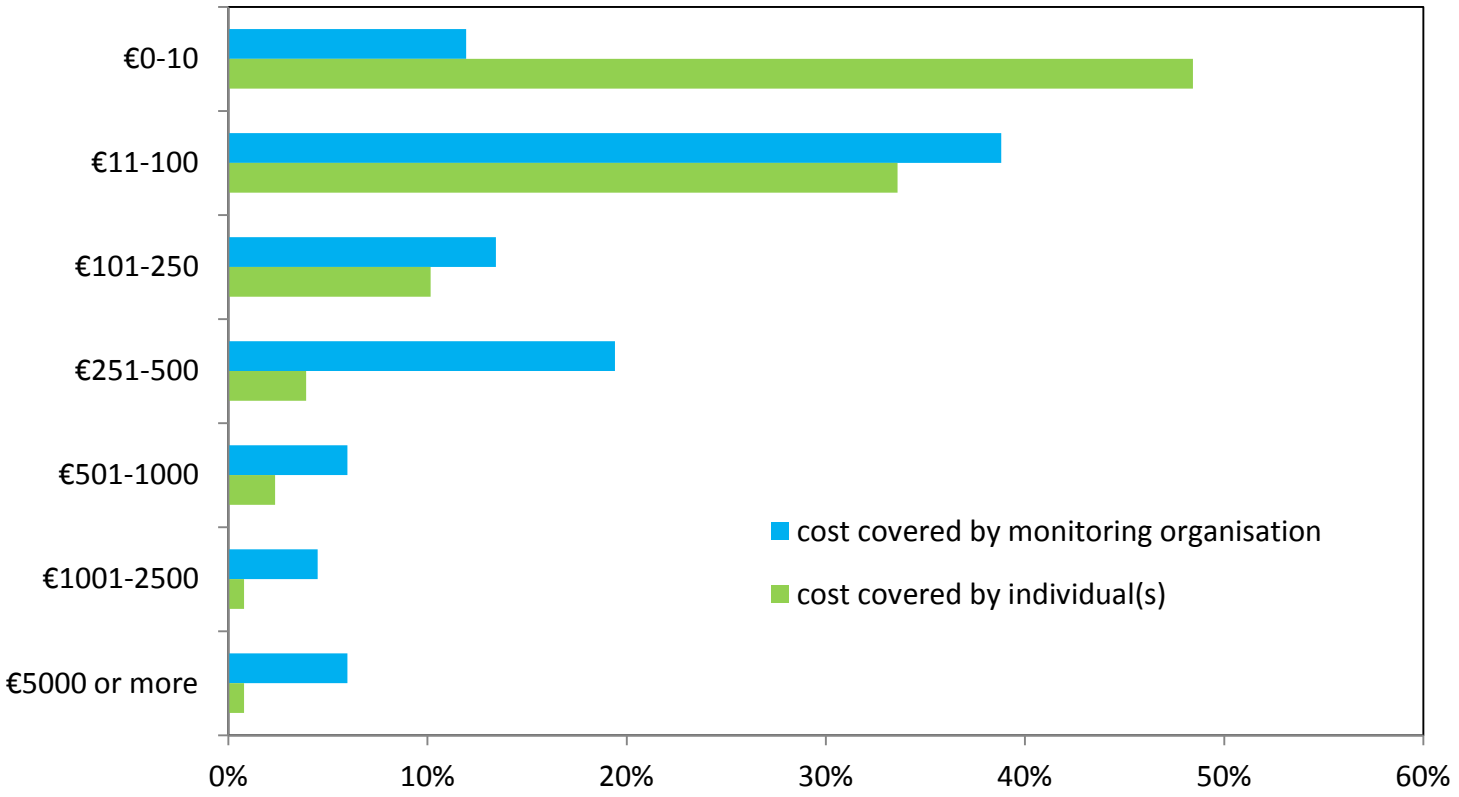
Increasing cost-efficiency in water quality monitoring can likely be achieved through:



Lowered sensor cost and improved automation are expected to give the best improvement on monitoring cost-efficiency.

