UK Health Security Agency

# Wild (Open Water) Swimming Resource
# UKHSA guidance and practice resource to support public health investigations

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February 2025

# Wild (Open Water) Swimming Resource

- Overview of aspects of health protection arrangements in England
- Partners in health protection
- Food and water microbiology and water testing
- Water immersion and the Ministry of Health Report 1929
- Wild/Open Water Swimming in the UK
- Rationale and process for developing guidance for Health Protection Teams
- Commonly associated pathogens in recreational water matrices
- Links to other guidance and scholarly articles
- Mitigation measures in open water

# Health Protection in England

- **Public Health Laboratory Service/Communicable Disease Surveillance Centre & Health Authority Communicable Disease Teams**
- **Health Protection Agency – circa 2003**
- **Public Health England – 2013 (a year after the Olympics)**

- **National Institute for Health Protection - 2020**

A new organisation to focus on rigorous science-led approach to public health protection

Institute will boost UK's ability to deal with and recover from COVID-19 and meet health challenges of the coming winter

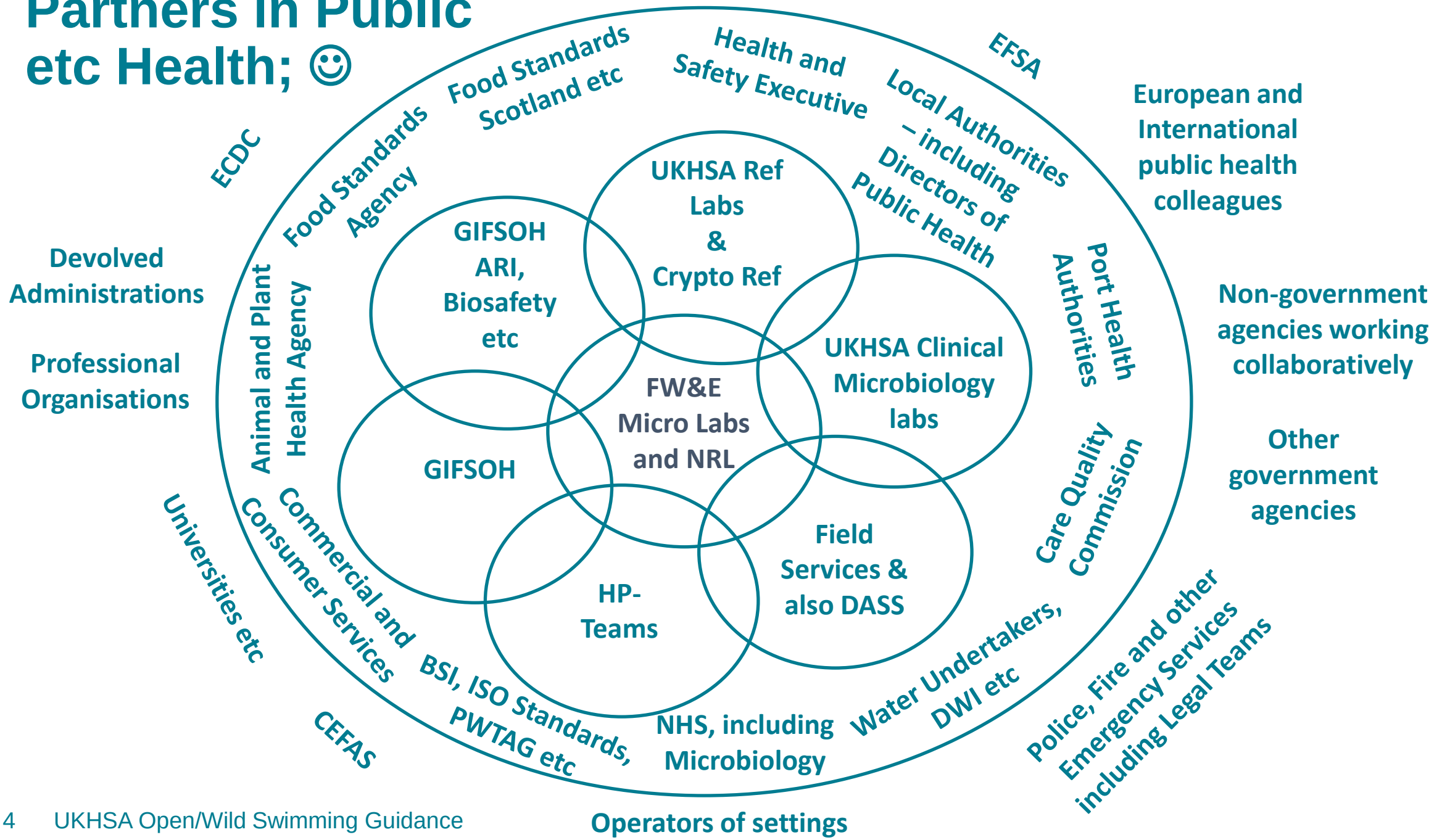
**United Kingdom Health Security Agency (UKHSA) – 2020/2021**

Health Protection Teams supported by Epidemiology Colleagues in Field Service, colleagues from the 'Chemicals' Team and many others including microbiology services

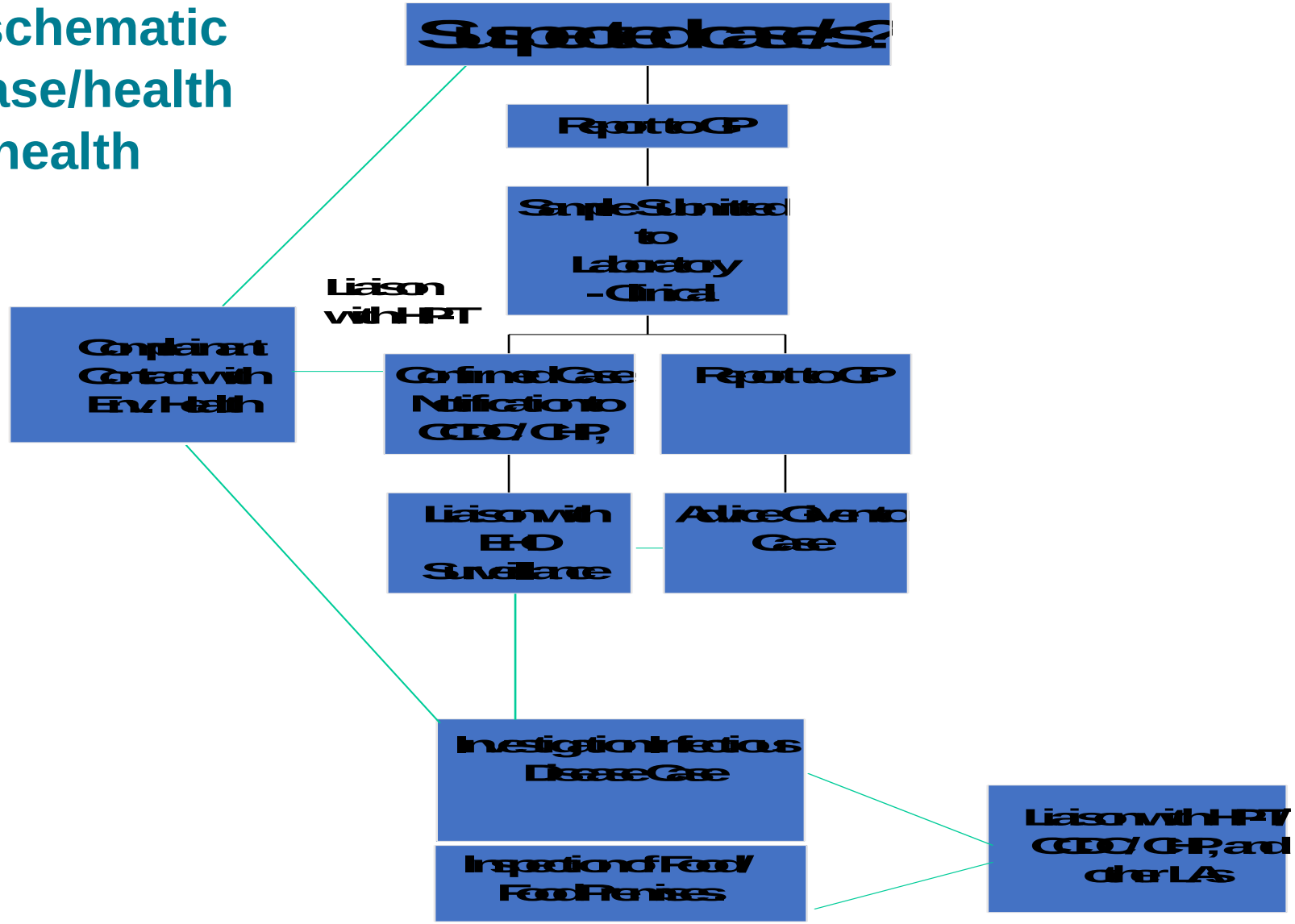
Note; Chief Executive Officer, Jenny Harries - to mid 2025

