A behavioural approach to communicating bathing water quality

Research report

February 2025

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Dr Robert Bradburne
Chief Scientist

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1 Executive summary

1.1 Background

Bathing in poor quality water has been linked to adverse health effects. For example, numerous studies have shown a causal relationship between gastrointestinal symptoms and recreational water quality, as measured by levels of faecal indicator organisms (e.g. Wiedermann et al, 2006). The risks associated with bathing in such water need to be communicated to the public in a clear and effective way.

Currently, the main official channels through which bathing water quality information is communicated are signage at designated bathing locations, and online via the Swimfo website[1].

This research, commissioned by the Environment Agency (EA) and the Department for Environment, Food and Rural Affairs (Defra) and conducted by Kantar Public UK's Behavioural Practice, aimed to identify potential ways to optimise existing communication channels, and to highlight additional opportunities for disseminating bathing water quality information.

This was a small project with limited scope, and further research would be necessary to inform the optimum modifications for existing communications and to find the best potential options for new communication channels or other interventions.

This is a piece of standalone research and not a commitment from the EA or Defra to implement any of the suggested interventions.

1.2 Methodology

The first stage of the research involved a Theory of Change workshop with colleagues from the project team and other relevant teams from within the EA and Defra to define the nature of the problem faced.

In addition to the Theory of Change workshop, Kantar Public conducted two evidence review sessions with EA colleagues to gather existing knowledge on bathing water quality

[1] Swimfo is an Environment Agency website which provides information on water quality at designated bathing waters: https://environment.data.gov.uk/bwq/profiles/.

information communication, alongside a rapid evidence review of 12 papers from the relevant academic and grey literature identified via searches on Google Scholar. The 12 papers were selected based on assessment of their quality and relevance to the project. An adjacent country review of initiatives in the USA and Germany was also conducted to provide supplementary information about effective interventions in comparable contexts.

The second stage of the research was a small exploratory phase involving depth interviews with eight expert stakeholders working in the field of risk communication, and with a small sample of six outdoor bathers. The purpose was to explore issues related to communicating bathing water quality information from a service provider and a service user perspective.

As sample sizes were small, the findings in this report should be viewed as hypotheses which require further investigation, rather than conclusive evidence.

1.3 Findings

Findings from this small scoping study indicate some potential factors contributing to low levels of engagement with bathing water quality information (Quilliam et al, 2019), including a general lack of understanding and awareness of the issues surrounding poor water quality. From the literature and interviews, water quality does not appear to be a priority factor in decisions to bathe, and that the focus may instead be on having an enjoyable experience. Findings from the literature and interviews also indicated that positive associations with outdoor bathing and past experiences of bathing without experiencing adverse outcomes may also decrease propensity to seek water quality information. The research suggests that bathers, instead of researching water quality, may use quick heuristics or ‘rules of thumb’ to determine whether it is safe to bathe. Finally, some bathers and stakeholders interviewed in the study felt that they have a right to bathe in outdoor waters, and believe it is the responsibility of government and water companies to ensure that water is safe to bathe in.

Although the scope of our study was small, the interviews and literature review point to some potential *individual difference factors* which may influence how bathing water quality information is likely to be received. These include individual risk appetites, as well as demographic factors (e.g. Hagle, 2015, Spiegelhalter, 2017). Regular bathers are a particular group who, according to the research, may be less inclined to change their behaviour in response to bathing water quality information. This is because interviewees felt that regular bathers may see outdoor bathing as part of their ‘identity’, be more confident in their own abilities to determine water quality and feel their enjoyment of bathing outweighs concerns over negative consequences.

Three *situational context factors* emerged as possible determinants of bathing decisions: whether the location is familiar or unfamiliar, whether the trip is spontaneous or planned, and the social group with which the bather is bathing. The key outputs from this research include three *user journeys* structured around each of these situational contexts, which

illustrate considerations and influences for “hypothetical” bathers at each stage of their bathing user journey. The user journeys are available in Appendix E of this report.

To maximise their effectiveness, water quality communications should adhere to key principles for good risk communication. Expert stakeholder interviews and our literature review identified eight principles which could be used to enhance existing channels or to develop new forms of communication for water quality information. Specifically, communications about bathing water quality need to be easy to access, timely, good quality, easy to interpret, actionable, relevant to users, consistent and delivered by the best messenger.

Based on this research, we recommend some options for raising awareness of the need to use bathing water quality information and provide specific suggestions for targeting bather groups. The options include optimising current channels of communication, tapping into community networks to reach active bathers and providing well-signposted and simple information to occasional bathers. Further research would be necessary to explore which options are likely to be most effective.

2 Background

2.1 Context for the research

Effective communication about water quality is essential for enabling bathers[2] to make informed decisions and to protect their health. Bathing in poor quality water has been linked to adverse health effects. For example, numerous studies have shown a causal relationship between gastrointestinal symptoms and recreational water quality, as measured by levels of faecal indicator organisms (e.g. Wiedermann et al, 2006). The Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency (EA), along with Local Authorities (LAs), are responsible for providing information on water quality so that people can make informed choices about bathing safely. LAs are required to display information about bathing water quality at designated bathing waters, whilst the EA is required to use appropriate media and technology to disseminate bathing water quality information.

Research suggests that public awareness of bathing water quality information is low, as is understanding of the signs and symbols used to communicate information (e.g. Quilliam et al, 2019). The number of bathing locations is increasing with some rivers being designated

[2] By bathers, we mean individuals who are immersing themselves partially or fully in outdoor water for swimming or paddling.

as bathing waters, and interest in the activity is growing (e.g. Defra 2023. This makes it even more important to communicate water quality information so that bathers receive or seek information at a time and in a manner that allows it to have impact on their decisions. There is therefore a need for evidence and insight that can support the design of more effective communications approaches.

2.2 Research objectives

The EA and Defra are keen to explore the issue of bathing water quality communications – from understanding communications needs and opportunities through to measuring the effects of communications interventions. This involves understanding more about the specific behaviours related to bathing, including how bathers seek information and make decisions about whether to enter outdoor bathing water.

This research, commissioned by the EA and Defra and conducted by Kantar Public UK's Behavioural Practice, aimed to explore the issue of communications on bathing water quality in England, from understanding specific communications needs and opportunities through to looking into the effects of communications interventions.

For this research, the requirement was to focus on three overarching research questions:

- RQ1: What do we know about behaviours of bathing water users?
- RQ2: What interventions have been successful in similar contexts?
- RQ3: What is our Theory of Change or user journey/experience? Where are the best opportunities for interventions?

This report provides initial answers to these questions, but is limited in scope due to the small sample sizes used, so also raises questions for further exploration. All findings in this report should be viewed as hypotheses which require further investigation, rather than conclusive evidence.

3 Methodology

3.1 The DEEP Model & Methods Used

Kantar Public UK's Behavioural Practice uses a four-stage project lifecycle – DEEP: Define, Explore, Execute and Prove. This project focussed on the 'Define' and 'Explore' phases, which are outlined below:

- The *Define* stage served to provide an initial understanding of the context around bathing water quality information, and to identify the specific issues that needed addressing through research as well as any comparable areas of best practice that Defra and the EA can draw from.

- The *Explore* stage provided a more thorough understanding of the problem of communicating risk information to the public and best practice in this area. It also sought to understand the user journey of bathers including the main touchpoints with information along this journey.

3.2 The Define Stage

The initial *Define* stage of this research sought to identify the specific problem that Defra and the EA were looking to address, to build background knowledge of the issues surrounding bathing water quality information to identify what has worked in comparable contexts (both in other risk areas and other countries). It also sought to build an initial Theory of Change diagram, to be refined upon completion of the research.

The research activities included in the *Define* stage are outlined below.

3.2.1 Definition of a problem statement and Theory of Change

Kantar Public held an initial workshop with colleagues from the project team and other relevant teams within the EA and Defra to define a problem statement to guide the remainder of the work and to create an initial Theory of Change that would be developed further during the course of the project. The agreed problem statement was:

Many people do not access or consider information about water quality before deciding to enter the water.

This project was therefore intended to explore how to improve the salience, accessibility and usage of bathing water quality information at the most influential points in the bathing user journey.