Survey results – sensor cost

What would be a reasonable price for a sensor operated by a volunteer to measure your main variable of interest?



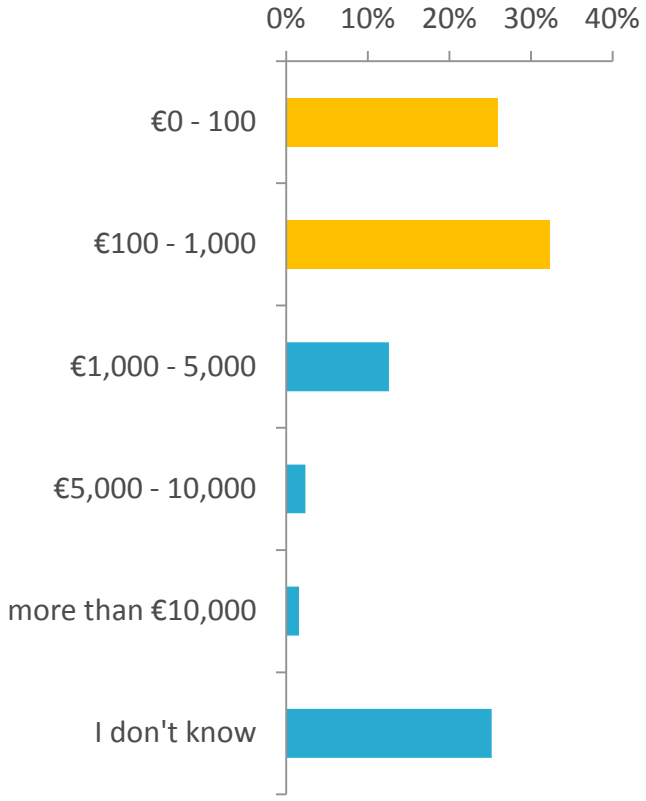
The optimal price point for volunteer-operated sensors is around €10-€100 according to most respondents, with some allowance if it is provided by a monitoring organisation.

Survey results – sensor cost

What is the cost of the sensor that you consider most useful to water quality monitoring in your region?