Note; UKHSA doesn't include Public Health Scotland and Public Health Wales – though there is much synergy and working. Limited teams in UKHSA, such as radiation protection, work in the devolved administrations

# Partners in Public etc Health; ☺

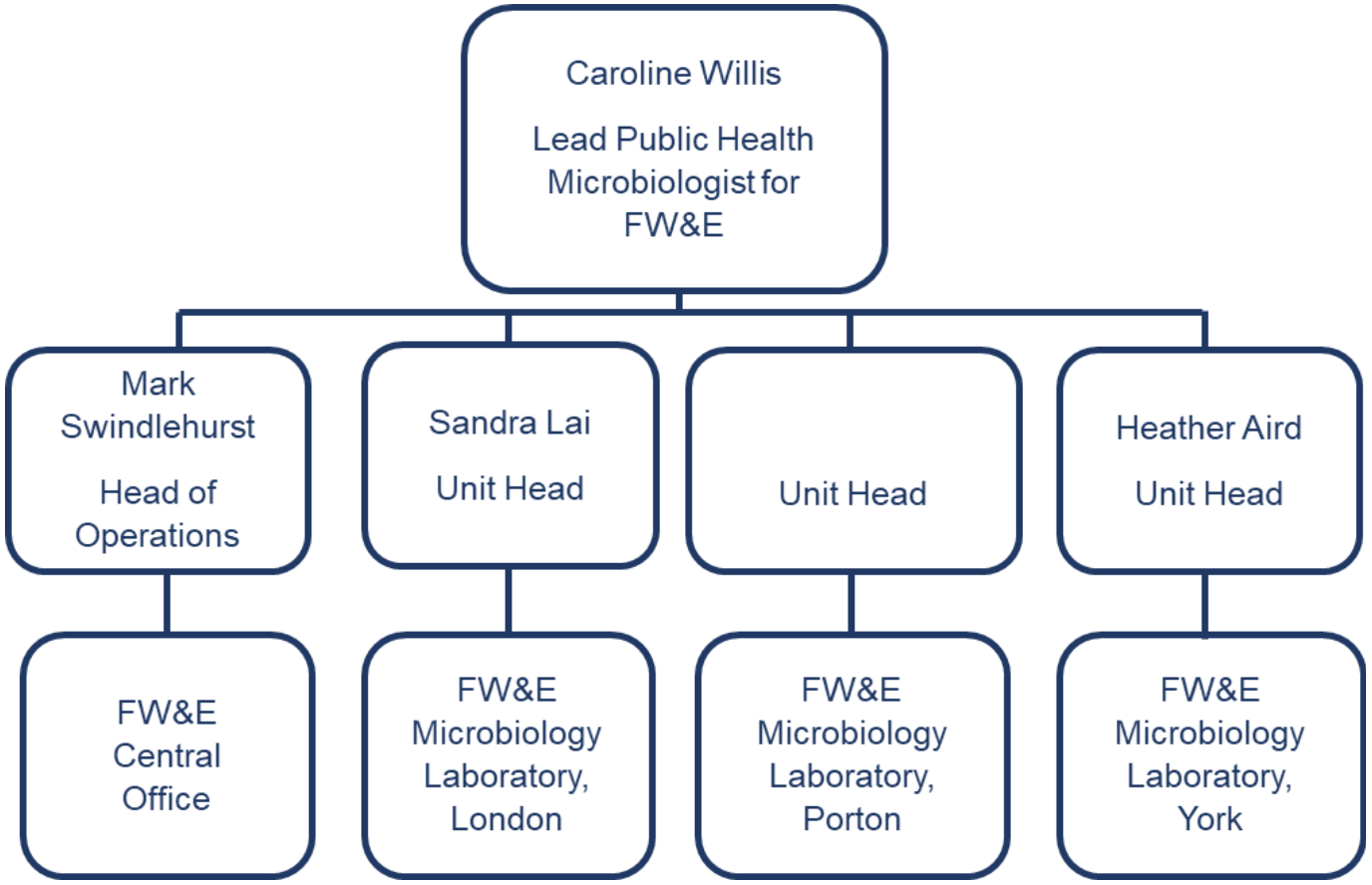


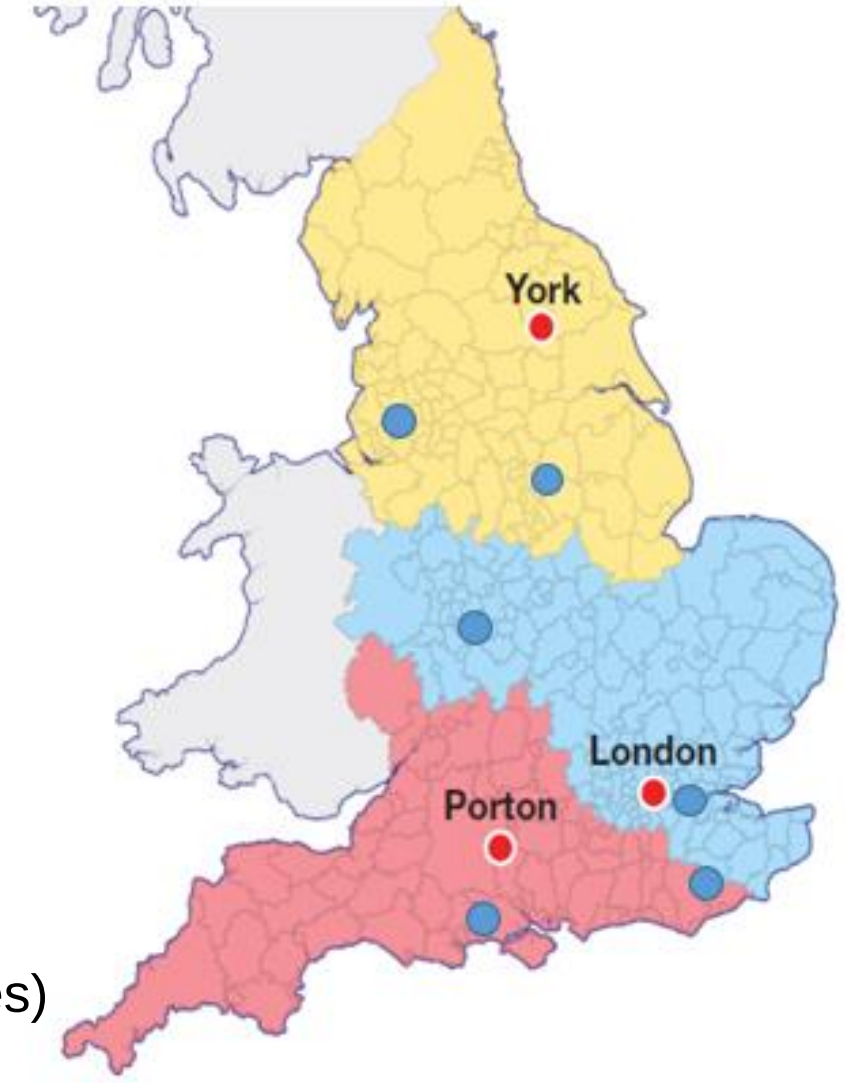
# (Very) Simplified schematic of infectious disease/health protection/public health investigations