The final Theory of Change diagram is available on request by emailing: research@environment-agency.gov.uk

3.2.2 Evidence review interviews

We conducted two evidence review interviews with EA colleagues (three colleagues per session) to gather knowledge on existing water quality initiatives and information communication, and to establish key knowledge gaps.

These sessions were conducted online via Microsoft Teams and used a semi-structured guide developed by the Kantar Public research team. Findings from these interviews were written up and fed into a brainstorming session with the research team which informed the development of the initial draft Theory of Change.

3.2.3 Rapid evidence review

Following these interviews, we conducted a rapid review of literature including academic and grey literature around how risk is communicated in parallel fields. We reviewed a total of 12 papers, a full list of which can be found in Appendix A.

We identified the papers for the rapid evidence review via Google Scholar using the following search terms:

1) “swimming” and “water quality” and “risk communication”, since 2015
2) “health risk communication” not “pandemic” or “covid”, since 2015

The purpose of search string 1) was to source recent papers that are most relevant to the specific topic of outdoor bathing water quality information. The purpose of search string 2) was to source recent review papers on broad health risk communication and papers on communication approaches that may have applications to communicating bathing water risk.

We selected papers based on assessment of their quality and relevance to the project. Three researchers made these assessments individually and chose the most frequently selected papers to be part of the final 12.

We extracted findings from the 12 papers into an analysis template created by the research team. The project lead then synthesised the findings for use in the written reports.

3.2.4 Adjacent country review

Alongside the literature review, we conducted a review of policies and activities in countries similar to the UK (USA and Germany) to build an understanding of how bathing water quality information is communicated in comparable contexts. The purpose of this review was to identify common practice with the UK and examples of where bathing water quality information is communicated differently.

We selected the USA and Germany for the adjacent country review as these countries were known by the EA and Defra teams to have examples of good bathing water quality information communications approaches, and produced content in languages in which the research team had proficiency.

The information was collated via an internet search of publicly available resources from the USA and Germany, and for each country the most relevant tool or approach was selected to be written up into a case study. The case studies are available in Appendix D of this report.

3.3 The Explore Stage

The *Explore* phase of research included interviews with stakeholders to gain insight into best practice in risk communication, and with a small sample of bathers to build an initial understanding of the bathing user journey.

3.3.1 Stakeholder interviews

Kantar Public engaged with eight government and third-sector bodies and independent experts in risk communication to share their expertise.

We selected stakeholders for their expertise in communicating risk to the public, either specific risks around outdoor bathing or comparable risks related to health or environment. The selected stakeholders included a spread of those with direct experience of communicating risks to the public, and those with more theoretical or academic knowledge of risk communication.

The selected stakeholders were contacts of the EA and Defra and were recruited via email. The interviews lasted 60 minutes and were conducted online via Zoom or MS Teams between 13 and 24 February 2023.

We conducted stakeholder interviews with relevant staff from:

- two Local Authorities in England;
- one foreign government agency responsible for risk communication;
- three third-sector organisations which communicate with the public about bathing risks;
- one academic with expertise in risk communication; and
- one UK government risk communicator.

These experts shared their perspective on both the challenges and opportunities associated with communicating water quality risks effectively at bathing sites.

Stakeholder interviews were semi-structured and used topic guides which provided prompts for the interviewer to ensure all key themes were covered in sufficient detail.

3.3.2 Bather interviews

We interviewed six bathers (across five interview sessions) to gather insights into the factors that influence their behaviour when visiting bathing sites, particularly regarding water quality.

Bathers were recruited via contacts of the research team, against set criteria as outlined below which were agreed with the Defra and the EA project team. This was to ensure bathers interviewed represented the range of views and characteristics necessary for this research. Interviews lasted 60 minutes and were conducted online via Zoom between 20 February and 3 March 2023.

The bathers interviewed represented a mix of the following:

- bathing locations (lakes, rivers, reservoirs and sea)
- swimming frequency (regular vs. occasional)
- social groups (bathe alone, with friends and/or with family, including children)
- ages and genders.

A full breakdown of the sample from the bather interviews can be seen in Appendix B. Two of the six bathers were a couple who were interviewed together. Again, bather interviews were semi-structured and used topic guides which provided prompts for the interviewer to ensure all key themes were covered in sufficient detail.

As the number of bathers interviewed was small, any conclusions drawn from these interviews should be viewed as hypotheses that could be explored further as part of any future research. Additionally, the sample for this research did not contain any bathers from higher-risk groups or with specific vulnerabilities. Further research would be needed to explore the specific experiences of these groups of bathers.

3.3.3 Thematic analysis of interviews

Interviews from both stakeholders and bathers were recorded and then coded into analysis frameworks (which closely followed the topic guides) by the researcher, who manually noted relevant information and quotes into the relevant cell of the framework. This facilitated a preliminary thematic analysis, which was followed by two workshops amongst the research team, one for stakeholder interviews and one for bather interviews, where the researchers who conducted fieldwork had the chance to discuss the insights from their interviews against the project's goals and objectives. The project lead then analysed the interviews thematically, looking for recurring elements and how they interplayed.

Analysis was structured to inform the desired research report outputs (Theory of Change document, User Journeys and full written report). Due to the small sample of bathers, we did not apply a specific behavioural framework to the findings of this research as any conclusions about particular barriers and drivers to engagement with bathing water quality

information are hypothetical at this stage. Further research would be needed to identify and comprehensively analyse the full range of barriers and drivers to seeking, understanding, using and re-visiting bathing water quality information.

3.4 Research outputs

This research project produced the following outputs:

- A Theory of Change document synthesising findings from across the project
- Three user journeys for each of the identified situational bathing contexts
- A two-hour debrief and workshop session on the key findings for EA and Defra clients
- An accessible written report

3.5 A Note on methodological limitations

The research informing this report was qualitative, and as noted above used small sample sizes. A key limitation of all qualitative research is that results will tend to be indicative, rather than representative, of the population of interest. This is a particular limitation of the bather interviews which were conducted with only six bathers across five separate interviews. Therefore, all findings in this report should be viewed as hypotheses which require further investigation, rather than conclusive evidence.

Resources were available to talk to a restricted number of industry experts and other stakeholders. Interview participants were selected using a purposive sampling strategy, identified through the project team's networks and desk research. Interview participants were selected based on their expertise in risk communication and their relevant knowledge to the project aims. Participants who took part in the interviews may therefore have held specific views on risk communication. Selection bias was minimised through discussion and agreement of potential interviewees with the EA and Defra. We also ensured that experts from a range of organisations and sectors were included in order to provide a range of perspectives on the research questions.

Other evidence that informed this report is also subject to some potential limitations. The rapid evidence review involved 12 papers identified by the Kantar Public research team (listed in Appendix A). The project was not resourced to conduct a systematic review of the literature, so it is possible that other relevant information exists that was not included.

Regardless of these limitations, Kantar Public, Defra and the EA are confident this was the most suitable methodology given the resources available and adequate to meet requirements at this stage. Qualitative research during the Explore stage was key to gaining an in-depth understanding of the context around communicating bathing water quality information, best practice in risk communication, and the bather user journey. Conducting these interviews allowed for a richness of insight, and depth of feedback, which would not have been possible to achieve with a quantitative methodology.

4 Theory of Change diagram

Findings from the initial Theory of Change workshop and other elements of the *Define* stage were consolidated into a Theory of Change diagram. This provides an overview of how the different activities involved in communicating bathing quality are expected to lead to the desired outputs, intermediate outcomes and long-term outcomes in practice. Producing a Theory of Change is an important first step in any behaviour change project as it illustrates how any behavioural interventions are expected to work and can expose any underlying assumptions to be assessed[3]. This includes identifying assumptions which are assertions about the world that underlie the anticipated change process. It is important to note that the Theory of Change summarises hypotheses that have not yet been tested.

The final Theory of Change diagram is available on request by emailing: research@environment-agency.gov.uk.

[3] The Magenta Book, HM Treasury 2020.

5 Current approaches to communicating bathing water quality information

5.1 Bathing water quality information in England: context

The findings on communication of bathing water quality information that are discussed in this report should be considered within the context of other bathing water quality activities carried out by the EA, Defra and other organisations. The relevant activities are summarised below.