Purchase cost

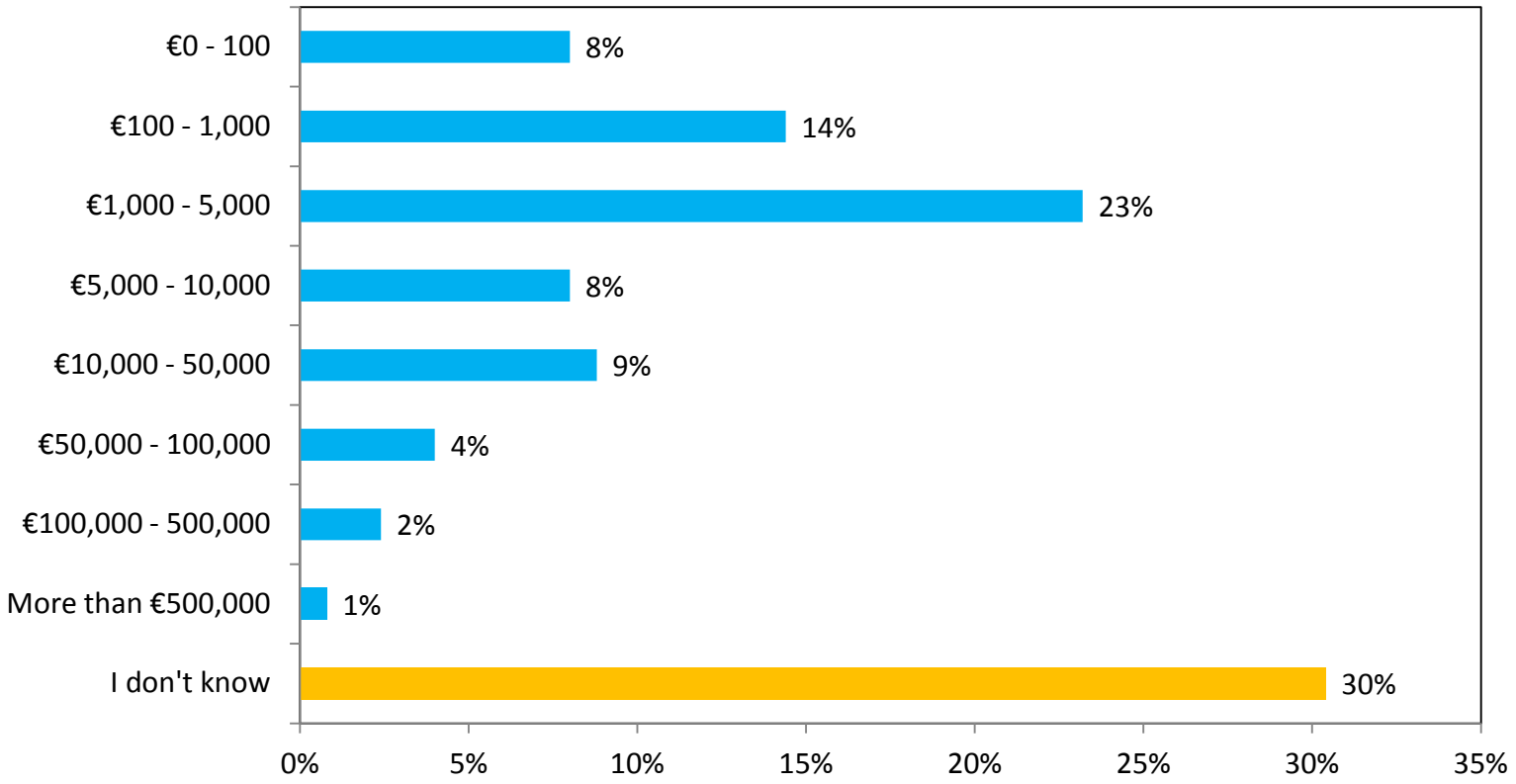
Annual maintenance



There is strong support for fully open sharing of in situ data and very little support for pay-for-use. This means that funding for in situ activities needs to be guaranteed to have sustainable operations.