**UKHSA Communicable disease outbreak management guidance 21st January 2025**
https://www.gov.uk/government/publications/communicable-disease-outbreak-management-guidance

# UKHSA FW&E Microbiology Laboratory Network

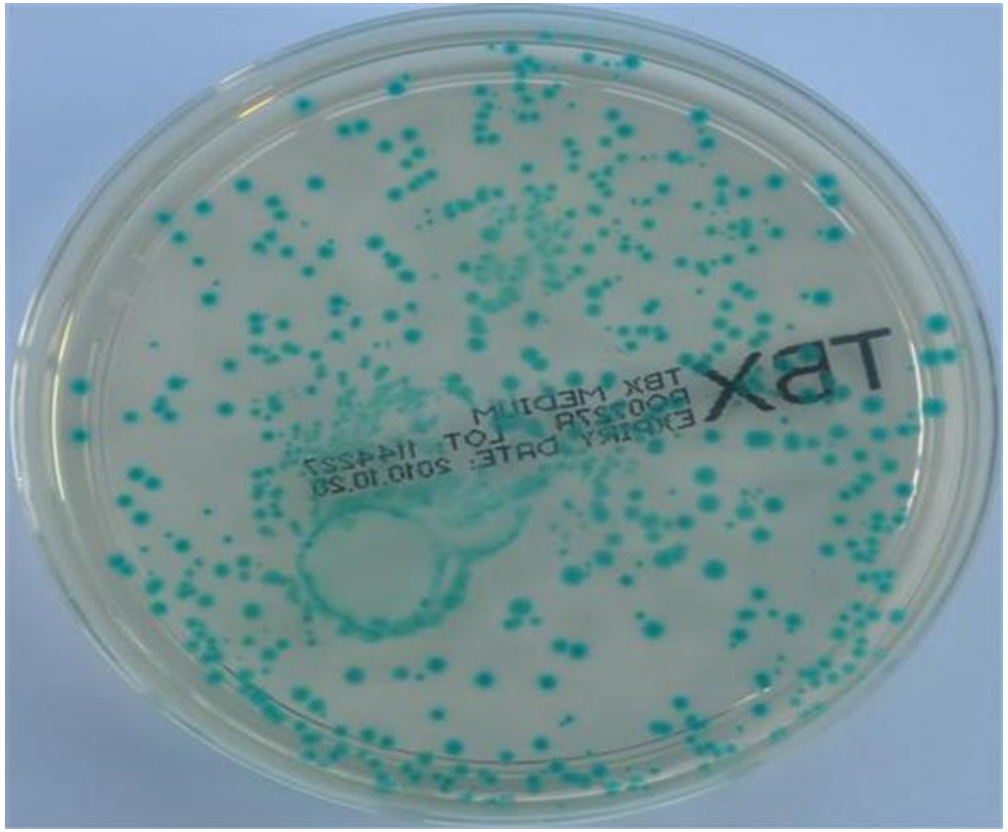



Some 100 staff within the FW&E Microbiology Laboratories
6 Out-posted Scientists – (now within UKHSA Field Services)

# UKHSA FW&E Microbiology Laboratories;

## Testing for indicator organisms and pathogens; *E. coli* indicators TBX and E.coli O157. Tests are also available for other bacterial pathogens





Culture based techniques – supported by molecular methods and others eg PCR and MALDI-TOF (Matrix-Assisted Laser Desorption/Ionisation – Time of Flight)

# Sampling and testing recreational and other waters

- Bathing ponds
- Open water locations; ponds/pools and harbours
- Outdoor designated areas - in reservoirs and gravel pits etc
- Designated bathing waters – coastal and inland

- Managed recreational waters – guidance from Pool Water Treatment Advisory Group, PWTAG etc

But there are many waters that are used for water immersion…….

# The Purification of the Water of Swimming Baths Ministry of Health 1929

Swimming, ‘has been extolled alike by poet and teacher. Locke, in his famous work in Education in 1693, says’;

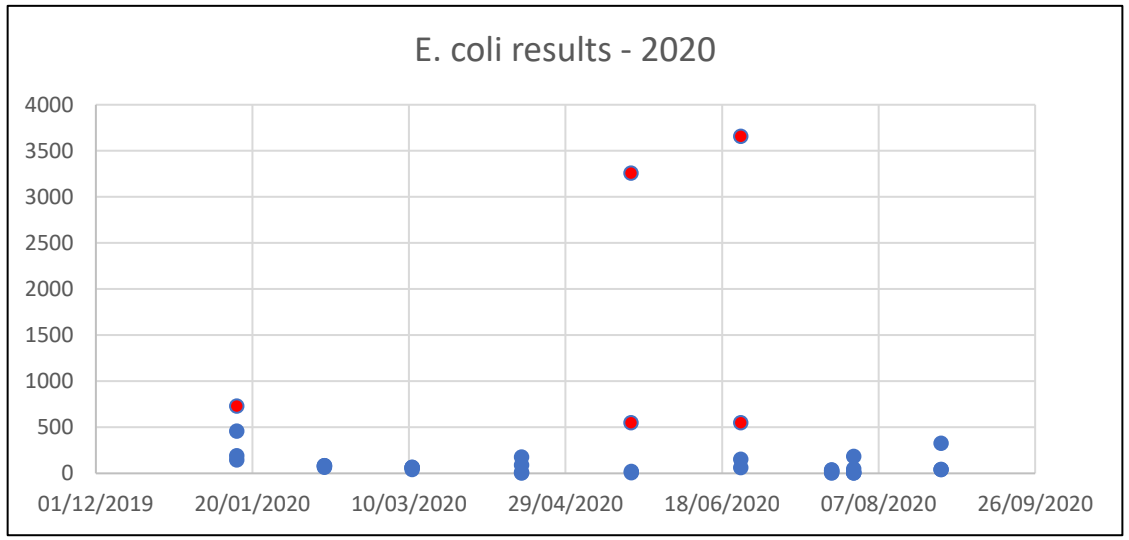
*“the advantages (besides that of swimming) to health by often bathing in the summer in cold water are so many, that I think nothing need to be said to encourage it”*

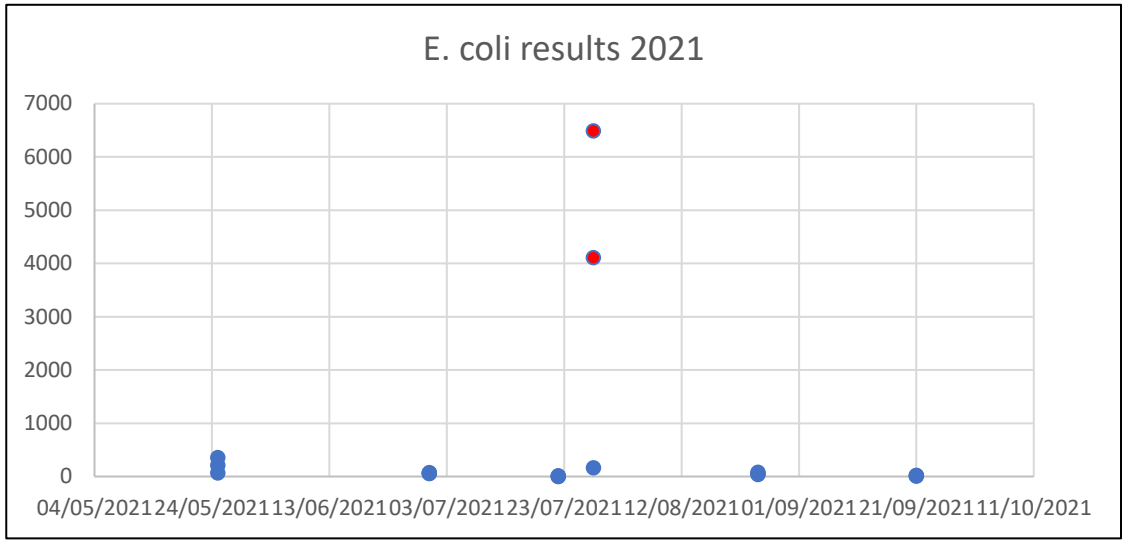
‘The latter end of the eighteenth century saw the beginning of the great revival of sea-bathing, which may be said to have begun in 1750 with the publication of the book by Dr Richard Russell, of Brighton on the remedial effects of sea bathing.’