5.1.1 Designated bathing sites

The EA carries out a range of activities and collects information about designated bathing waters. There are currently 424 designated bathing waters in England which have been designated under the Bathing Water Regulations 2013[4]. The EA monitors the level of bacterial contamination at designated sites (specifically *E. coli* and intestinal enterococci). The results of this monitoring are used to determine a bathing water's classification each year. The EA also uses the results of this monitoring to drive water quality improvements where needed and to take enforcement action against polluters.

5.1.2 Testing water quality

The EA monitors water quality at designated bathing sites from May to September each year to determine water quality classification against standards set in the Bathing Water Regulations 2013. Assessing the quality of the water regularly enables the EA to identify potential health risks, to provide information on water quality to the public and to take appropriate action, such as issuing pollution risk warnings.

5.1.3 Bathing water classifications

Bathing waters in England are classified into four categories: 'excellent', 'good', 'sufficient' or 'poor', based on the levels of faecal indicator organisms (microorganisms associated with faecal pollution, namely *E. coli* and intestinal enterococci) detected in the water. This classification system is intended to provide an easy way to communicate bathing water

[4] The Bathing Water Regulations 2013 (legislation.gov.uk)

quality information to the public, as well as a way to monitor quality at these sites over time.

5.1.4 Pollution risk forecasting

Pollution risk forecasting provides an assessment of the risk of reduced water quality compared to 'normal' conditions through a daily assessment of factors previously associated with reduced quality. This forecasting is based on an assessment of a range of factors such as weather conditions, water quality data and historical trends. Information derived from the forecasts is provided to the public, to allow them to make informed decisions about whether to bathe whilst protecting their health by reducing the risk of illness or infection.

5.2 Communicating information

There are a number of ways through which bathing water information is currently shared to bathers.

5.2.1 Swimfo

Swimfo[5] is the EA's online tool which provides access to information about designated bathing waters in England. The website allows users to search for specific bathing waters by name or location, and provides a range of information about each site, including water quality data and any pollution risks or warnings.

5.2.2 Signage

The EA provides information that LAs use to produce signs to place at beaches and other designated bathing waters to provide important information about water quality, pollution risks and other relevant issues. Signage helps the public make informed decisions about whether to swim at these locations, whilst also raising awareness about water quality.

5.2.3 Other channels

In addition to the above, other third-party communication channels include water quality apps such as the Surfers Against Sewage 'Safer Seas and Rivers' app;[6]. These apps provide near real-time information about water quality, including pollution risks and other

[5] Bathing water quality (data.gov.uk).

[6] The Safer Seas & Rivers Service - Surfers Against Sewage (sas.org.uk).

relevant factors, to help bathers make informed decisions about whether or not to enter the water.

Water companies also provide information about water quality at bathing locations within their geographic area. This can be usually accessed through their websites. South West Water, for example, provides an assessment of bathing waters affected by its storm sewage outfalls (WaterFit Live)[7] on its main website, allowing users to access water quality reports and other relevant information.

In recent times, there has been significant media coverage of water quality issues, including pollution and sewage incidents at bathing sites. Such coverage can help to raise public awareness of water quality issues and encourage greater public engagement with efforts to improve water quality.

6 Factors influencing engagement

Findings from the literature, stakeholder and bather interviews suggest there are some key factors contributing to low levels of engagement with water quality information.

6.1 Understanding and awareness of the issue

One factor that might explain a lack of engagement with bathing water quality information is that some people may not recognise that the quality of outdoor water is an issue they should consider. Findings from our rapid evidence review indicate that the public do not always know that bathing waters are monitored for quality (Quilliam et al, 2019).

Even those who are aware that water quality can be a determinant in whether a location is safe for bathing may hold misconceptions about water quality issues and what these mean for them. For example, in a study of a community in the USA, Hagle et al (2015) found some residents incorrectly believed poor local bathing water quality would also impact the quality of their drinking water. While this was not a specific finding of our bather interviews, these interviews suggested that even the more engaged individuals who were aware that water quality can make bathing unsafe did not have a full understanding of the causes and consequences of poor water quality or when or how to check for this.

However, stakeholders suggested that they felt that awareness of water quality issues is increasing, partly as more people are choosing to bathe outdoors since the Covid-19

[7] https://www.southwestwater.co.uk/services/your-water/postcode-search/

pandemic, and also because of recent high-profile media reports of pollution incidents, such as sewage being released by water companies.

Some of the bathers we spoke to assumed that water quality issues must be linked to specific sewage or pollution incidents and were unaware of other reasons for water quality to be poor.

It also appears that some bathers may not be aware of the consequences of bathing in poor quality water. For example, one stakeholder suggested that people do not always report their symptoms to their doctor if they become ill after bathing as they do not make the link between bathing outdoors and their symptoms. This could suggest that understanding and awareness of the consequences of bathing in poor quality water may be low.

6.3 Water quality not a priority factor

For bathers interviewed in this research, water quality did not appear to be a priority factor to consider when deciding whether or where to bathe. Interviews with stakeholders and bathers suggested that bathers and those engaging in other water-based activities (e.g. surfing) tend to base decisions on other factors such as recommendations for a good place for swimming or other water-based activities, and where they think they will have the most enjoyable experience.

Interviews with some bathers and stakeholders also suggested that some bathers are more aware of natural risks, such as tides and waves, as these are more noticeable and considered to carry a greater risk than poor quality water.

6.4 Positive associations with outdoor bathing

Evidence suggests that positive associations that come with outdoor bathing may also push water quality further from a ‘front of mind’ consideration. Bathers interviewed indicated that activities such as outdoor swimming are fun and enjoyable, and they tend to focus on having a good experience rather than thinking about water quality risks.

> *"There's other things going on for people, the beach is usually associated with wellbeing and health so understanding that there are risks is more challenging"*
>
> **Stakeholder, Third sector organisation**

In part, this may be due to the halo effect (Nisbett and Wilson, 1977), a cognitive bias whereby feelings of positivity toward one part of something are extended to all other parts of it. Being in nature and bathing outdoors have many positive associations, so bathers may feel that the quality of the water they are bathing in must also be good. Bather interviews also suggested that bathers may unconsciously downplay negative aspects of their trip such as risks associated with water quality, or even consciously ignore or avoid researching these, in order to preserve the otherwise pleasant and beneficial experience of bathing.

6.5 Using heuristics to determine water quality

Bathers who *are* aware of water quality issues and do keep these in mind when bathing still may not use data on water quality to determine whether it is safe to bathe. The rapid evidence review and bather interviews highlighted that many bathers use *heuristics* (mental shortcuts or 'rules of thumb' that people use to make judgements quickly and easily) to determine whether to bathe.

Evidence suggests that bathers make decisions about entering water based upon their own perception of the water quality, such as how 'clean' it looks (Quilliam et al, 2019), and using sensory cues such as water clarity, colour, objects in the water or odour (Barnett et al, 2018).

This suggests that bathers feel they can 'tell' whether water is safe to bathe in without having to check official data or recommendations; and it may not occur to them that they need to check.

Stakeholder interviews suggested that there are parallels with other risk fields: for example when determining whether a restaurant is hygienic, people use cues based on what they can see, whilst disregarding what may not be directly visible to them.

> *"[With restaurants], something that is a lower food hygiene rating they expect to look grubby"*
>
> **Stakeholder, Government Risk Communicator**

Other social and visual cues such as other bathers already being in the water may also play a role, although this specific influence on decision-making needs exploring further.

6.6 The role of past experience

The review of the literature found that experiential factors such as past negative experiences with water, such as getting sick after bathing, have been shown to drive water quality perceptions (Barnett et al, 2018).

Conversely, bather and stakeholder interviews suggest that positive experiences in the past can lead to similar decisions being taken in the future even when there are continuing risks. If a bather regularly swims in outdoor water without experiencing issues, they may be more likely to carry on doing so, even if they encounter information that suggests the water quality is poor.

As discussed previously, stakeholder interviews suggest that even bathers who do become ill after bathing may not automatically make the link between these two factors, and could therefore remain unaware that they have experienced adverse effects due to bathing in poor quality water.

Our stakeholder and bather interviews and the literature suggest this appears to be a particular issue for regular bathers.

6.7 Right to bathe

Stakeholder and bather interviews suggested that some bathers feel they have a right to use outdoor water as this is a public resource which they have a right to enjoy.