Survey results – sensor cost

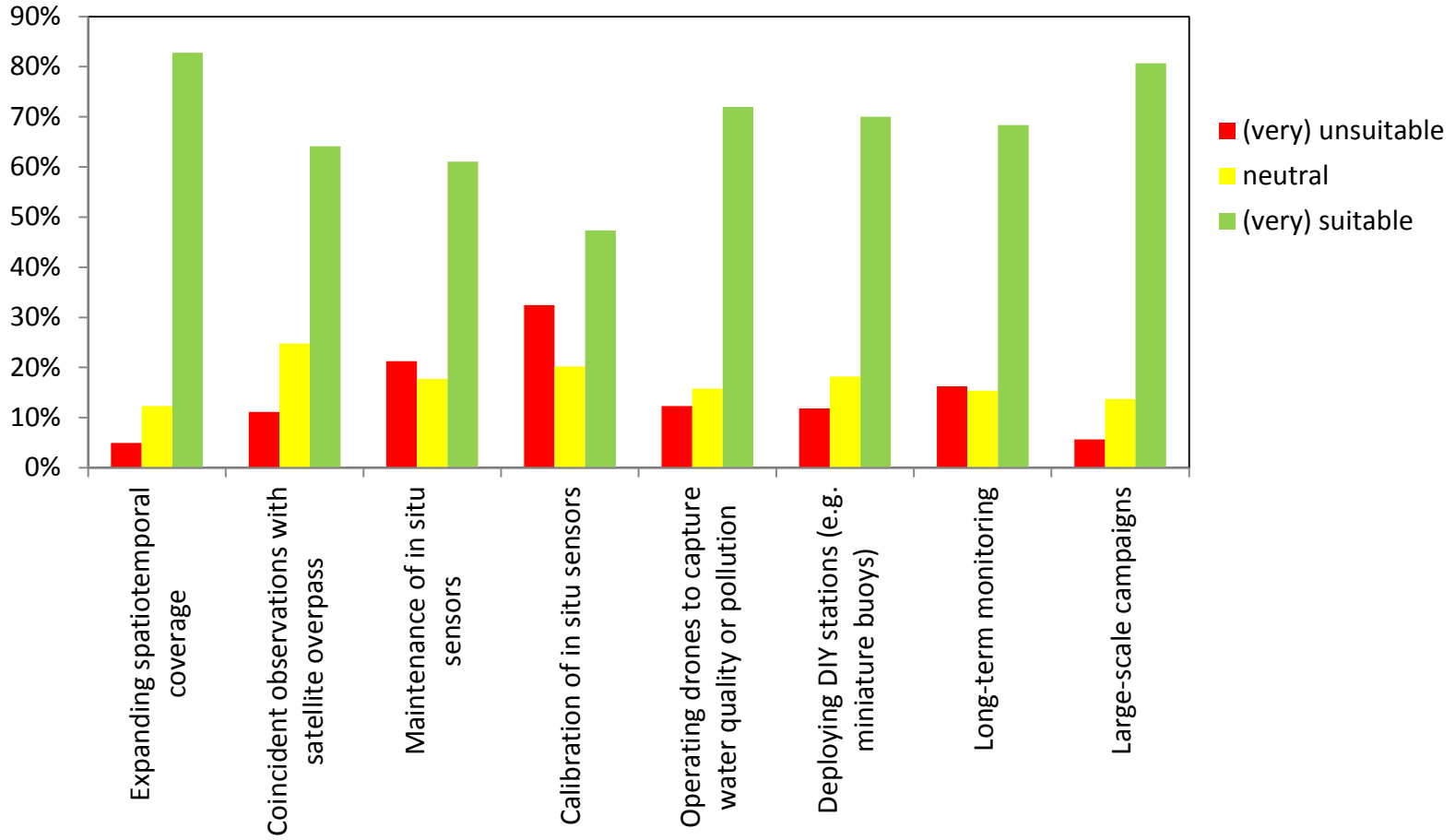
How much do you spend on average on sensors in a given year?



Average annual spending on sensors, for those respondents who had this information, is peaked in the order of €1000-€5000.

