27 April 2023

Updated prospects for irrigation – Area forecasts for 2023

Our updated prospects for irrigation across England in 2023 range from GOOD through to MODERATE. Further detail of the prospects for your local area can be found in this document.

Ensuring a successful irrigation season

We encourage all irrigators to understand the risks of a period of prolonged dry weather on your abstraction. We ask all irrigators to take such actions as possible to minimise the impacts of prolonged dry weather on the environment and their businesses. If you believe your abstraction is at risk this summer, please talk to us about actions you can take. If you don't know your local Environment Agency contact, please call our customer service line on 03708 506506 and ask to speak to your local water resources member of staff dealing with irrigation prospects. We have provided local Environment Agency contacts within this report.

Abstraction Licences

- Understand your licence conditions. If you don't, please get in touch and we can help you.
- Check your licence details and, always:
    - adhere to licence conditions ensuring that abstractions are only taken from authorised locations during authorised periods
    - ensure volumes and rates are not exceeded and keep accurate records of meter readings
- Where third parties undertake irrigation, licence holders should ensure contractors fully understand the abstraction licence conditions. Those who have licences with compensation discharges and re-abstraction conditions should ensure that water is released at the same time as abstraction is taking place.
- Review your water needs. Make sure that you apply to make any changes to your water rights so that your abstraction is more resilient.
- Register to manage your licences online
    - We have developed a secure online Service, which can be found by searching GOV.UK for 'Manage your water abstraction or impoundment licence'.
    - As part of the Service you can now:
        - View your licence online and view previous returns submitted
        - Submit your abstraction returns online
        - Give permission to a named contact to manage your licence
- The Environment Agency is moving towards using the online Service to provide e-alert notifications to abstractors who have hands-off flow or level conditions in licences. This will improve access to water when it is available and better protect water rights and the environment when it is not. Not all abstractors will receive email alerts this year, but they are an important step in helping abstractors to adapt to river and groundwater levels as the climate changes. We will provide more information on the water abstraction alerts as they become available in your area.

Voluntary Restrictions

- Support voluntary restrictions if and when they are requested. This will delay and may avoid the need for more formal restrictions. If you voluntarily reduce your abstraction, this will not count against you if you apply to renew your licence.

Storage Reservoirs

- Take every possible opportunity to ensure that high flow storage reservoirs are as full as possible by the start of the irrigation season.

- If you are currently having trouble filling your irrigation reservoirs, please contact us as early as possible to enable maximising any potential that may exist to fill your reservoir.
- If you are in an Environment Agency Area which is in drought or prolonged dry weather status, we may consider requests for Local Enforcement Positions to allow an extension to the reservoir refill season beyond March 2023. This will only be supported where flows are above winter hands-off flow conditions so that protection of the environment and other water users remains in place. We will not consider requests where a similar proposal has previously been made by the same abstractor and no subsequent action has been taken to improve future resilience of supplies. Details of Environment Agency contacts are given in the area-specific sections below.
- Continue to plan for the future. Is there an opportunity to change when you abstract, for example from direct summer abstraction to high flow storage? Please talk to us about options you can take.
- The Rural Payment Agency's Water Management Grant Round 2 is now open for applications to horticultural and arable businesses growing or intending to grow irrigated food crops, ornamentals or forestry nurseries. Applicants have until 12 July 2023 to access the Online Checker. For those invited to make a full application, the deadline is 31 October 2024. If planning permission and an abstraction licence is required, they will need to be submitted with the full application. More information can be found here.
- Ensure your reservoir is regularly maintained, checking for cracks and leaks.

Irrigation Management

- Make sure that meters are in good working order and properly fitted.
- Check irrigation systems and replace worn or broken items before the start of the season.
- Make sure that irrigation systems are properly set up and operated in accordance with an accurate and reliable irrigation scheduling system.
- Ensure you are prepared to change your irrigation plans if necessary.
- Prioritise crops and fields in terms of water need.
- Choose irrigation times carefully, e.g. avoid the heat of the day; irrigate at night, if possible.
- Undertake a water audit. Know the cost of your water, calculate crop per drop.
- Read our latest abstraction and dry weather advice in the Farming Advice Service newsletters.
- A Water Rights Trading Map is available for East Anglia, Midlands and Lincolnshire and Northamptonshire areas.
- See also the document: Guidance on the planning and design of irrigation reservoirs in Kent, jointly produced by Environment Agency, Kent County Council and EMR.

Abstractor Groups and Guidance

- Where appropriate, discuss issues and share ideas with neighbouring farmers. Several local liaison groups already exist for this purpose. Consider joining or setting up a group.
- Maintain an awareness of developing guidance from academic institutions and farming organisations (such as e.g. NFU, UKIA, Cranfield University etc.).

Other useful links and guidance

- We have a range of literature available to help support your business including Rainwater Harvesting; Adopting Best Metering Practice; and Think About Installing an Irrigation Reservoir (please request these from our local Environment Agency area – contacts below).
- Keep updated on the latest water situation reports at https://www.gov.uk/government/collections/water-situation-reports-for-england (national and area specific reports are available).

Definitions

Good	Water levels are average or above average and supplies are expected to be safe. There is a possibility of minor local controls on abstraction from surface water in late summer if the weather is exceptionally hot and dry.
Moderate	Water levels are low. Some controls on surface water abstraction are possible by midsummer if the weather is hot and dry. Controls on abstraction from groundwater are possible in small, sensitive groundwater areas.
Poor	Water levels are well below average. Soil moisture deficit is developing early and significant restrictions on abstraction from surface and groundwater are probable.