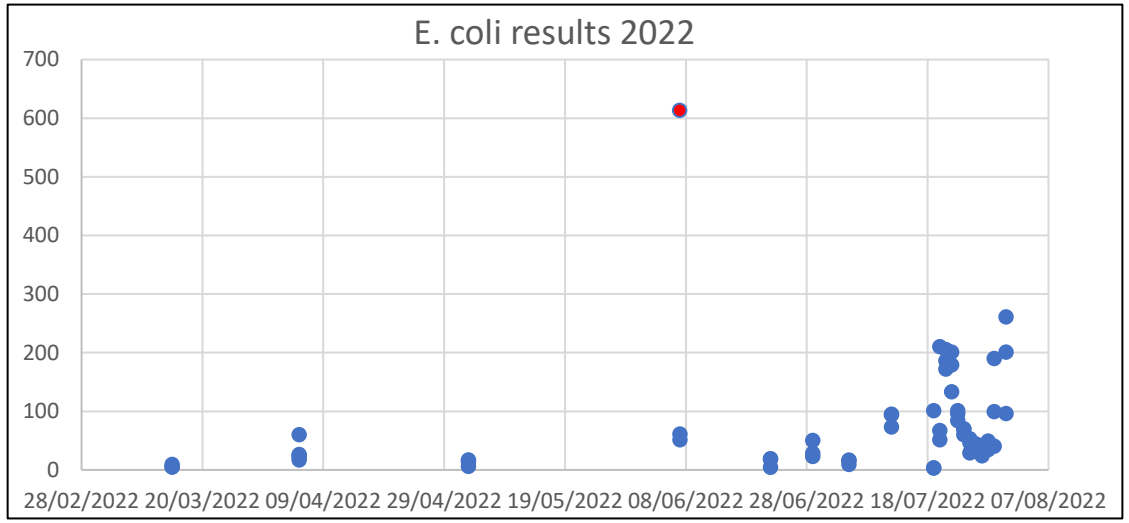
‘Swimming, moreover, in cool water is of great value in hardening the body and enabling it to maintain its heat regulating mechanism in active function.’

# Sampling and testing - managed recreational waters

# Birmingham Games 2022 Triathlon Lake




High E.coli results observed in the warmer summer months

# Wild (Open) Water Swimming

- Increase in outdoor swimming in recent years
- Reduction generally in outdoor managed pools/Lidos – though some new pools have been built and some areas maintained their outdoor pools including seasonal pools
- Use of sea waters, inland rivers, lakes/lochs/reservoirs and ponds including gravel pits for swimming
- Open water swimming venues with some management

**Incidents associated with sporting activities and open water exposures**

Note; Wild swimming – generally where there is no supervision

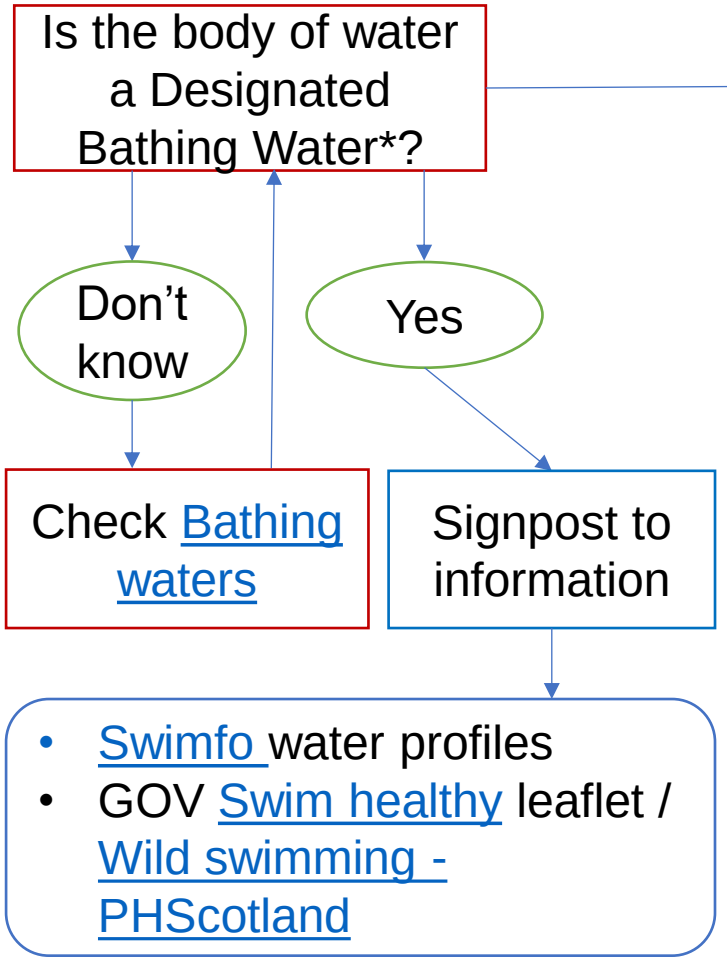
# Rationale and development of the guidance

- An evidence-based resource required to support public health risk assessments for Health Protection Teams

- Inclusive of bacterial and other pathogens, chemical, thermal and anti-microbial risks associated with wild/open water swimming
- Available guidance and microbiology standards generally based upon managed waters and bathing waters

- **Extensive Literature review to develop guidance;**
- Engagement with various specialist teams/colleagues within UKHSA

# Developing a resource for responding to enquiries regarding wild / open water swimming




Signpost to information to inform risk assessment and mitigation

- GOV Swim healthy leaflet / Wild swimming - PHScotland
- Surfers Against Sewage App and website combines EA pollution risk forecasts with water company sewage spill data
- Sewage discharge information: SW Water waterfit live
- ROSPA Weil's disease leaflet
- Water industry published raw data [1]
- WHO Guidelines on recreational water quality: Volume 1 coastal and fresh waters (who.int) [1]
- WHO animal waste water quality and human health [1]

[1] not intended for lay audience

# Note; There is a National Bathing Waters Group

Environment Agency led group

- Water Undertakers
- Local Authorities
- Third Sector Environmental Groups
- NFU
- British Triathlon
- UKHSA

A group with focus on designated bathing waters but with interactions with wild/open water swimming in undesignated waters

And ….. within UKHSA there are interactions with, for example, ISO standards for water microbiology and the Pool Water Treatment Advisory Group for managed recreational waters

# Rationale and development of guidance; Evidence based information available

In scope (124)

- waterborne pathogens
- recreational exposures
- waters not managed for recreation

Out of scope (84)