Survey results – citizen science

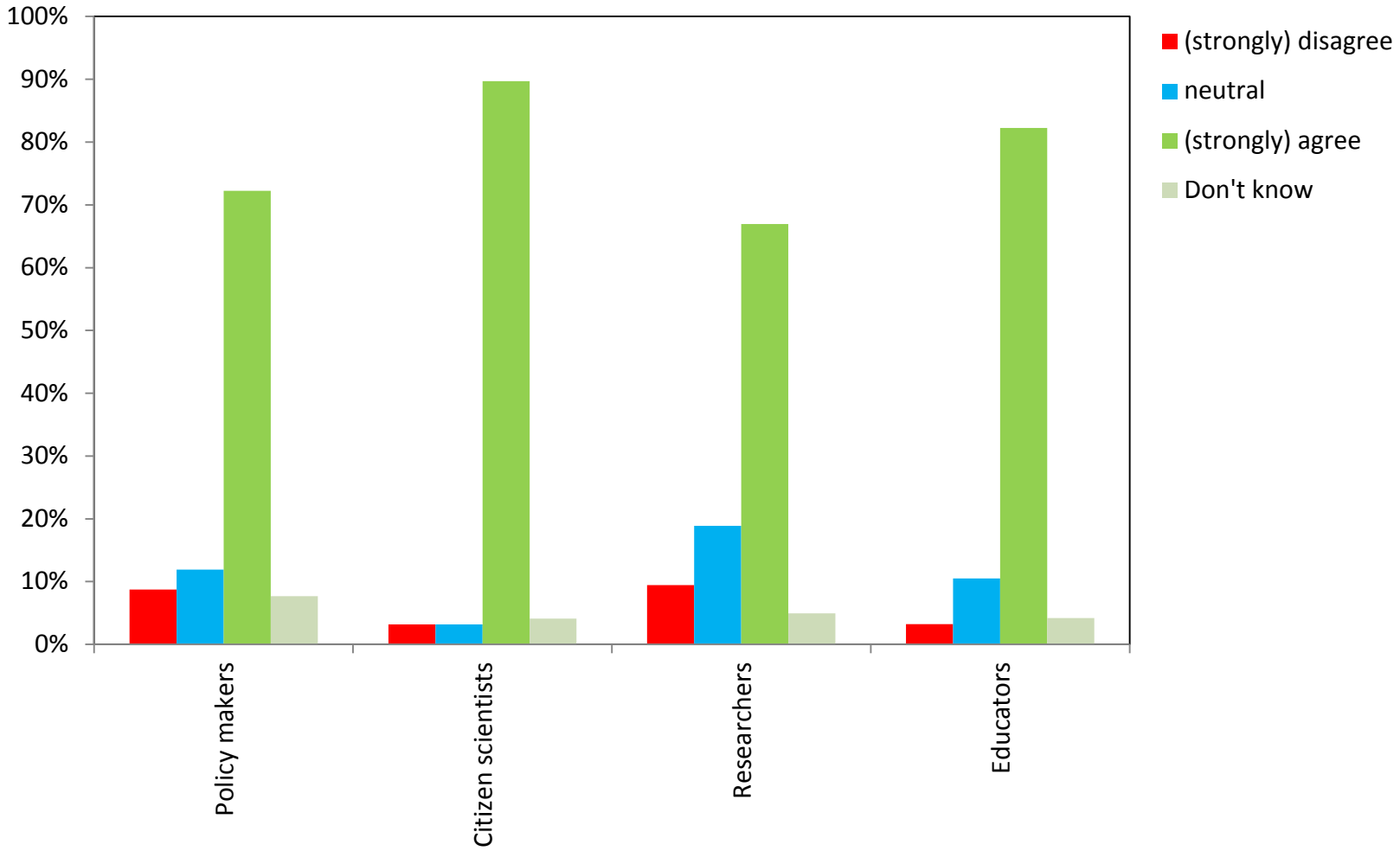
How suitable do you consider citizen science in water quality monitoring in the following situations?



Citizen scientist are primarily considered helpful to expand coverage, particularly in large-scale campaigns. Involvement with sensor calibration is controversial, but sensor maintenance is possible.