There is a perception among some bathers that water companies and the government should be responsible for keeping water clean. As mentioned previously, poor water quality is largely seen as a human-made problem caused by sewage leaks, which are seen to be preventable and controllable by water companies and government. Some outdoor bathers feel that entities with control and authority should ensure outdoor water is safe for bathing rather than they themselves having to alter their behaviour.

7 Responses to current communication

7.1 Overarching responses to current communications

In addition to being unaware of the issue of water quality risk, interviewees felt that people may be *unaware of existing information* about water quality, and may not know *how or when* they should use this information.

Some limitations appeared to respondents to be common across current forms of water quality information. These include:

- **Not being clearly signposted or visible.** Bathers interviewed were largely not aware of either Swimfo or location-based signage. Some recalled seeing signs on beaches but had not usually paid attention to these, although some bathers did mention noticing prominent signs flagging specific pollution incidents and changing their behaviour in response.

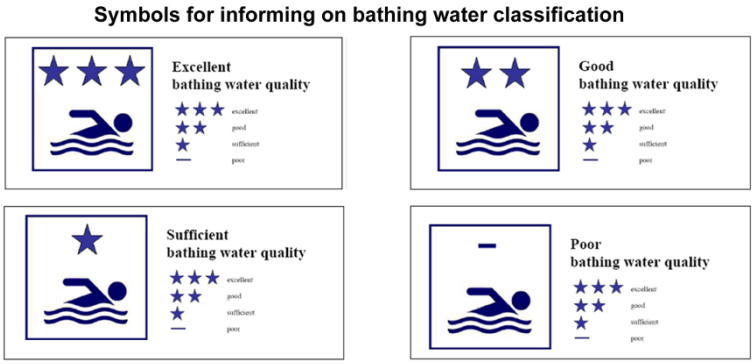
- **Not making risk tangible or actionable.** Bathers and stakeholders interviewed suggested that current communications do not enable bathers to understand the risk posed to them (in terms of gastrointestinal symptoms), and what they can do to avoid these symptoms.

- **Inconsistency between channels.** Stakeholder and bather interviews highlighted that channels can sometimes be inconsistent or display messages in different ways, which can become confusing for bathers and means that bathing water quality information is not intuitive to use.

- **Use symbols that people do not always understand.** The rapid evidence review suggested that bathers do not always recognise the four EU bathing water quality

symbols[8] (see Figure 1) (Quilliam et al, 2019). This means that they do not understand what these signs mean in terms of the risk posed or actions needed to prevent the risk.

Figure 1. Symbols for informing on bathing water classification



7.2 Responses to Swimfo

None of the bathers interviewed were aware of Swimfo, although some knew of similar tools such as Surfers Against Sewage's 'Safer Seas and Rivers' app. Some more engaged bathers found such tools useful for checking bathing water quality but did not do this every time they bathed.

When shown the Swimfo site, bathers interviewed felt that the site contained useful information, but that there is too much information provided, and that the key details such as whether the water is currently safe to bathe in and how long this applies for are difficult to spot. Bathers and stakeholders also suggested that the information provided is not intuitive (for example, they did not always understand the symbols and rating systems) and they did not understand what they should do in response to it.

The age of the information was also questioned. Bathers interviewed were not sure if what they saw was up to date, as the dates displayed for the last available data were not always recent[9]. Alongside this, they were unsure how frequently the quality of water can change and therefore how long such information would be relevant. This suggests that they would not know how often they needed to check Swimfo for water quality updates, were they to use it for real.

[8] The symbols are a requirement of The Bathing Water Regulations 2013 (legislation.gov.uk) and should be used on signs at designated bathing waters.

[9] For example, classifications are from the previous year until a retrospective classification is made at the end of the bathing season.

The rapid evidence review indicates that if information for one swimming location is often poor, people may experience user fatigue and as a result dismiss or ignore information about this location (Quilliam et al, 2019). This suggests that if one bathing location is rated as ‘poor’ for too long on Swimfo, the effectiveness of communicating this may lessen over time. However, this would need to be explored further with users of the Swimfo site.

7.3 Responses to signage

Signs used to display bathing water quality information at bathing sites were more familiar as a concept than Swimfo to bathers and stakeholders interviewed in this research. One potential concern raised by stakeholders is that there is too much information on signs to get the message across clearly to bathers.

The rapid evidence assessment, and stakeholder and bather interviews, all pointed to lack of salience and noticeability being an issue with signage communicating bathing water quality information. Additionally, stakeholders and bathers interviewed suggested that signage on beaches can be crowded and there are a lot of different types of information competing for people’s attention – including other information about safety and different types of water-based hazards, in addition to water quality information.

> *“If you're lucky, people will look at a fixed sign for six seconds, and at the entrance to a beach that is quite a crowded space… safety signage and water quality signage get very lost in the signage pollution.”*
>
> **Stakeholder, Third sector organisation**

Bathers may also assume that the information on signs is outdated. This may be due to the ‘fixed’ nature of signs. Several bathers interviewed reported noticing signs but disregarding them as they assumed they had been there for a long time and did not contain current information.

Stakeholder and bather interviews suggest that people may not understand the timeframes in which water quality can change, with the potential result that bathers who do notice signs may use signs only once rather than repeatedly. Bather and stakeholder interviews suggest this may be a particular issue for regular bathers who may see a sign the first time they visit a site and assume the water quality is fine on subsequent visits.

The interviews and the literature also suggest there are potential issues with the point at which signage is encountered (e.g. on arrival to a beach or river bathing location). At this point, bathers have already travelled to a location to swim and may be reluctant to change their plans, although this would need to be further explored in future research.

8 Audiences for communications

8.1 Individual differences in risk perception

Findings from the literature, stakeholder and bather interviews suggest that some individual and personality factors influence perceptions of water quality risk.

8.1.1 Individual risk appetite

One factor that may drive engagement with bathing water quality information is level of risk appetite, which varies between individuals. This was highlighted in the rapid evidence review (e.g. Hagle et al, 2015; Spiegelhalter, 2017). In our bather interviews, respondents with a higher risk appetite appeared less likely to be concerned about water quality issues, or more likely to see the benefits of bathing outweighing any potential risks. Conversely, those who are more risk averse may be more likely to seek out water quality risk communications and to change their behaviour in response.

8.1.2 Demographic characteristics

Age and gender may also play a role in responses to bathing water quality communications. One study reviewed indicated that women and older adults have higher levels of concern about water quality than men or younger adults respectively (Hagle et al, 2015). Another study found that risk appetite is generally higher among males and younger people (Spiegelhalter, 2017).

8.1.3 Regular bathers

Interviews with stakeholders and bathers suggested that they felt that bathers who regularly swim or undertake another activity in outdoor water do so because they highly enjoy the activity. They hypothesised that they may see it as part of their identity, for example ‘a wild swimmer’ or ‘a surfer’. Interviewees believed that regular bathers therefore have an incentive to continue to bathe, so may be less likely to pay regard to bathing water quality information that may deter them.

However, regular swimmers do appear to be concerned about water quality issues, as indicated in interviews and in the rapid evidence assessment (Barnett et al, 2018). Interviews with stakeholders and bathers suggested that instead of changing their bathing behaviour in response to water quality risk communications, they felt that regular bathers may be more likely to focus their attention on advocating for better quality water and putting pressure on the government and water companies to ensure outdoor water is safe to bathe in. This highlights that people may take different actions in response to similar information.

The stakeholder and bather interviewees believed that regular bathers with lots of prior experience may also be more confident than occasional bathers in their ability to

overcome bathing risks of all kinds. They felt that this may be especially true if they have regularly bathed outdoors without experiencing any adverse effects – their experience of the absence of risk or effect may breed confidence that this situation will apply now and in the future.

8.1.4 Vulnerability to poor water quality: a gap in understanding

Further evidence would also be needed to assess whether those at higher risk of negative impacts from bathing in poor quality water have different concerns about water quality and respond differently to communications. For example, those with compromised immune functioning may be more susceptible to gastrointestinal illness from poor water quality (Boehm et al, 2009). This phase of research did not include any bathers with these types of vulnerabilities, so these individuals should be considered in any future research on the topic.

8.2 Situational factors

Whilst individual factors were found to play a role in responses to water quality communication the evidence collected suggested that an individual can also respond differently depending on the specific context of their bathing trip.