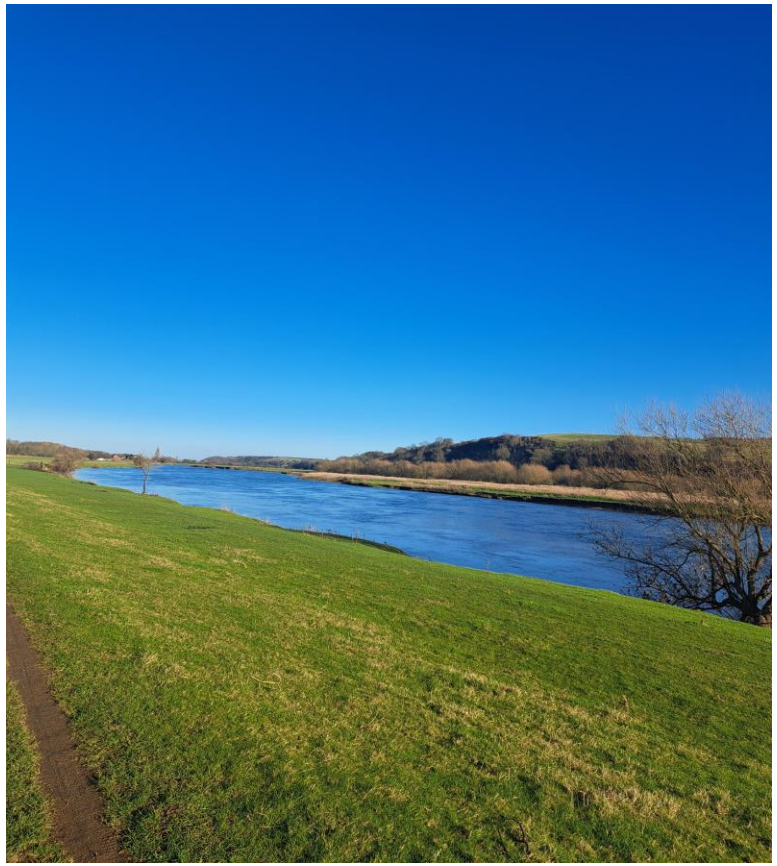
- water pollution by chemical hazards including pharmaceuticals
- health risks or injuries unrelated to waterborne pathogens e.g. cold-induced shock, swimming induced pulmonary oedema
- pathogens not identified in UK or waters of similar latitude and climate
- methods not available to health protection teams and the public e.g. microbiological modelling, laboratory testing, water management plans

# Rationale and development of guidance; Main factors affecting water quality

- Water industry - wastewater treatment
- Capture in river / lake / seabed sediments
- Amount of sunlight (UV exposure), temperature and pH of the water

- Water draining from fields, farms and towns during heavy rain
- Untreated sewage mixed with rainwater (overflow to prevent homes from flooding)
- Homes and businesses draining dirty water into the wrong pipes
- Density of recreational use

# Factors affecting water quality



Note; higher E.coli levels in river water correspond with turbidity
UV impacts on open water are more limited in high turbidity waters and during winter

# Evidence based information available – Some information highlighted more at-risk groups

Population groups more at risk:

- children are more susceptible than adults due to behavioural factors and more vulnerable due to less developed immunological, neurological and digestive systems (vulnerability not specific to recreational water exposure)
- pregnancy - foetal exposure to enterovirus and infectious hepatitis can result in severe illness and fatality
- young children, the elderly, pregnant women and immune-compromised individuals have been shown to acquire infection at lower doses and with more significant adverse health outcomes

# Overview of most commonly cited health issues associated with open water exposures

- GI/diarrhoea – commonly from adenovirus/norovirus
- Skin rashes
- Ocular irritations or otitis
- Respiratory infections

- Leptospirosis
- Cryptosporidiosis
- Other zoonotic infections

- Water chemical contamination issues
- Emerging risks

# Shiga toxin-producing E.coli

Cattle are the most important reservoir of STEC O157 but other animals have associations, including deer, rabbits, horses, pigs and wild birds

**Transmission can be from contaminated food/drinking water or from swimming in contaminated waters**

People infected with STEC can have a combination of these symptoms:

- diarrhoea (about 50% of cases have bloody diarrhoea)
- stomach cramps
- fever
- Some people may have mild diarrhoea, or even no symptoms at all (termed asymptomatic carriage).

- Symptoms can last up to 2 weeks in cases without complications.

A small proportion of patients, mainly children, may develop haemolytic uraemic syndrome (HUS) which is a serious life-threatening condition resulting in kidney failure. Other complications may also arise in some cases

# Cryptosporidium

A protozoan parasite

- watery diarrhoea, abdominal pain, and nausea and/or vomiting.
- For most people, an unpleasant but generally self-limiting illness lasting up to 3 weeks,
- Some very immuno-compromised individuals may have a severe, possibly life-threatening illness.

- Transmission is via the oocyst life cycle stage, during close contact with an infected person, animal, or their faeces, or through consumption of contaminated food, drinking water or recreational waters.

**Open waters are also a potential source !**

- There is a high probability of infection from a single oocyst.
- Oocysts may continue being shed for two weeks after symptoms have ceased, with long-term asymptomatic carriage also reported.

# Leptospirosis

- a zoonotic infection caused by spiral-shaped bacteria of the genus Leptospira (also referred to as leptospires) with a mild flu like illness or potentially fatal liver complications

Leptospires may be either:

- pathogenic, capable of causing disease in animals or humans
- saprophytic, free-living in surface waters and not known to cause disease

- The majority of infections are caused by L interrogans and related strains, but other species may occasionally cause infection in humans.

- Wild and domestic animals may also be infected by leptospirosis, or they may carry the organism asymptomatically.
- Animals can spread the leptospires in their urine.
- Nearly all mammals are capable of carrying the bacteria and may spread the disease among their own kind and to other species, including humans.

**Common animal reservoirs include rodents, cattle and pigs but also open waters .**

# Epidemiological reports of swimming-associated zoonoses*

- Case studies in Vietnam and Cambodia identified swimming or bathing in open water frequented by poultry as possible source of H5N1 infection:
  - two cases in a single family in Vietnam – possible infection from swimming or washing in contaminated canal water [1, 2]
  - one case and seroprevalence study in Cambodian village with confirmed H5N1 in domestic poultry – contaminated water as potential risk factor [3, 4]
- Literature review concluded "lack sufficient data…to fully evaluate other potential risk factors for infection such as the role of water":
  - Brief literature review for the WHO global influenza research agenda - highly pathogenic avian influenza H5N1 risk in humans (Kerkhove, 2013)

- Zoonoses Report UK 2017:
  - water based activities increase risk of leptospirosis with possible seasonality (↑ cases in autumn)
  - 4 of a total of 10 non-foodborne outbreaks of cryptosporidiosis in 2016 and 2017 were associated with swimming pools (not technically zoonotic transmission to humans)

** excluding common minor and self-limiting conditions e.g. swimmer's itch*

# Additional sources of guidance considered

- Wild Swimming .co.uk

Health and safety risks;

- Blue-green algae; go somewhere else
- “Swimmer’s itch”(cercarial dermatitis); avoid wallowing in the bogs
- Weil’s disease; never swim in urban rivers, particularly canals, and be particularly cautious after heavy rains. If you are concerned about water quality cover any open wound with a waterproof plaster and keep your head (eyes, nose and throat) out of the water as much as possible.

https://www.wildswimming.co.uk/health-safety/#:~:text=Moving%20water%20and%20currents&text=Lots%20of%20our%20best%20water,over%20and%20carry%20you%20away.

- River and Lake Swimming Association
  - River in spate; do not swim for a few days after
  - Leptospirosis; if you have a cut, consider not swimming or cover with waterproof plaster
  - Check water quality rating with EA, avoid swimming after heavy rainfall, best swim at an EU Bathing Water site
  - Blue green algae; greater risk in stagnant or slow moving water, do not swim if unsure.