Survey results – citizen science

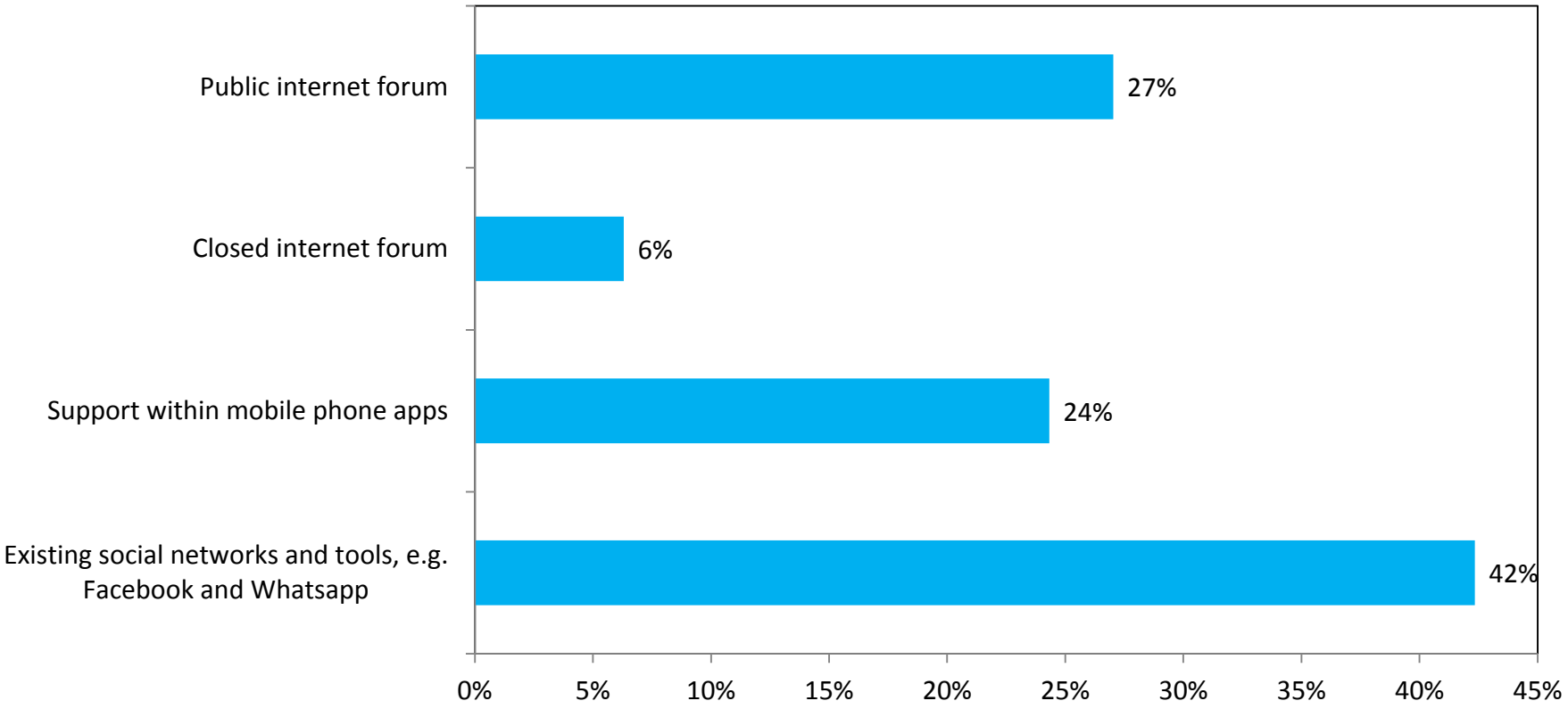
Publishing success stories and best-practises will increase uptake of Citizen Science data and tools with these audiences:



Success stories from citizen science activities are expected to be well received by multiple audiences.

Survey results – citizen science

What is the best way to support communication between participants in Citizen Science projects?

