

The background features a vibrant green golf course with a sunburst effect emanating from the center. A white water pipe is visible in the foreground, partially obscured by the sunburst. The image is framed by blue geometric shapes on the right side.

# Changes to water availability

Greener Golf  
8th February 2024

A close-up photograph of water ripples on a dark blue surface, with light reflecting off the peaks of the waves. The ripples are concentric and spread across the left side of the slide.

## By the end of this presentation...

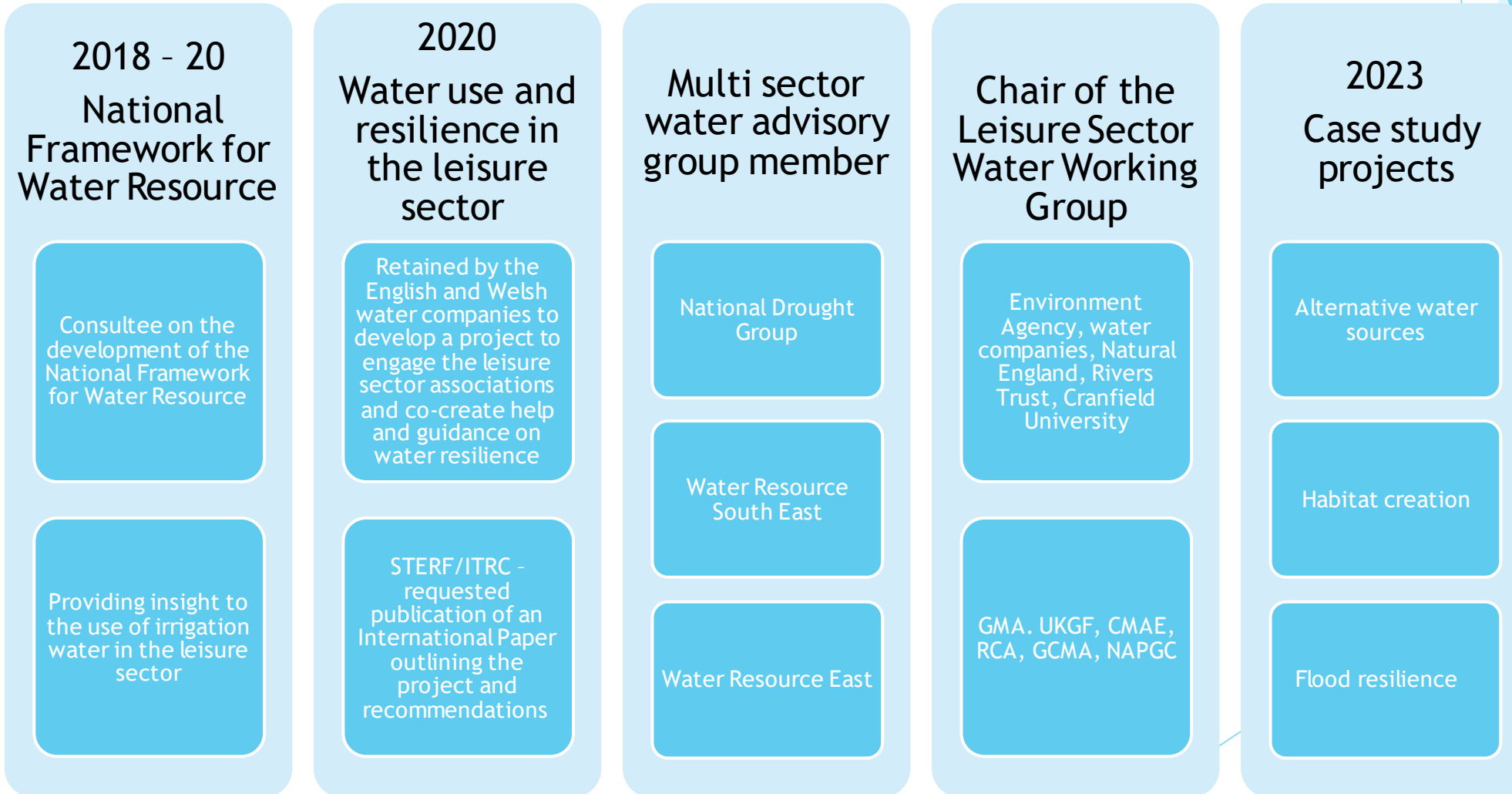
- ▶ Who am I?
- ▶ Why is water availability changing
- ▶ Why golf is in the spotlight
- ▶ What should you do about it