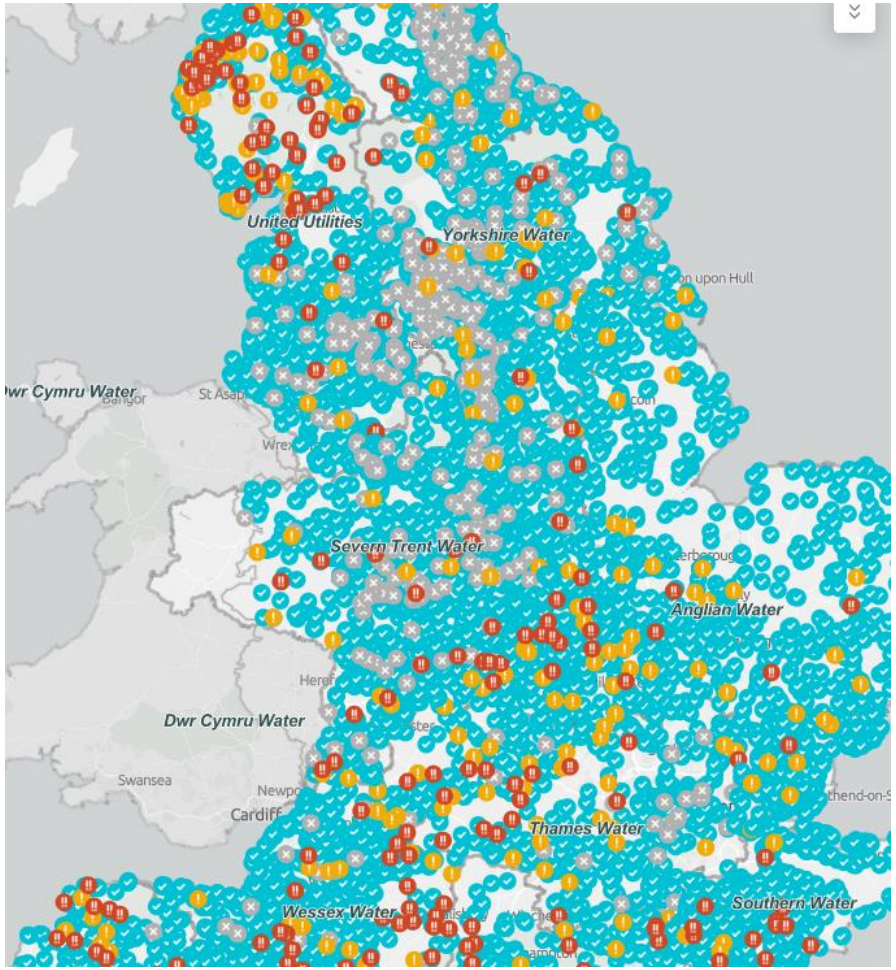
https://www.river-swimming.co.uk/

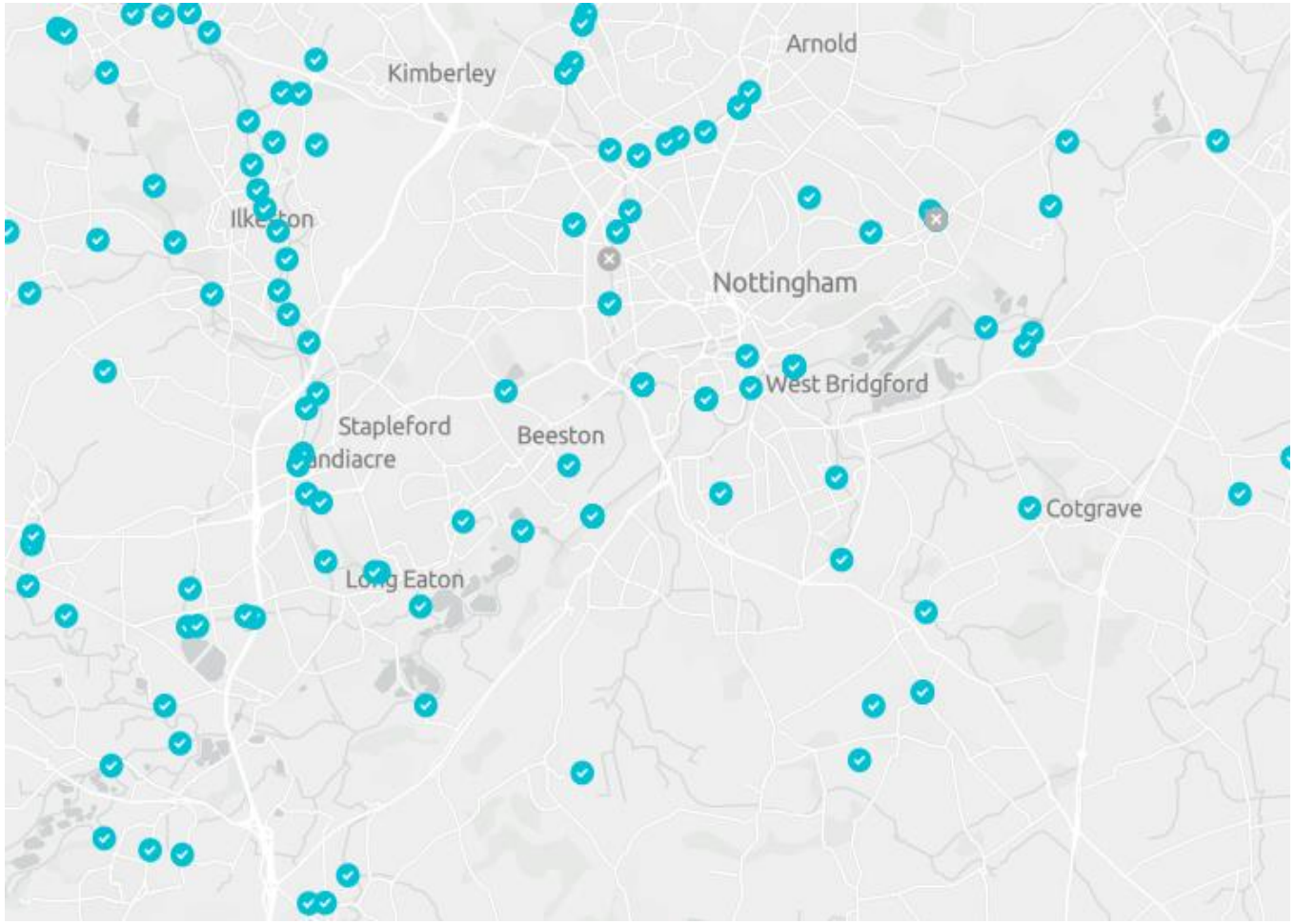
# Additional sources of guidance considered

- Outdoor Swimmer Magazine Safety and Risk Assessment (May 2019)
  - Quotes PHE Leptospirosis associated with a triathlon - GOV.UK (2014); minimise swallowing of water, shower after swimming, wash hands before eating
  - Other waterborne diseases; use beaches that meet bathing waters standards, avoid swimming in rivers after heavy rainfall
  - Consult The Rivers Trust sewage map