This research identified three situational factors that may influence bathers' behaviour in response to bathing water quality information and the steps a hypothetical bather may take in their bathing user journey. These are: familiarity of the bathing location, the social context, and the spontaneity of the trip.

8.2.1 Familiarity of location

Our research suggests bathers may use bathing water quality information differently depending on whether they are visiting a familiar or a new location.

Bather and stakeholder interviews and the literature suggested that bathers who have swum repeatedly at a location without experiencing issues in the past may not check water quality information because they feel confident that they can safely swim there. Interviewees felt that regular bathers may feel less confident when visiting new, unfamiliar locations, and may be more likely to check information on these occasions.

This indicates that bathers who are bathing in familiar locations and who go there regularly may be a more challenging group to engage with water quality information, as they could focus on previous experience.

8.2.2 Social context

Stakeholder and bather interviewees also suggested that decisions and responses to communications may depend on whether people are bathing alone, with friends or with family.

Some bather interviews suggested that bathing alone may make it more likely for people to seek out and engage with bathing water quality information as they feel less confident in facing the risks. Bathing with a group was felt by the interviewees to provide additional motivation to go through with plans to bathe, even when they may be having second thoughts. Those interviewees who went bathing in a group said they tended to make decisions about bathing as a group, rather than individually.

A third social context for bathing mentioned by interviewees is doing so with family, particularly as a parent bathing with children. Some interviewees talked about occasional family holidays, but others said this might be more regular for those who live near the coast or other bathing locations. Stakeholder interviews suggested that parents may be less likely to take risks than other groups, and could be more cautious in situations where harm may come to their children than in situations where the potential harm is to themselves. This was supported by the bather interviews: parents interviewed reported being more cautious about risks when swimming with their children than when swimming alone or with other adults.

8.2.3 Spontaneity of trip

A third situational factor which was reported to influence bathing decisions is whether the trip is planned in advance, or spontaneous such as deciding to swim after spotting an outdoor swimming location whilst hiking. The bathers we spoke to said they were more likely to stick to decisions they have made in advance. For example, having researched a location and travelled there for the purposes of swimming, interviewees thought that people may be less inclined to change their mind once they arrive.

8.3 User journeys for each situational context[10]

We have outlined bather user journeys for each of the situational contexts outlined above, which can be seen in Appendix E. It is important to note that the user journeys are summarising hypotheses that have not yet been tested.

[10] The FSA Risk Communication Toolkit | Food Standards Agency

9 Principles of effective risk communication

9.1 Summary of principles

To maximise their effectiveness, water quality risk communications should adhere to key principles for good risk communication.

We have identified eight key principles that have emerged as useful for the specific issue of bathing water quality risk. It is worth noting that some of these overlap with the Food Standards Agency (FSA)'s principles for good risk communication included in their toolkit[11]. for communicating food risk to consumers. This toolkit was reviewed as part of the rapid evidence review.

Our research suggests that communications about bathing water quality need to be easy to access, timely, good quality, easy to interpret, actionable, relevant to users, consistent and delivered via the best messenger. Each principle is outlined in more detail below.

9.2 Easy to access

Bathing water quality information needs to be **readily available and clearly signposted**, ideally via channels that bathers are already using as part of their bathing user journey. Our recommendations for how current channels can be made easier to access are discussed in Section 11.

Additionally, it could be useful to explore new opportunities to signpost information in line with existing bather user journeys.

9.3 Timely

Bathing water quality information needs to be **available at the right point in the bathing user journey** – at the time when decisions about whether or not to bathe are being made. Information that comes after this point may be ignored or discounted if it contradicts decisions that have already been made.

One way to ensure communications are timely is to **provide information before people arrive at the beach** (or other bathing location), for example by positioning bathing water quality information in car parks as well as on the beachfront. This would allow bathers to change their decision in response to the information before they have fully committed to bathing.

It is also important that the **timeframe for checking water quality** is clear, particularly as our bather interviews suggest that bathers may not understand the timeframes during which water quality can change. The Environment Agency should highlight to bathers the need to **check the same day as bathing**, every time they are planning to bathe, as a priority message.

9.4 Good quality

Bathing water quality information needs to **reference specific, up-to-date data** as far as possible to make the risk feel relevant at the specific time and location.

The information provided also needs to have sufficient detail for bathers to understand the context behind it. Whilst many bathers may only want the key facts, more engaged bathers may benefit from a greater level of detail on how the water quality is measured and what specifically this means.

Further research may be required to identify which levels of detail are optimal for different bather groups.

9.5 Easy to interpret

Bathers need to be able to **understand the information** and interpret what the risks it communicates **mean for them**. This means making sure the **key message is simple and clear** so that bathers know which information to focus on.

Stakeholder interviews suggested that using a *priority message,* a simple statement which is the key 'take home' or focus point for communications, can be particularly effective. For example, the RNLI have a priority message to 'always visit a lifeguarded beach', which is the one main action that they want the public to pay attention to and remember. Using something similar for bathing water quality communications such as 'always check the water quality before you enter outdoor water' could be an effective approach.

Making communications easy to interpret also includes using **recognisable language** that people can understand. Stakeholder interviews highlighted that this is particularly important for issues like bathing water quality which are communicated using fairly specialist language.

Further research may be needed to determine which terms and phrases are easiest for potential bathers to interpret. One stakeholder suggested, for example, that people may not recognise 'microbial water quality', which could make it more difficult for them to understand and engage with bathing water quality information using this term.

Finally, the **risk of bathing in poor quality water should be made tangible** by mentioning the specific consequences that may occur. Bather and stakeholder interviews suggested that bathers do not always understand what the specific risks of poor water quality are and what this would mean for them.

9.6 Actionable

In addition to the risk being tangible for bathers, communications should also **outline specific actions** that bathers are recommended to take to mitigate the risks. Again, this requires a priority ‘take home message’ for which behaviour will mitigate the risk, for example ‘do not bathe here’ or ‘keep your head out of the water if bathing here’.

Where possible, if the recommendation is to avoid bathing, **suggestions for alternative locations** to bathe should be provided to allow opportunities to change location rather than behaviour.

To ensure maximum effectiveness of communications, further research may be needed to build an understanding of which actions are acceptable to people. For example, regular bathers with no alternative bathing location may not stop bathing completely, but may be persuaded to keep their head out of the water. Understanding this may be useful in maximising the numbers of bathers adhering to guidance on the actions to take.

9.7 Relevant to users

Bathers need to feel that the bathing water quality information they see is **pertinent to their individual situation**. This includes the risk feeling **real and tangible**, and also making sure the information seems like it is **aimed at people like them**. Otherwise, bathers may feel the information is irrelevant and disengage.

Making information relevant includes **targeting information** at those engaging in specific **activities** (e.g. swimmers versus people paddling) or specific **bathing contexts** e.g. holidaymakers or locals swimming in a regular spot, and ideally referencing this targeting in communications.

9.8 Consistent

Sources of information need to **be aligned and not contradict one another**, to avoid confusion and disengagement. If a bathing location is rated as poor by one source but adequate by another, this will **undermine bathers’ trust in the quality of the communication**. Moreover, using the same symbols or rating systems across channels will make the information **easier for bathers to interpret.**

To ensure consistency, therefore, Swimfo and signage should be aligned in messaging and in the symbols and language used. Where possible, the Environment Agency should also collaborate with other information providers to ensure consistency in message, for example, using the same colours and language to signify each level of water quality.

9.9 Delivered via the best messenger

Bathing water quality information needs to come from a source or messenger that is **trusted and respected by its audience**. Trust in the messenger is transferred to perceptions of the message/information itself, so if the organisation disseminating bathing water quality information is not trusted, the information will not be given the appropriate consideration.

The most effective messenger may be different for different audiences, but getting this right has the potential for making communications feel relevant to that specific audience.

In order to determine the best messengers for different bather groups, further research could be conducted to understand which messengers are trusted by different groups of bathers, and are most appropriate to deliver tailored communications in different bathing contexts and at different points on the bathing user journey.

10 Potential opportunities for intervention

This section provides some suggestions for how current bathing water quality information channels can be optimised, based on the findings discussed in this report, along with some potential new approaches to disseminating bathing water quality information. These approaches would need to be tested and evaluated to confirm which are most effective at increasing engagement with and understanding of bathing water quality information.