# Who am I?

- ▶ Involved in the golf sector (professional/club management) for since 1985
- ▶ The Facilities Management Group - Sustainability Director 2003 - 2009
- ▶ Environmental Solutions International - Managing Director 2009 - onward
  - ▶ Environmental Management Systems - ISO14005
  - ▶ Net Zero
  - ▶ Compliance
  - ▶ Water resilience
- ▶ Golf Environment Organization Sustainability Associate since 2012
  - ▶ Conducted over 60 GEO Verifications

# ESi - the leisure sector, and water resilience...



# Some of our clients





Why is water  
availability  
changing?

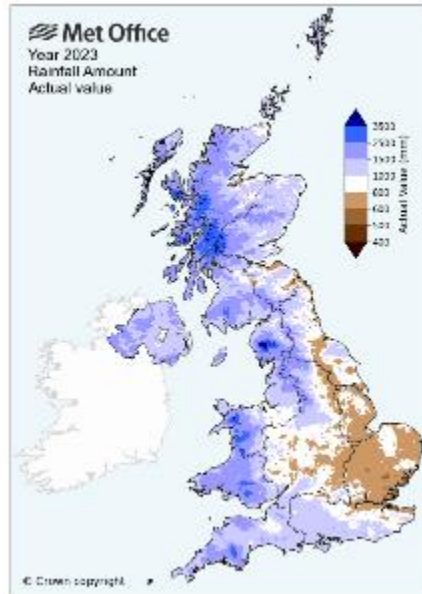
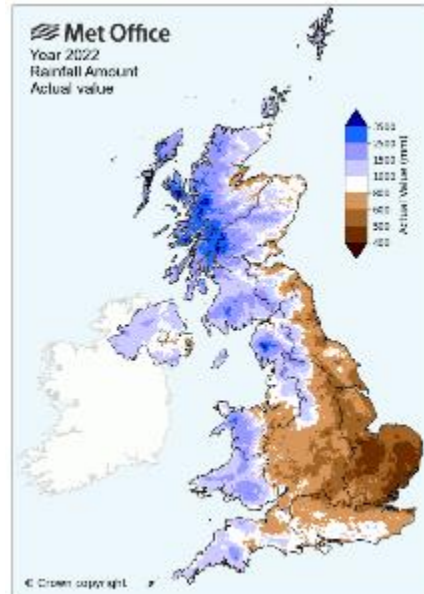
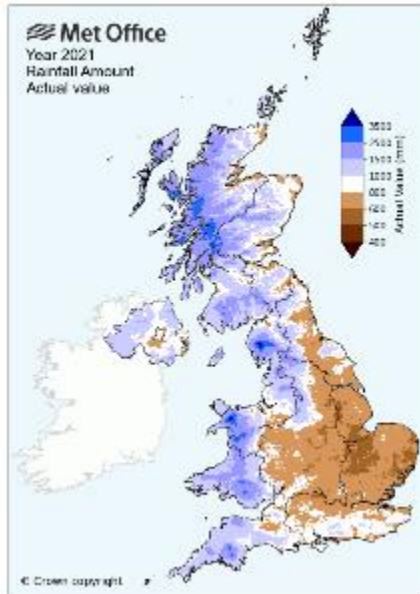