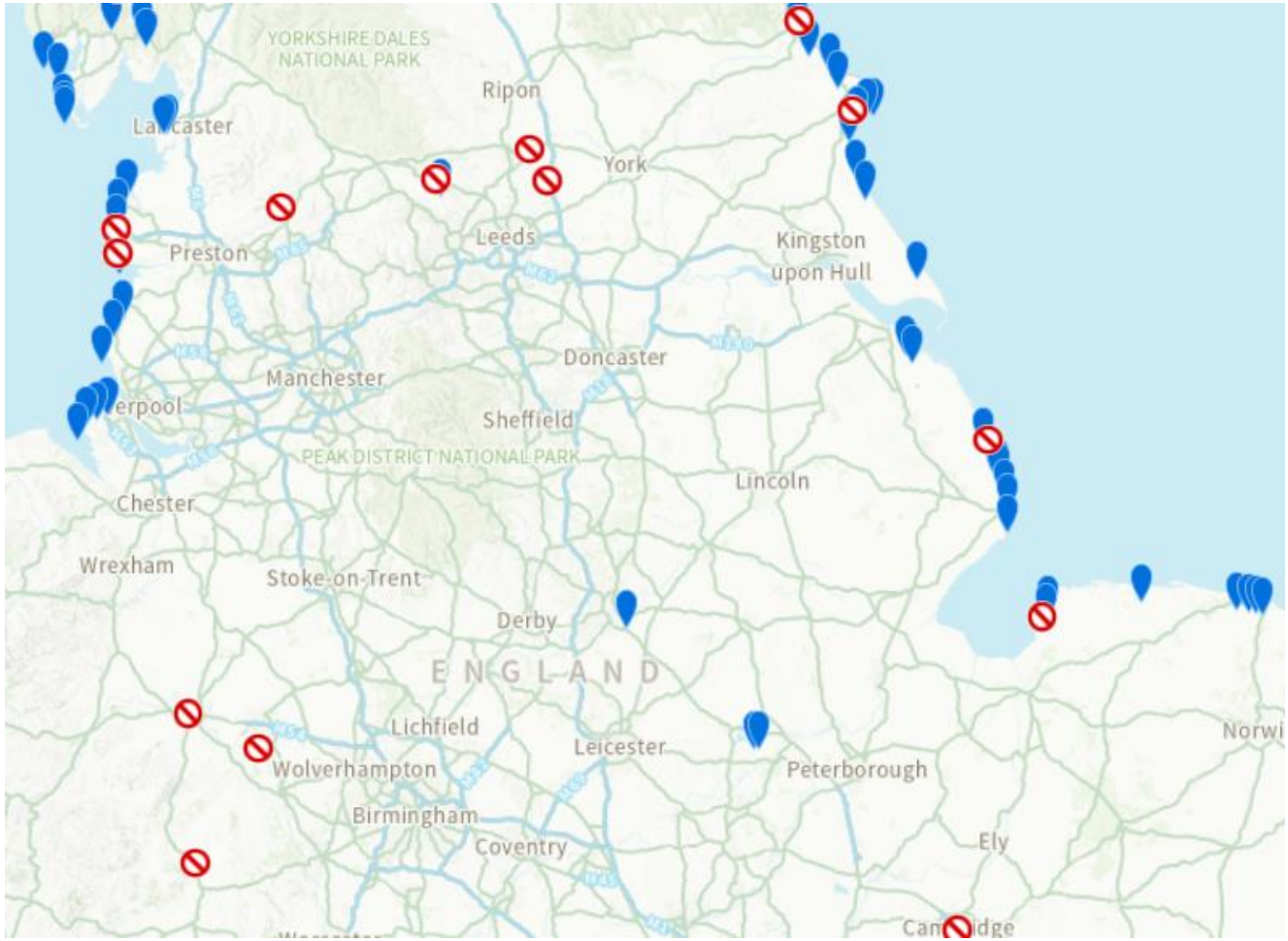
- Guidelines on recreational water quality: Volume 1 coastal and fresh waters (who.int)
- Oceans, Lakes, and Rivers Healthy Swimming CDC
  - Check swim area safety online, especially after heavy rain
  - Check with healthcare provider if you have health problems or take medications that lower immunity
  - Do not swim in cloudier than usual, discoloured or bad smelling water, or if pipes drain into or around the water, or you have an open wound (or cover with waterproof bandage
  - Don’t swallow water, keep sand from mouths, regular toilet breaks, wash hands before eating (if unable to wash, use 60% alcohol hand sanitiser)

# Rivers Trust - real time health alerts for effluent discharge



# List of ‘designated’ bathing waters https://environment.data.gov.uk/bwq/profiles/



# Additional Guidance; Swim Healthy.Gov.Uk
# Hazards and risks from swimming in open water

- Swim healthy - GOV.UK, 24th June 2019

https://www.gov.uk/government/publications/swim-healthy-leaflet/swim-healthy

**Leaflet including health risks from open water swimming;**

Anyone can become unwell from swimming in any open water as there will always be micro-organisms present. The risk of becoming ill depends on various factors:

- children and novice swimmers are more likely to swallow water accidentally
- those with an impaired immune system are more susceptible to infection
- those swimming in rivers and estuaries are more likely to become unwell
- heavy rainfall can wash harmful bacteria from agricultural land, urban areas and sewage to rivers, seas and bathing waters and affect water quality

# Swim Healthy.Gov.Uk
# Hazards and risks from swimming in open water

Wild swimming: how to swim safely in Scotland's outdoor water

https://publichealthscotland.scot/media/20099/2023-06-12-wild-swimming-v1.pdf

Risks associated with open water swimming; overview of risks including physical risks and cold-water immersion

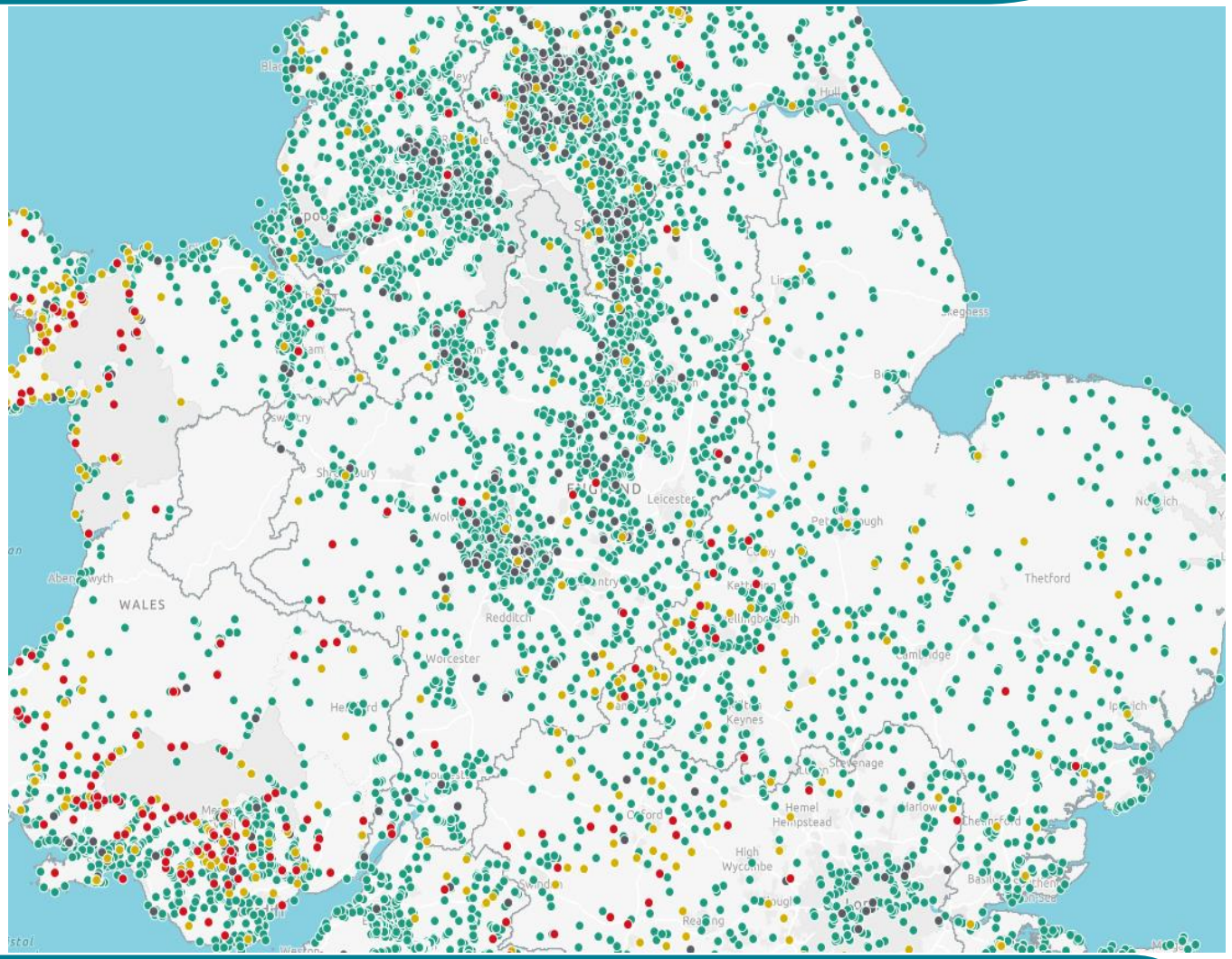
- Water quality hazards and risks
- Blue-green algae
- Swimmers itch – from fresh water schistosomes parasites with complex lifecycle with free swimming larvae that cause allergic reactions in swimmers