10.1 Optimising current channels

The risk communication principles and other suggestions made in this report could be applied to current communication channels, namely Swimfo and signage, to improve their effectiveness.

Swimfo

Swimfo could be **optimised for use on mobile phones**, potentially by creating an app that can be downloaded instead of requiring users to access via a web browser. Swimfo is currently a website without a mobile application, which means it may not be as user friendly on mobile. Optimising its usability for mobile devices is likely to be particularly important for bathers who may not have done any planning prior to leaving their house, and for whom mobile access may be their main source of water quality communication from Swimfo.

Personalising the information to specific bather groups could be beneficial, for example by asking users to select the type of bather they are (e.g. regular vs occasional) when entering or signing up to the service, and providing targeted information as a result. Likewise, allowing users to subscribe to alerts for a specific bathing location so they can receive more **proactive notifications**, for example receiving warning messages in the event of a poor pollution forecast or pollution incident.

Having **clear priority information** at the top of the webpage or screen, or otherwise making this information obvious, could increase salience and ease of access. Priority information should include the water quality rating, the potential risk posed and the recommended action to take. Providing information on local **alternative bathing locations** where possible, to allow users to alter their plans rather than change them altogether, may reduce any propensity to ignore risks.

Signage

According to this research, the key issue with current signage is that this is not salient enough for bathers. One option for improving this is digital signage.

Aside from digital signage, there are some modifications which could be made to static signs to make these more impactful, including:

- using **more, larger signs in a variety of prominent locations**, for example in car parks or by roadsides leading up to the beach or bathing location, as well as at the bathing site itself.

- ensuring signs always contain **up-to-date information**, and that bathers can be sure that it is up to date, for example by including the date of posting.

- summarising **priority information** such as the current date, water quality rating and whether it is currently considered safe to bathe clearly on every sign.

- providing **alternatives at locations** where water is currently poor quality, for example signposting nearby swimming locations with higher quality ratings or indicating at which times of the day the water quality is expected to improve.

It may also be useful for Defra to review the current regulations and practice around bathing waters signage to consider these potential modifications.

10.2 Potential opportunities for different bather groups

The small number of bathers interviewed for this project means that no strong conclusions can be drawn about the best approaches for different bather groups. However, this research did indicate that it may be beneficial to provide tailored communication approaches for regular and occasional bathers, as these are two distinct groups who appear to have quite different bathing journeys.

Some suggestions for how regular and occasional bather groups could best be approached are outlined below, however it is important to note that these approaches need to be refined and explored further to establish how effective they are likely to be.

Leveraging community networks for regular bathers

Those who belong to a **community or group** (e.g. a wild swimming group) may have high engagement with communications targeted at that group. Stakeholder interviews suggested that these channels are a potentially effective route to engaging these groups.

More generally, **community networks and interpersonal communication** have been found to be influential in disseminating information about water quality (Fischer at al, 2022), and communication efforts involving community members in development and dissemination have been found to be more successful than those which do not (Hagle et al, 2015).

Therefore, using **channels aimed at activity groups**, for example swimmers, is likely to help make information feel personally relevant to bathers. Targeting messages at a group with which an individual identifies makes it more likely that the information will resonate.

Research with the **specific local groups** who are **bathing in poor quality bathing waters** would be helpful to understand these groups and the contexts in which they are making decisions.

Providing well-signposted and simple information to occasional bathers

Those who are **visiting a location for the first time** may place more reliance on bathing water quality information to inform their decisions than those who are familiar with the location. However, they may have travelled a long way in order to bathe, so providing **information early in the user journey** and **suggestions for alternative locations** could prevent bathing once they have committed to doing so.

As occasional bathers are likely to be assimilating a lot of information about the new location, bathing water quality information should be **as simple as possible** to avoid information overload.

It could be useful to explore the roles of **hotels and tourism organisations** in providing or signposting this information, as these are channels and touchpoints that occasional bathers such as holidaymakers are already likely to be using.

Information for these groups of bathers could also be **targeted seasonally,** as occasional bathers may be more likely to bathe in the summer months. Therefore, running campaigns about water quality via tourist organisations may be most impactful in summer.

All the bathers interviewed for this research said they planned their bathing trips to some extent, so further research may be needed to **identify specific differences in a bathing journey that is very spontaneous**. Moreover, it would be useful to examine degrees of spontaneity. For example, stumbling across a bathing location whilst out walking and making an impromptu decision to swim is quite a different bathing situation to one where a bather has brought their swimming costume to a beach ‘just in case’ and makes a final decision once they are at the bathing site.

11 Conclusions and recommended next steps

11.1 Conclusions

The research identified some potential opportunities to improve bathing water quality information and communication. There may be opportunities to optimise current communication channels in line with the principles of good risk communication. To improve bathers' engagement, water quality communications should be: easy to access, good quality, easy to interpret, actionable, timely, consistent, communicated by the best messenger, and relevant to users.

The research also generated some hypotheses about individual and contextual factors that may impact responses to risk information. This included individual characteristics such as personal risk appetite, as well as differences between regularly visiting a familiar location to bathe and visiting a new location. This means different approaches may be appropriate for the same bather at different times, depending on the specific context of the bathing journey.

11.2 Next steps

This was a stand-alone piece of research designed to help generate hypotheses for improving communication about bathing water quality. Further research would be necessary to inform the optimum modifications for existing communications and to find the best potential options for new communication channels or other interventions. At this point, there are no plans or funding committed by the EA or Defra to carry out further research.

12 Appendices

12.1 Appendix A: Rapid Evidence Review References

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12.2 Appendix B: Bather interviews achieved

	ACHIEVED
TOTAL	
x5 depth interviews	
PRIMARY QUOTAS[12]	
Swimming Frequency	
Few times a year	3
Throughout the year	3
Priority of the swimming	
Primary	4
Secondary	3
Swimming location	
Sea	5
Rivers, Lakes and Reservoirs	3
Who do you swim with?	
Alone	1
Friends	4
Family	1
Family - children	2
Club	1
Concern about water quality	
Concern/anxiety has interfered in their decision-making	4

[12] The primary quota was set to capture views from different types of bathers with different experiences of bathing in the interviews. The secondary quota ensured a spread of age, gender and location in the sample.

Concern/anxiety has not interfered in their decision-making	2
SECONDARY QUOTAS	
Age	
18-24	
25-34	3
35-44	2
45-54	1
55-64	
65+	
Location	
London	
East Midlands	
West Midlands	
Yorkshire and the Humber	
East of England	1
North West	1
South East	1
South West	3
North East	
Gender	
Male	2
Female	4
Non-binary	
In another way	

12.3 Appendix C: Additional References

Boehm Jr, A. B., Ashbolt, N. J., Colford Jr, J. M., Dunbar, L. E., Fleming, L. E., Gold, M. A., ... & Weisberg, S. B. (2009). A sea change ahead for recreational water quality criteria. *Journal of Water and Health*, *7*(1), 9-20.

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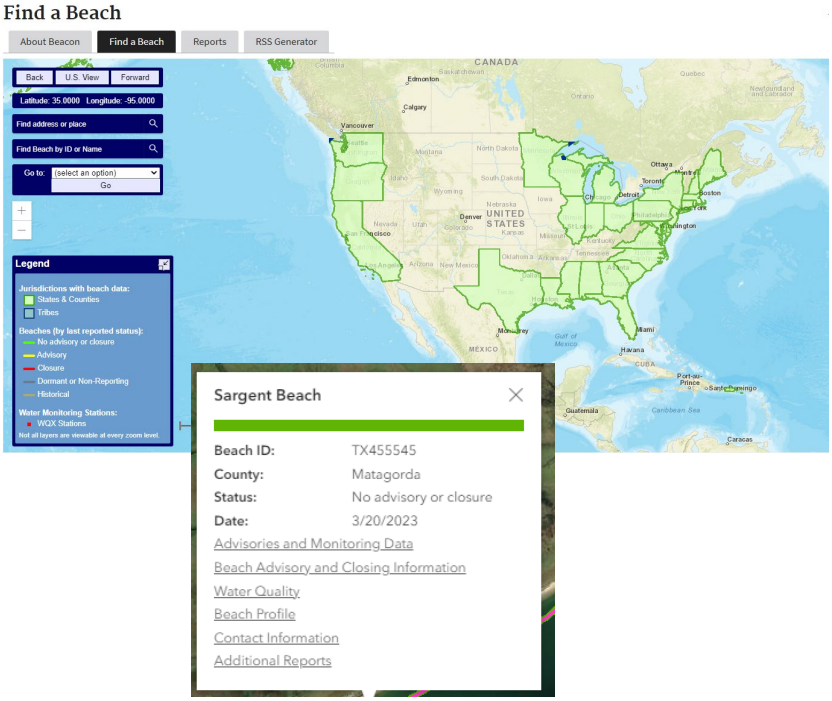
12.4 Appendix D: Adjacent country review case studies

To improve water quality communications, it is also useful to draw upon examples of how bathing water quality has been communicated elsewhere.