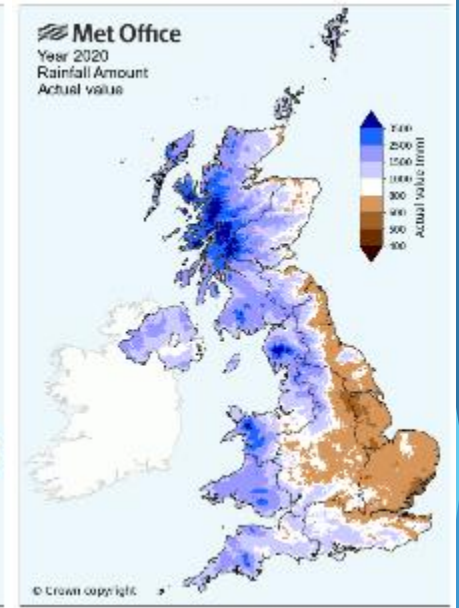
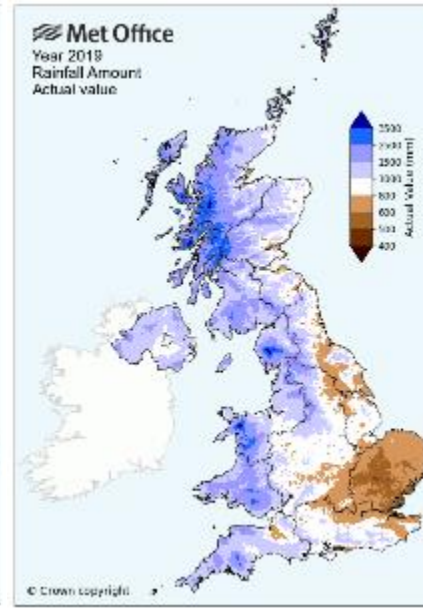
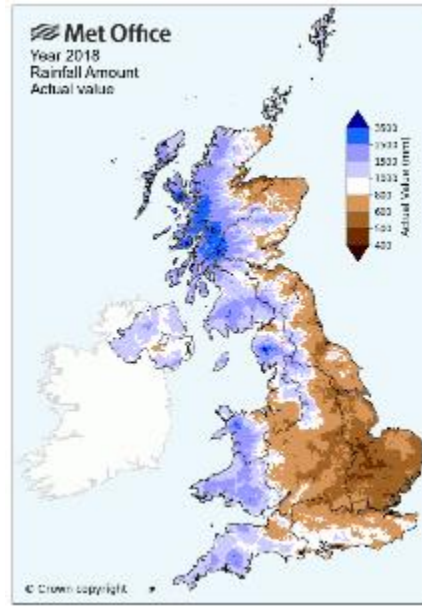
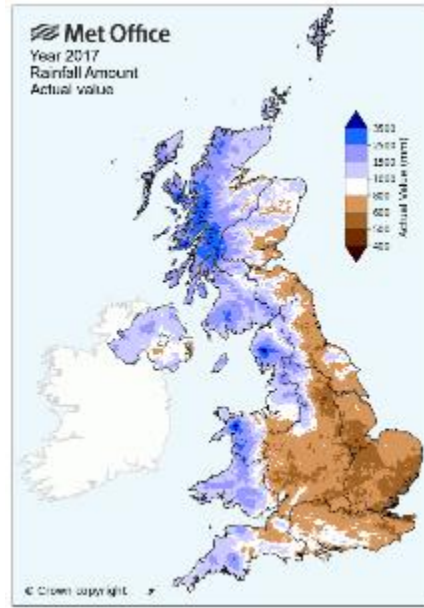
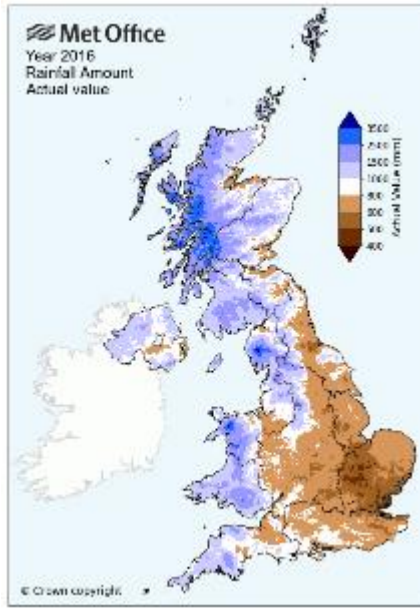


# Climate change

- ▶ Weather patterns are changing
- ▶ 2023 was the hottest year on record
- ▶ 2024 is forecast to be another hot year following on from the challenges turf managers faced in
  - ▶ 2012
  - ▶ 2018
  - ▶ 2020
  - ▶ 2022
- ▶ Business Resilience Plans must include the impacts of drought and flood



# Annual rainfall 2016 to 2023 - '61 to '90 anomaly







Climate change results in  
longer drier spells and  
heavier more intense  
rainfall...  
4 named storms in the  
January 2024 and Floods...