Guidance on reducing risks such as using designated bathing waters, avoiding blue-green algae and avoiding swimming after heavy rainfall

# Surfers Against Sewage;
https://datahq.sas.org.uk/sewage-data-hq/is-it-safe-to-swim/

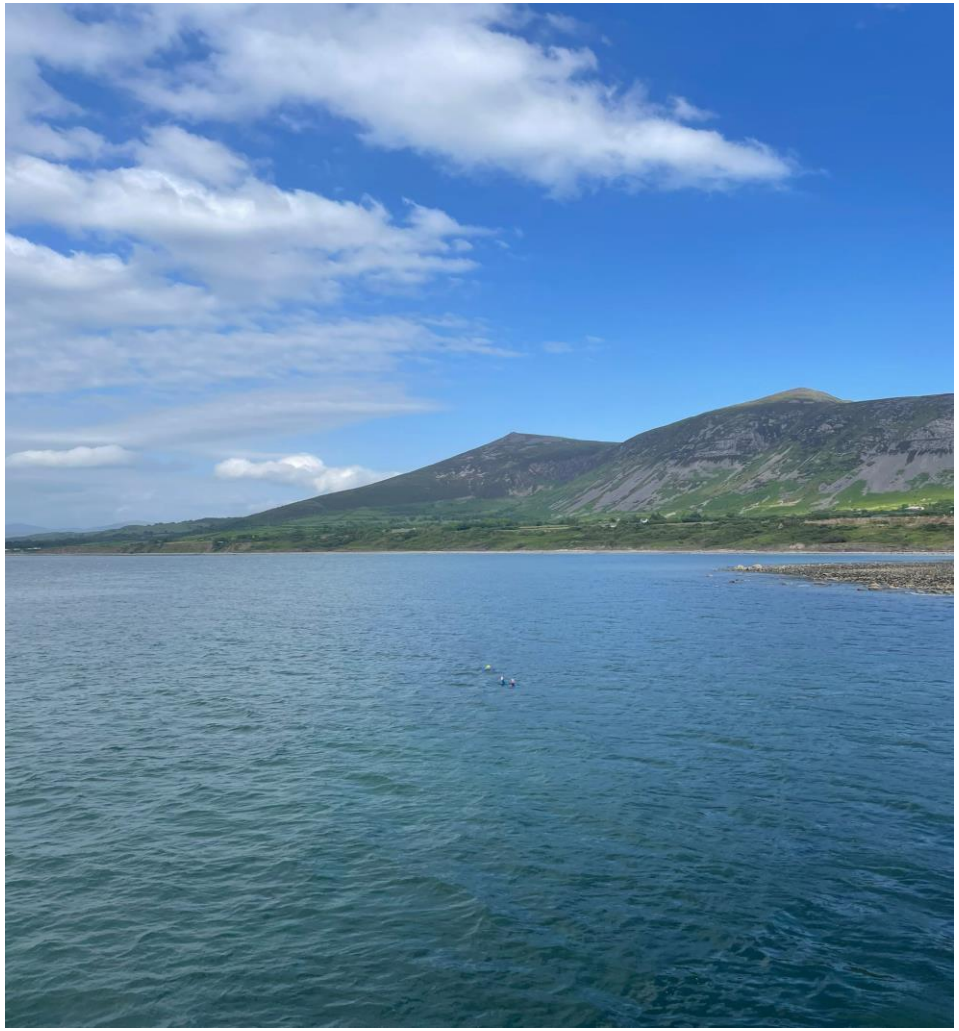
Status guide

- Discharging
- Recently discharged
- Offline
- Not discharging



# Swim England – A safety guide to outdoor swimming https://swimming.app.box.com/s/reelt5zzkf2a4upkt09ia1urkjvavhyy

- Health benefits – better sleep and rest, ‘increased happiness’ and boosted immune system
- Guidance on safe swimming; weather, visibility, water quality, safe access and egress etc
- Advice on action to take in the event of accidents or illness in the water
- Swim procedures; accessing the water, realistic goals and rewarming
- Guide for cold water swimming; including recommended times in cold water <10°C



# Additional sources of guidance considered

- Published guidance:
  - Gastrointestinal infections: guidance for public health management - GOV.UK (www.gov.uk), 31st January 2020
    - E.coli, Giardia, Salmonella, Sapovirus reference *waterborne transmission*
    - Cryptosporidium and Giardiasis reference transmission linked to *swimming pools*;
    - Giardia ref. transmission linked to *swimming in contaminated recreational water*
    - STEC ref. transmission linked to *swimming/playing in contaminated water, streams or ponds*
    - Vibriosis ref. transmission linked to *exposure to warm seawater*
    - Spread across 29 pages, not summarised in a format amenable to timely HPP response
  - Swim healthy - GOV.UK (www.gov.uk), 24th June 2019

Potential for variability of risk assessment advice by HPTs

# Mitigations; cited by the literature

- Avoid after heavy rainfalls - suggested 24-48 hours after heavy rainfall events
- Avoid visibly turbid water, algal blooms, animal waste/carcasses or litter pollution in or around water margins
- Time of day and water temperature: UV (sunlight) kills off pathogenic organisms so it may be preferable to swim later in the day in slower flowing inland waters
- Crowded waters present more risk from pathogens shed by other people – balanced against availability of help/supervision

**Hygiene measures:**

- Cover skin cuts or abrasions with a waterproof dressing
- Avoid swallowing water
- Shower as soon as possible after swimming
- Dry ears after swimming
- Wash hands before eating or drinking
- Anyone who had diarrhoea must wait until at least 48 hours after being symptom-free before swimming

# Emerging risks in/from open waters

- Antimicrobial resistant bacteria
- Severe storm events – with effluent discharges and agricultural etc run-off

- Rising water temperatures and increased nutrients creating more favourable conditions for algae, Cyanobacteria and vibrio species;
- Biochemical processes and temperatures – which increase with water temperatures and influence survival time of microorganisms and inactivation of viruses

- High levels of rainfall having an impact on potential Leptospirosis
- Potential impacts following climate change such as expansion, transmission and distribution of Naegleria fowleri  (a ‘brain eating’ amoeba)

# Additional resources for consideration

Health effects of climate change
https://assets.publishing.service.gov.uk/media/65708af2809bc3001330819c/HECC-report-2023-chapter-8-vector-borne-diseases.pdf
Guidelines on recreational water quality: volume 1 costal and fresh waters WHO
https://www.who.int/publications/i/item/9789240031302
Swim England – a guide to outdoor swimming
https://www.who.int/publications/i/item/9789240031302
Animal waste, water quality and health WHO:
https://www.who.int/publications/i/item/9789241564519
UK Zoonoses Report 2017:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918089/UK_Zoonoses_report_2017.pdf

UK Health Security Agency

# Questions