12.4.1 USEPA BEACON 2.0



The US Environmental Protection Agency (EPA)'s BEach Advisory and Closing Online Notification (BEACON) tool was developed to provide to the public a database of pollution occurrences for coastal bathing waters.

The BEACON 2.0 tool includes an interactive map of the USA with the ability to zoom in on each individual state and beach within that state. Links are also provided to each state beach website.

When hovering over each beach, the tool provides information on:

- the current beach status (advisory, closure, dormant or non-reporting, or no advisory/closure)
- the date on which the information was last updated

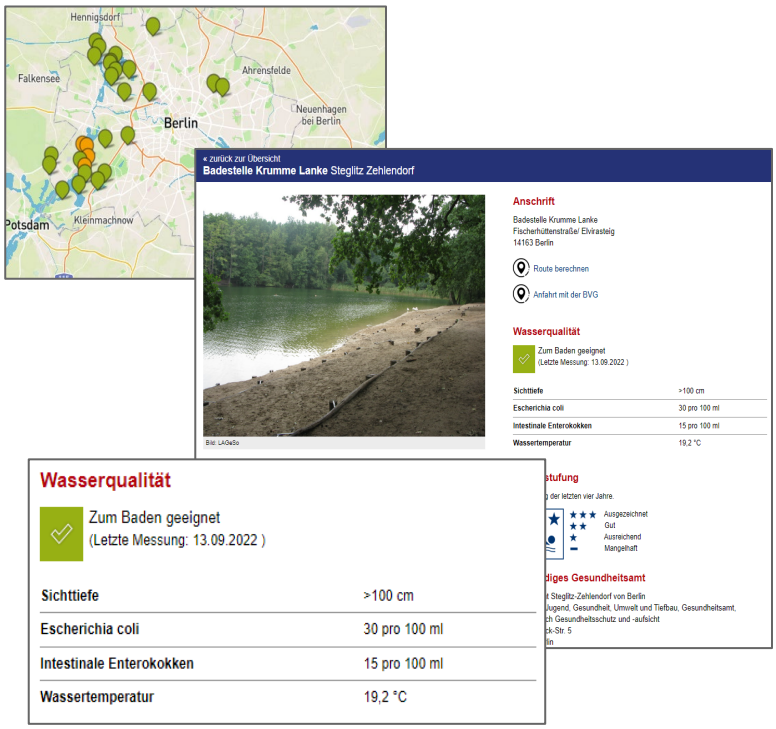
Hovering over a beach also uncovers links to further information on:

- advisories and monitoring data
- beach advisories and closing

- water quality specific information
- contacting the state or local beach representative, with a named contact and telephone number

The inclusion of specific named contact information for each location improves the information in line with some of the outlined principles. For example, it makes the information **relevant** and **easier to access** for the user by providing the option to personally contact a local a beach representative directly. This also improves the **quality** of information as it enables bathers to gain more detail on any water quality issues if needed.

12.4.2 Berlin's application of the EU Bathing Water Directive



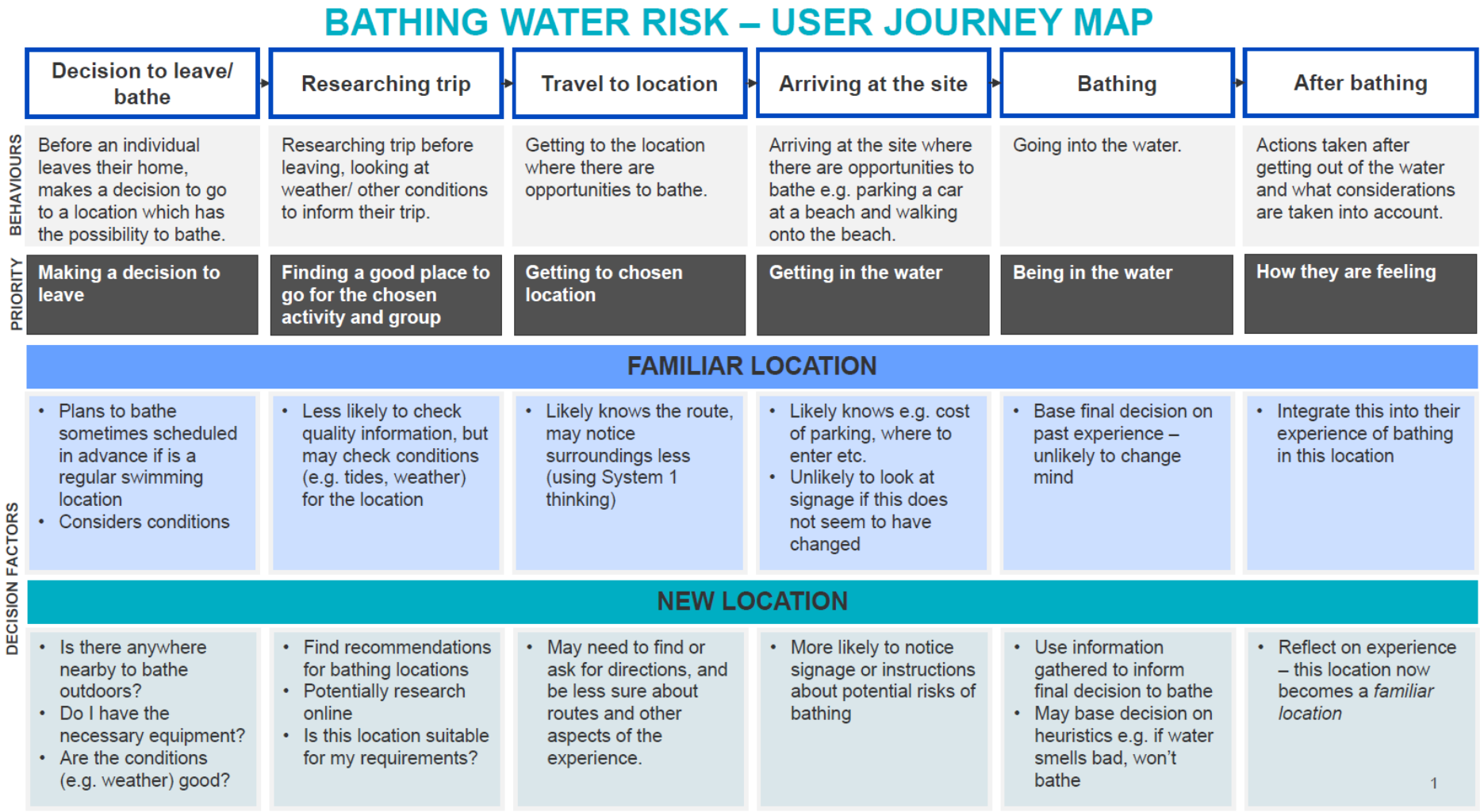
The EU Bathing Water Directive came into place in 1975 with the goal of safeguarding public health and protecting the aquatic environment in coastal and inland areas from pollution. In 2006 the Bathing Water Directive was developed to streamline bathing water quality communications by introducing a system for informing the public about the quality of bathing water using 4 categories: 'poor', 'sufficient, 'good' and 'excellent'. The current 2013 Bathing Water Regulations in England are derived from the EU Bathing Water Directive.

Since 2006, Germany's federal states have implanted the Directive in national law and the states are responsible for designating and monitoring bathing waters. Each state communicates about bathing quality online and through signage at bathing spots.