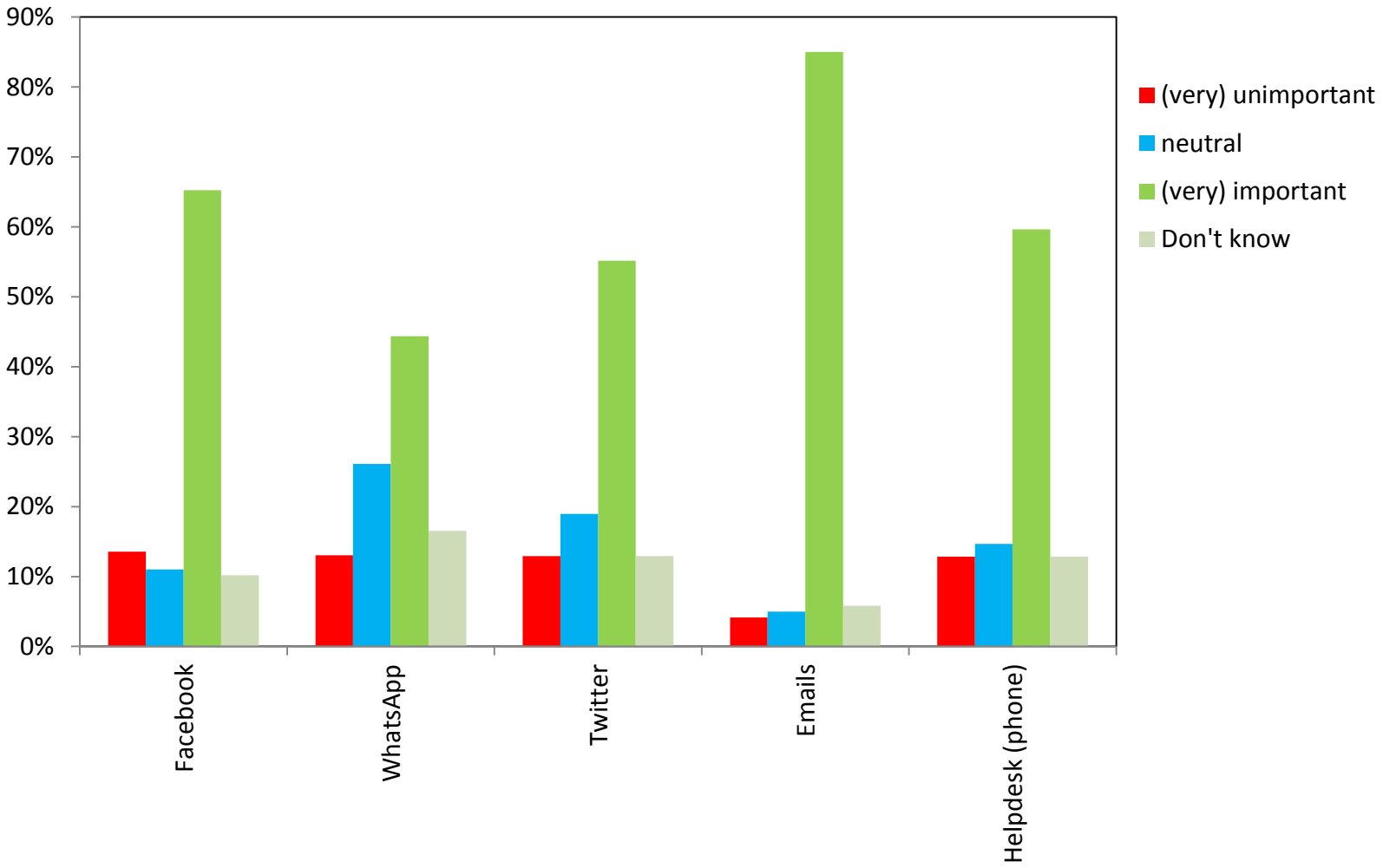


There is strong preference for established social networking tools in communication with citizen science participants.

(continued on next slide)