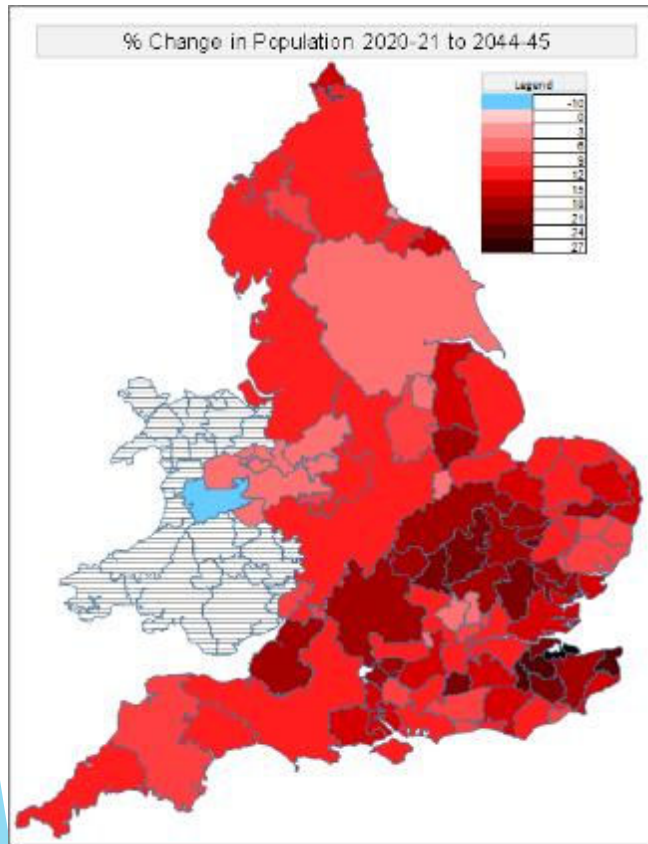
# Changing population

- ▶ We have net migration of around 500k per year
- ▶ Growing populations are forecasted to be located in areas of existing water stress
- ▶ By 2050 UK population we have grown by 12.5 million people





Personal consumption has doubled in the last 50 years, and we face population growth...



What would 20% population growth in the Thames Region look like?

Imagine the population of Manchester moving!





# Regulations and legal framework

- ▶ Past over abstraction
  - ▶ Many areas have over abstracted GW and SW for decades
- ▶ Longer drier spells
  - ▶ Reduce SW flows and result in waterways falling below environmental flow rates due to pollution concentrations
- ▶ Heavier more intense rainfall events
  - ▶ Flush pollutants into water ways and overwhelm combined sewer systems





# The Environment Act 2021

## WATER

- ▶ Effective collaboration between water companies through statutory water management plans
- ▶ Drainage and sewerage management planning a statutory duty
- ▶ **Minimise damage water abstraction may cause on environment**
- ▶ Modernise the process for modifying water and sewerage company licence conditions
- ▶ Currently, only 14% of surface water bodies achieve "Good" ecological standard - the EA has a legal obligation prevent further degradation - resulting in abstraction reduction - **including water companies**





# Water Framework Directive 2017 & revised

There was concern that existing Directives governing the management of the water environment were rather fragmented.

- ▶ A high level of environmental protection, leading to a clean and healthy water environment.
- ▶ The ‘precautionary principle’ and the ‘polluter pays’ principle.
- ▶ Taking preventative action against pollution and controlling pollution at source.
- ▶ Taking account of the costs and benefits involved within a fair water pricing policy.
- ▶ Ensuring that wide and active consultation takes place during the development of water management plans.
- ▶ The need for international collaboration for certain river basins (e.g. Northern Ireland and Ireland).
- ▶ The regulatory approach enabling...





