Why do practitioners not use reservoir optimization methods?

Results from a survey of UK water managers regarding the uptake of reservoir operation optimization tools, their views on these tools and an examination of the existing decision making process

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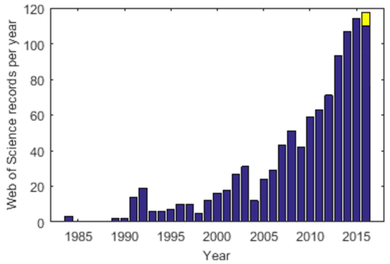
Barnaby Dobson, Francesca Pianosi, Thorsten Wagener | University of Bristol, UK | Contact: barney.dobson@bristol.ac.uk

Reservoir operation optimization can great efficiency gains for reservoir systems, evidenced by many studies. We survey UK water supply companies to determine their operation methods and uptake of optimization methods. The results suggest a difference in the 'paradigm' of operation between research and practice

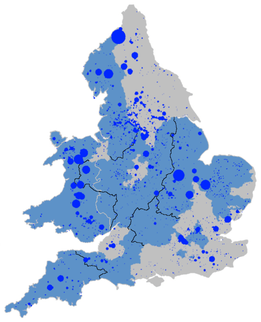
1. Reservoir operation optimization is an increasingly active field of research

More articles are being published on this topic each year (right). However, little is known about the use of optimization in practice; research into uptake is required to show the practical importance of the field.



2. Our aim was to determine whether these tools are used in practice, and why (not)

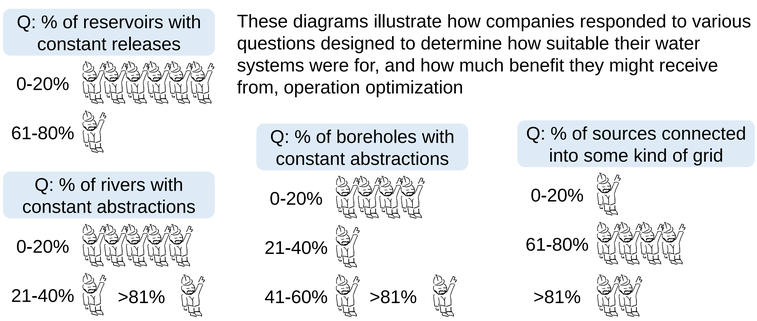
Based on a series of pilot interviews, we decided to create a questionnaire based survey. This survey reached 7 water supply companies across England and Wales. The survey had 5 sections to asses both current and potential uptake.



[Right] Respondents operate over 40% of the total England and Wales storage capacity (dark blue circles within the blue regions, circle size relates to reservoir capacity)

3. Results indicate the UK water industry could benefit from operation optimization

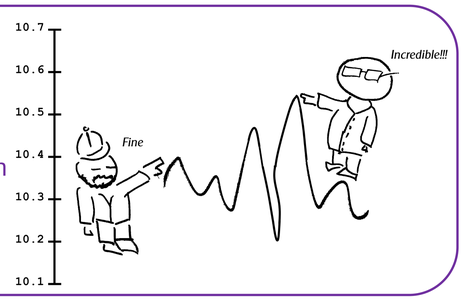
These diagrams illustrate how companies responded to various questions designed to determine how suitable their water systems were for, and how much benefit they might receive from, operation optimization



4. We found that practitioners' priorities do not necessarily align with research focuses

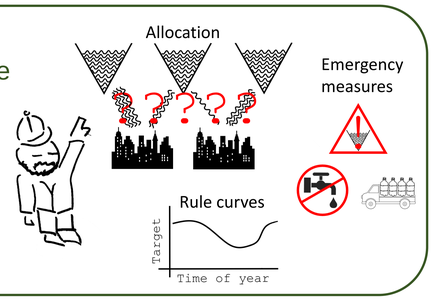
(a)