Survey results – citizen science

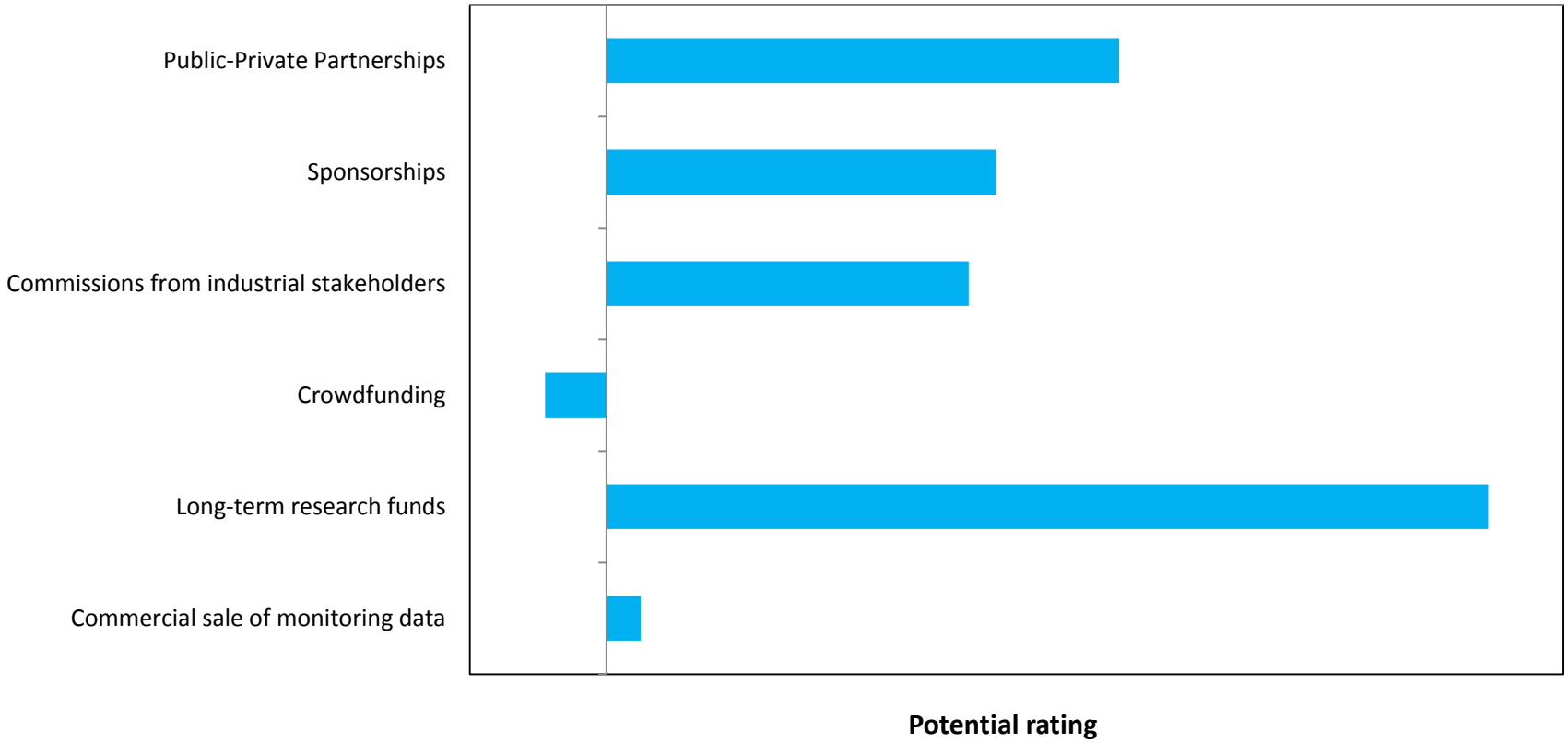
Rate the following mechanisms in terms of their importance to provide information and tips in citizen-science projects:



At the same time, traditional means (helpdesk, email) are considered essential to provide support in citizen science projects.

Survey results – funding

Please rank the following mechanisms for their potential to provide funding for water quality monitoring, in your region:



Research funds are thought most reliable for water quality monitoring, followed by sponsorships, commissions and public-private partnerships, in contrast to crowdfunding and commercial data sales.

Project information

PML Plymouth Marine Laboratory

Universiteit Leiden

vito

GeoEcoMar

CSIC Consejo Superior de Investigaciones Científicas

Water Insight

University of Stirling

EarthWatch Institute

DDQ innovative mobile projects

Sitemark

Peak Design

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