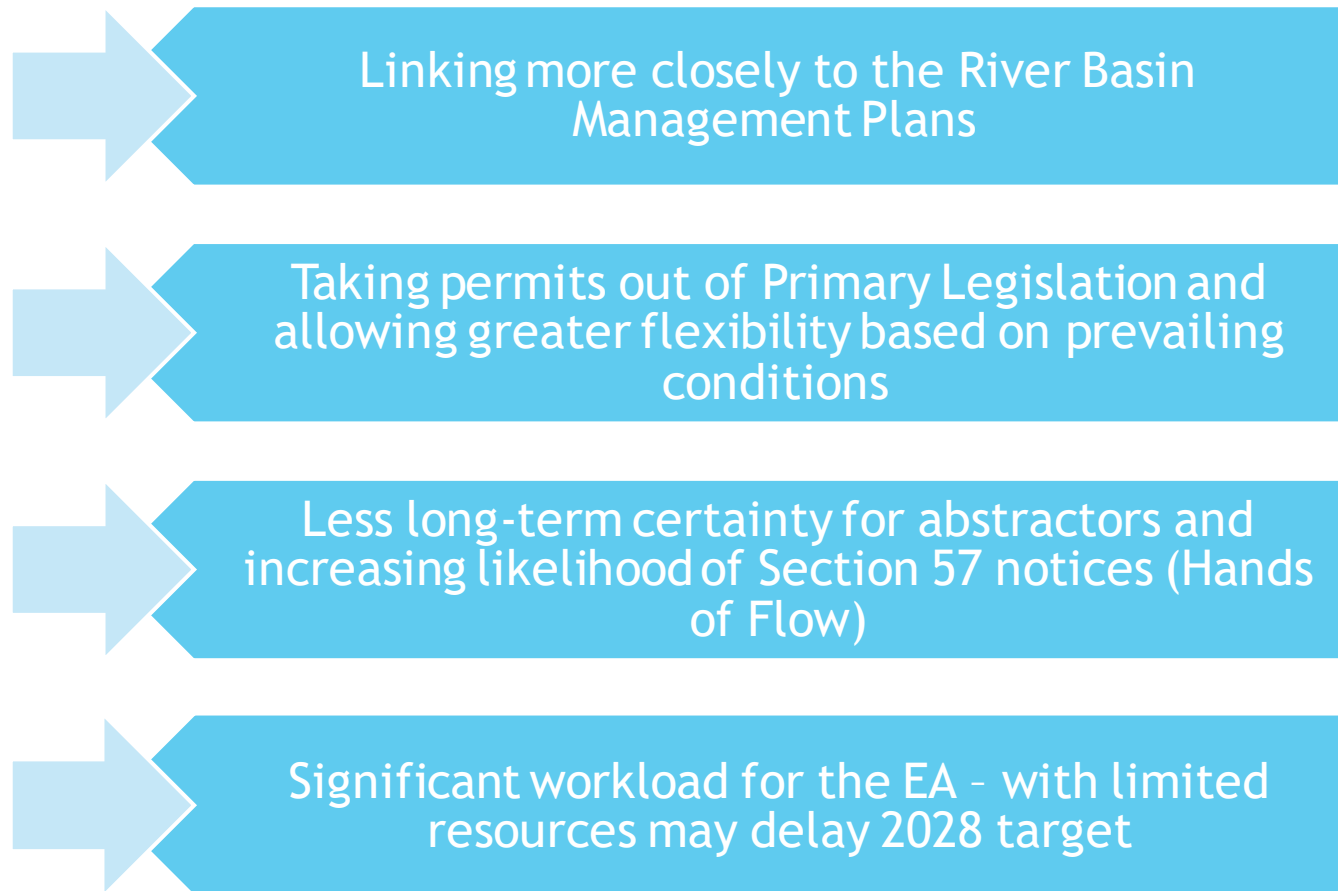
# The 25-Year Environment Plan


## Clean and plentiful water

We will achieve clean and plentiful water by improving at least three quarters of our waters to be close to their natural state as soon as is practicable by:

- ▶ reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies
- ▶ reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per our River Basin Management Plans
- ▶ supporting OFWAT's ambitions on leakage, minimising the amount of water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15% by 2025
- ▶ minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters; we will make sure that potential bathers are warned of any short-term pollution risks
- ▶ So far only **14%** of rivers achieve "Good" ecological standards and projection indicate that by 2043 this will fall to **6%**
- ▶ **Enabling...**