No respondent considered global optimality an important software feature



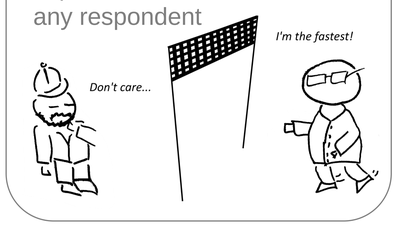
(b)

Allocation problems were the most commonly defined purpose of operation optimization

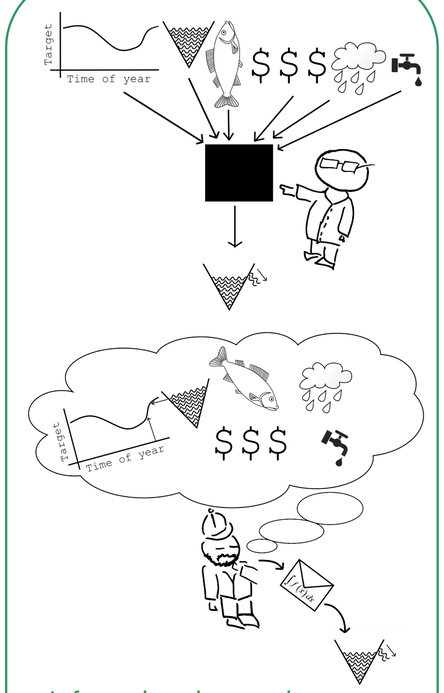


(c)

Speed was not considered an important software feature for any respondent



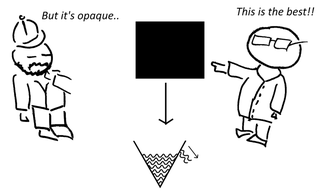
(d)



Informal and expertise based decision making is used in practice. This may explain why knowledge transfer was cited as the biggest problem of the decision making process

(e)

Policies are a key research tool in operation optimization. No such concept exists in practice. Rule curves are the closest parallel to policies, yet these are informally incorporated into decision making while polices use automated decision making

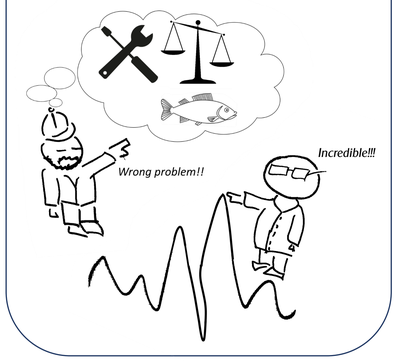


(f)

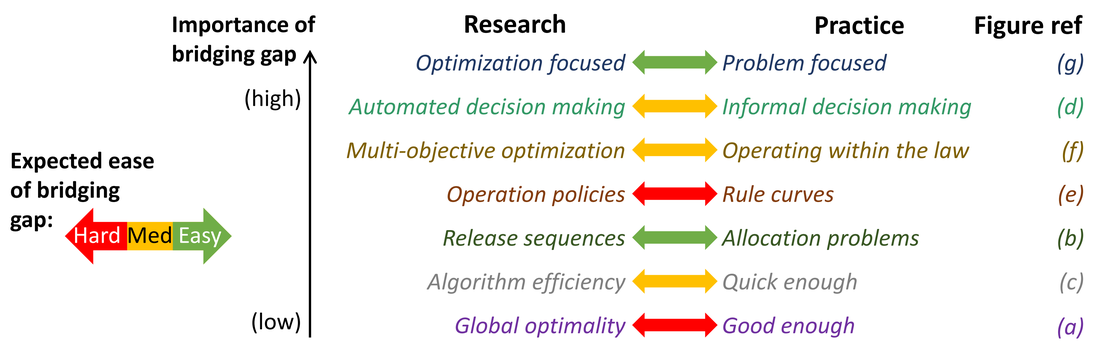
Respondents listed a wide range of different concerns for their water systems including climate change, environmental and legal regulations, or maintaining assets

(g)

A common complaint about simulation models was their simplistic physics



5. We can conclude that a distinct gap exists in the definition of operation between research and practice for a variety of reasons



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