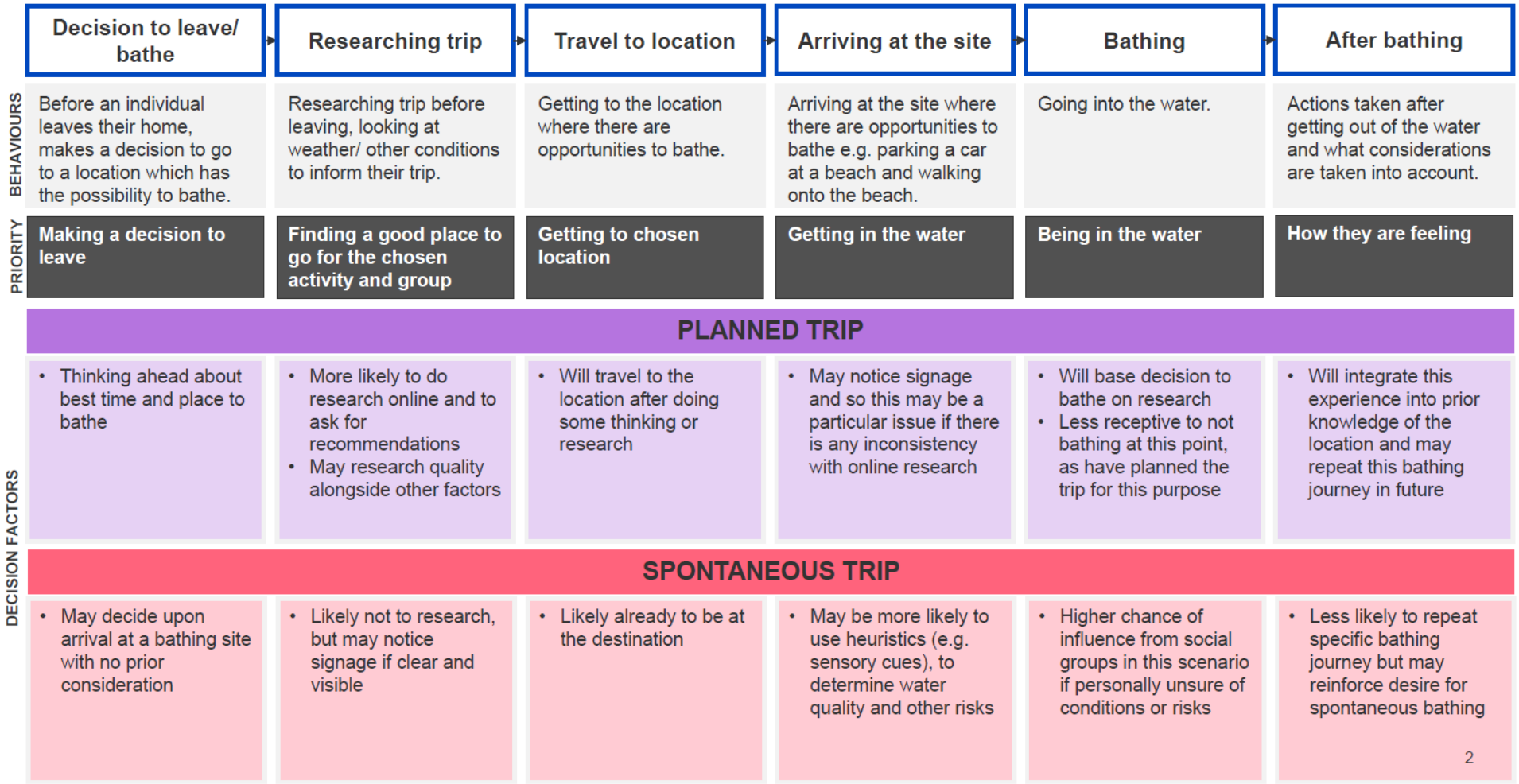
In Berlin there are many lakes which are designated for bathing. In 2018 the city released an online tool providing a map of the lakes; selecting a lake reveals information about the water quality. The information includes the EU Directive bathing water classification, but also a description of the water quality that explains what the classification means for swimming. For example, “zum baden geeignet” means “suitable for bathing”. There is also information about how deep the water is, the presence of microbial risks and the water temperature.

This additional detail of what the classification means for swimming means that the information is **actionable** for users, and illustrates how actionable information could be used on Swimfo.

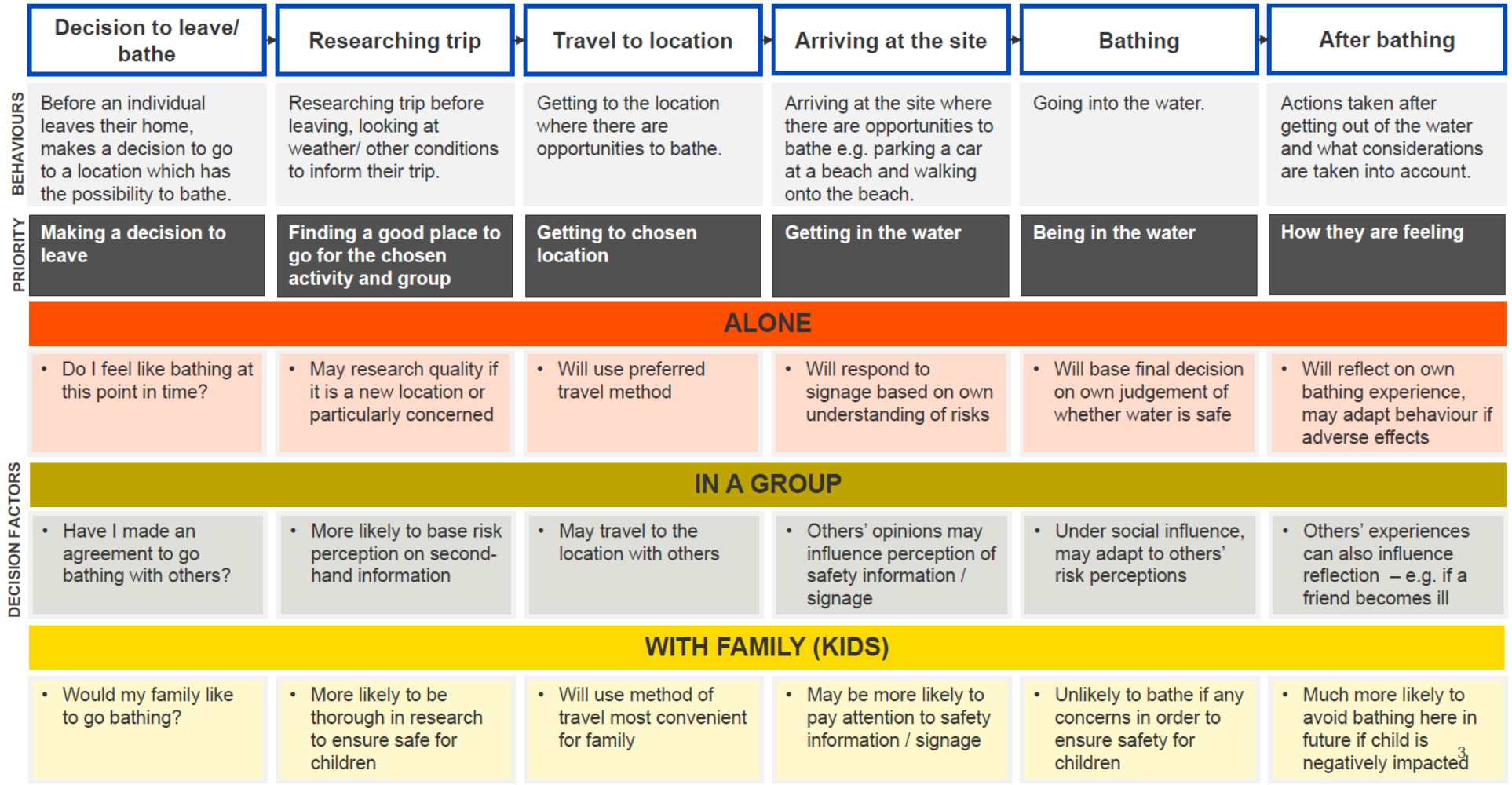
12.5 Appendix E: User Journeys



BATHING WATER RISK – USER JOURNEY MAP



BATHING WATER RISK – USER JOURNEY MAP



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