# Transition of Abstraction Licensing to the Environmental Permitting system

- 
- Linking more closely to the River Basin Management Plans
  - Taking permits out of Primary Legislation and allowing greater flexibility based on prevailing conditions
  - Less long-term certainty for abstractors and increasing likelihood of Section 57 notices (Hands of Flow)
  - Significant workload for the EA - with limited resources may delay 2028 target



Given this complexity, the planning water for availability and allocation of water to 2050 and beyond was essential, and led to:

**Meeting our future water needs; A National Framework for Water Resources...**



# 2-year consultation started in 2018... Meeting our future water needs: a national framework for water resource

- ▶ The Environment Agency was instructed to research and develop a roadmap towards water sustainability
- ▶ The report and programme required broad consultation
- ▶ ESi were invited to act as a consultee representing the golf sector alongside power sector, paper, agricultural sector, rivers and canals and numerous other industries
- ▶ The final framework document was published in March 2020 and set out the process and timescales for the process of demand reduction and infrastructure development needed to safeguard water availability for the next 50 years and beyond...

# Creating and implementing a plan for the availability of water

- ▶ 5 Regional water groups were created
  - ▶ Water Resource East
  - ▶ Water Resource South-East
  - ▶ West Country Water Resource
  - ▶ Water Resource North
  - ▶ Water Resource West
- ▶ The Regional Groups are funded and made up of the stakeholders in the regions - water supply companies, Environment Agency with input from Natural England, Rivers Trust, water users
- ▶ Each group has to create a local water resilience plan fitting the National Framework within the defined timeframe



# National Framework for Water Resource 2020

- ▶ The national framework sets the direction and expectations for regional groups.
- ▶ Following publication of the national framework this is the timeline for the regional groups:
  - ▶ March 2020 – set out their initial statement of regional water needs
  - ▶ July 2020 – publish the approach they will take to developing their plans
  - ▶ February 2021 – update their statement of regional water needs
  - ▶ August 2021 – share their draft plans to ensure they are aligned
  - ▶ January 2022 – hold an informal consultation on draft regional plans
  - ▶ August 2022 – publish their final draft plans
  - ▶ September 2023 – publish their final regional plans

If no action is taken between 2025 and 2050 around **3,435 million extra litres of water per day** will be needed for public water supply to address future pressures. This includes:

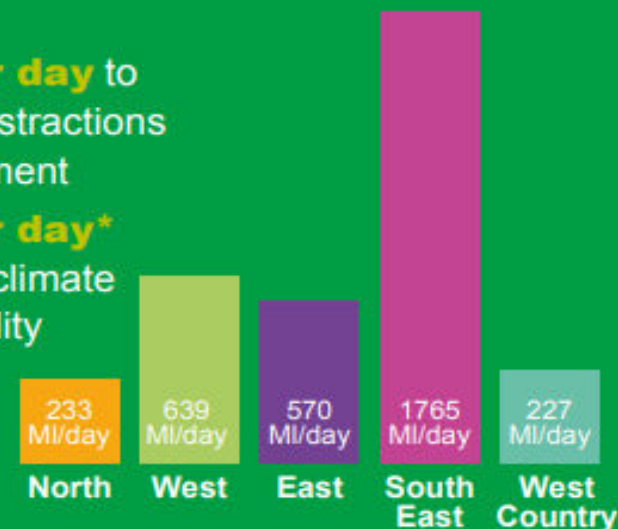
**1,150 million litres per day (MI/d)** to make water supplies more resilient to drought

**1,040 million litres per day** to supply the growing population

**720 million litres per day** to replace unsustainable abstractions and improve the environment

**400 million litres per day\*** to address the impact of climate change on water availability

Around **50% of the national need is in the South East**



\*Water companies have included additional impacts from climate change of around 640 MI/d in their plans up to 2025 which is before the start date for this analysis



# Where does golf fit in to the national picture?

The Water use and resilience in the  
leisure sector Project...

# No surprises for the golf sector

Knox, J.W., Rodriguez-Diaz, J.A., and Weatherhead, E.K (2007) Water resources for golf: current use and underlying trends. Final report to the English Golf Union (England Golf). Published by Cranfield University

Hanson, A.C, (2018) Water use and resilience in the leisure sector. Report to EG, BIGGA, and the R&A. Published by ESi

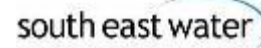
Hanson, A.C, (2020) Water use and resilience in the leisure sector. Report to EG, BIGGA and the R&A. Published by ESi

65% of golf clubs use mains water for irrigation, and 1,200 golf clubs in England are located in existing areas of water stress



# Esi's project was funded and supported by...

**waterwise**



# Part 1 - Identifying water use and source

- ▶ Collaborating with the water companies/Retailers/Environment Agency to collate data to confirm:
  - ▶ Leisure sector irrigation consumption total
  - ▶ Leisure sector irrigation consumption by source of supply
- ▶ Identify leisure sites in areas
  - ▶ With Limited or No abstraction availability
  - ▶ Where water companies have supply issues
  - ▶ In need of surface water attenuation and soft landscape flood relief
  - ▶ That suffer combined sewer overloads and sewage discharge to water course that may benefit from surface water attenuation
  - ▶ Of over abstraction impacting water and ecological quality

## Part 2 - Engaging with the National Associations and industry representatives

- ▶ Initiate discussions with the Governing bodies, representative organisations and professional bodies representing the Turf Grass industry in the UK at National and County level.
- ▶ Create documents and seminar/workshop material outlining the overlapping issues surrounding water resources, leisure turf irrigation, water quality, supply, and legislative ecological/environmental requirements.
- ▶ Discuss, develop and agree a strategy with representative bodies to reduce consumption of mains potable supply in leisure turf grass management and identify the range of alternative sources of supply
- ▶ Include discussions on land drainage, soft landscaping, formal/informal attenuation and flood relief and water quality management.



## Part 3 - Develop and agree an operator engagement process, solutions & water use targets with National Associations and industry representatives

- ▶ Identify what the National Associations and industry representative bodies in the leisure sector can do to ensure the strategic aims agreed are achieved by their membership.
- ▶ Discuss and understand the decision-making process around water use and source in the leisure sector.
- ▶ Develop and agree a range of tactical tools, and potentially market adjustments, to influence the decisions on water use at facility level
- ▶ Discuss and agree the method to access leisure facility operators
  - ▶ Encouraging facilities to make contact and volunteer specific data
  - ▶ Accessing the more reluctant facility operators

Project outputs created by the GMA, RCA, CMAE, UKGF, NAPGC, and GCMA...

The Leisure Association Water Charter

The Leisure Operator Water Charter

Case studies portal

Leisure sector water working group

Water Resilience Plan Template

# National and Regional Water Resource Plans incorporating consultations

- ▶ Following 5 years of development and consultation the regional water resource groups have developed their regional water resource plans to 2050 and beyond
- ▶ The regional plans were assessed to ensure they comply with the NFWR from March to August 2023
- ▶ September 2023 the 5 Regional Water Resource Groups published the adopted water resource plans
- ▶ The plans are largely based on
  - ▶ Supply side infrastructure to increase supply starting to come online from 2030
  - ▶ Demand reduction from 2024 - 2034
- ▶ **Leading to...**



# Why golf is in the spotlight

High and increasing consumption...



# Key findings - leisure turf irrigation...

- ▶ Water companies have a legal obligation to supply potable water for potable use
- ▶ 3 largest turf irrigators in the leisure sector
  - ▶ Golf (8 times the irrigation total of the next largest consumer)
  - ▶ Football
  - ▶ Horseracing
- ▶ Over 1,200 golf clubs are located within existing areas of water stress
- ▶ 65% of golf irrigation comes from mains as direct spray irrigation
- ▶ The irrigation/playing season has extended and has already exceeded the benefits to reduce consumption available from efficiency in many areas.
- ▶ Golf is estimated to double irrigation consumption in the next 10 years - due to fairway irrigation installation.
- ▶ Abstraction availability is reducing in many areas - making a sector move away from mains irrigation more difficult
- ▶ Leisure operators can offer solutions through the use of "Problem water" and should receive funding to do so...



# Positioning leisure as part of the solution by using problem water

- ▶ ESi has consistently positioned the leisure sector as being part of the solution to the impacts of climate change and population growth
- ▶ Working with The Environment Agency, Natural England, Highways England/National Highways, The Rivers Trust, The Wildlife Trusts, water companies and others we have case study projects underway that:
  - ▶ Reduce surface water flooding (land runoff, SuDS, and highway)
  - ▶ Create wetland habitat and onsite water storage
  - ▶ Enhance ecology
  - ▶ Improve water quality
  - ▶ Increase carbon sequestration
- ▶ We are in discussions with NE/DEFRA/EA about access to grants for environmental projects - ELMS/Local Nature Recovery...



# But...we face Abstraction license reductions

- ▶ The Environment Agency has started to create a leisure sector "Jeopardy map"
- ▶ Highlights existing abstraction licenses that are in areas where abstraction must be reduced to comply with the Environment Act and WFD - some reductions will be between 75% and 100%.
- ▶ Abstraction reduction will be implemented over the next 4 years
- ▶ Abstraction reductions will also impact water companies, reducing their available volume



# And...Non-Household Demand reduction targets

- ▶ Water companies have an obligation to reduce Non-Household Demand by 9% by 2038
- ▶ Primary focus will fall on discretionary water use - non potable
- ▶ Reductions in abstraction will not be available from mains supply
- ▶ The UK WIR Drought Code of Practice (Summer 2023)
  - ▶ To increase and encourage water resilience action in the leisure sector, UK Water Industry Research (UKWIR) has just updated the water industry Drought Code of Practice, that applies to every water company in England and Wales.
  - ▶ The Leisure Association Water Charter, Leisure Operator Water Charter, and Leisure Sector Water Working Group have been adopted within the new Code of Practice following a recommendation by Waterwise and Natural England.



# What should you do?

Create your water resilience plan...



Carpark water treatment will probably need a Bypass OWS of

1

L/S peak flow

**Elements we have reviewed during the process**

- [Record your water source and consumption](#)
- [Your irrigation - system and areas](#)
- [Agronomy - review of available information](#)
- [Technology - Review of available information](#)
- [Sustainable water sources - Review of potential sources](#)
- [Potential funding - review of possible funding sources](#)
- [Rainwater collection calculator - site data entered](#)
- [Oil water separator estimate - carpark runoff](#)
- [Surface water runoff - site potential entered](#)
- [On site storage potential - reviewed](#)
- [Abstraction - potential](#)
- [Highways - potential](#)
- [Water company - CSO](#)
- [Sustainable Urban Drainage \(SUDs\) - potential](#)
- [Greywater - potential](#)

Progress	Date
Complete	09/01/2023
Not Started	11/09/2021
Not Started	12/09/2021
Not Started	13/09/2021
Not Started	14/09/2021
Not Started	15/09/2021
Not Started	16/09/2021
Not Started	17/09/2021
Not Started	18/09/2021
Not Started	25/09/2021
Not Started	25/09/2021
Not Started	25/09/2021
Not Started	25/09/2021
Not Started	02/10/2021
Not Started	02/10/2021

We have now completed our Water Resilience Plan and we will be implementing the plan

To implement the plan we will...



Name



Position



Date



Publication date



# Your irrigation...

## Areas irrigated

- How large is your irrigated area?
- Is it increasing or decreasing?

## Controls

- Valve in head
- Remote control

## Moisture management

- Assessing need for water
- Partial runs and hand-watering

## Application accuracy

- Catch can test
- Individual head control

# Alternative water sources



## Rainwater harvesting

- Carpark
- Roof
- maintenance buildings
- land drainage
- Surface water flood issues in your area?



## Look over your fence...

- Roads
- Developments
- Existing buildings and hardstanding



# Creating water storage

## How much storage do you need

- What is your minimum overnight irrigation run in M3?  
60m<sup>3</sup>/80m<sup>3</sup>/100m<sup>3</sup>
- What drought period do you want to cover - 3 weeks, 3 months, 12 months?

## Space and volume

- Tank - above/below ground
- Informal storage - feature of the course
- Formal reservoir

## Planning process for a reservoir = 24-36 months

- Ecology surveys
- Design
- Application
- Involve LPA, EA, and other stakeholders from the outset to shape the plan/design

Thank you and any  
questions...

Contact details

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## The Leisure Operator Water Charter