Prospects for individual areas

To jump to specific areas, please click the links below:

Area detail

Environment Agency - Cumbria and Lancashire

The overall summer prospects for water resources availability for irrigation in Cumbria and Lancashire are likely to be GOOD if Cumbria and Lancashire has average rainfall.

Background

The Cumbria and Lancashire area has quick responding rivers and therefore the surface water situation can change relatively quickly. There are currently no concerns regarding irrigation from groundwater.

Rainfall/Soil Moisture Deficit

Cumbria and Lancashire observed above average rainfall over the previous three months (January 2023 to March 2023). Over this period, rainfall was 127% of the long-term average and was classed as above normal.

Rainfall up to 25 April was variable across Cumbria and Lancashire – ranging between 22% and 112% of the LTA (Long Term Average) for April, depending on the catchment.

The main surface water irrigation area in Cumbria and Lancashire is Crossens, which lies in the Douglas hydrological area. The Douglas area observed notably high rainfall during March (157% of the LTA for March), with the rain gauge at Crossens pumping station observing 161% of the LTA for March and 22% of the LTA for April by 25 April. Once we reach the drier months (probably in May), the pumping station trigger levels will change with the aim of maintaining water levels able to support irrigation abstraction in the level dependent parts of the Crossens catchment. When doing this we have to consider various priorities, including flood risk management.

Soil moisture deficits were low across Cumbria and Lancashire by the end of March, in the range of 0mm to 5mm - as expected for the time of year.

River Flows/Reservoir Storage

Monthly mean river flows across Cumbria and Lancashire for March 2023 were classed as either above normal or notably high for the time of year. River flows can decline relatively quickly if Cumbria and Lancashire experiences periods of below average rainfall over the coming months.

For the week ending 9 April 2023, total reservoir storage for North West England was at 93%, compared to 90% this time last year- as expected for the time of year.

Groundwater

There are no issues with groundwater resource availability in Cumbria and Lancashire at the present time. Principally, aquifers groundwater levels are all classed as normal or above and generally take a long time to decline, although groundwater reacts more quickly in shallow aquifers.

For more information please contact:

Integrated Environment Planning team - drought.northwest@environment-agency.gov.uk

Environment Agency - Devon, Cornwall and Isles of Scilly

The overall summer prospects for water resources availability for irrigation in Devon, Cornwall & Isles of Scilly are currently MODERATE.

Background

Because of the nature of the geology and landscape in Devon, Cornwall & Isles of Scilly, it is difficult to predict water shortages for irrigation in the coming season. Whether there is sufficient water will depend on rainfall, water abstraction and temperatures during the season. We therefore expect abstractors to be prepared and encourage applications for winter storage reservoirs.

Rainfall/Soil Moisture Deficit

Devon and Cornwall received above average rainfall totals between October 2022 and January 2023 with below average rainfall in February 2023 at 20% LTA. Rainfall in March 2023 was significantly above average at 203% of the LTA, 'exceptionally high' for the time of year.

Soil moisture deficit for Devon and Cornwall was zero at the end of March 2023. Soils are wetter than at the same time in 2022 and above the LTA.

River Flows/Reservoir Storage

Monthly mean river flows for March 2023 were normal for the time of year in West Cornwall, while they ranged from above normal, or higher for the time of year in the rest of the area. There will always be a risk that flows will drop off quickly if we have below average rainfall over the coming months.

2023 has begun with some storage reservoirs across the region below the normal level for the time of year. As of 27 March 2023, total storage is 79%, compared to over 90% this time last year.

Groundwater

As of March 2023, all groundwater levels are at normal status, except for those in the very fast-responding Winnards Perch borehole, which is at exceptionally high status due to recent rainfall. British Geological Survey Aquimod modelling for our Bussels No 7A indicator borehole predicts that normal levels are most likely at this borehole up until October 2023. This prediction may be extrapolated to some extent to the indicator boreholes across the rest of DCIS. In common with other faster-responding boreholes, groundwater levels in our Isles of Scilly monitoring borehole have, so far this year, risen and fallen rapidly in response to rainfall and are currently increasing, due to rainfall since the start of March.

Forward look

With the groundwater levels remaining healthy and the limited environmental benefit of placing section 57 restrictions in Devon, Cornwall & Isles of Scilly, we do not anticipate any section 57 restrictions regarding irrigation in the coming months. However, due to the nature of the geology and landscape in Devon, Cornwall & Isles of Scilly, it is difficult to predict water shortages for irrigation in the coming season. This position will be reviewed during 2023, dependent on the rainfall patterns and river/groundwater levels.

The current 3-month Met Office forecast issued at the end of March shows drier and hotter weather, and, together with the low reservoir levels, this has led us to lower our assessments, therefore the indicative irrigation prospects for Devon, Cornwall & Isles of Scilly are MODERATE for 2023.

Please contact for more information:

Debbie Peareth – Deputy Drought Coordinator DCIS Drought.DCIS@environment-agency.gov.uk

Environment Agency - East Anglia (East)

The overall summer prospects for water resources availability for irrigation in East Anglia (East) are currently MODERATE.

Background

The summer of 2022 was exceptionally hot and dry with many of the Anglian eastern coastal rivers experiencing less than 50% of average rainfall and a large swathe between the Yare and the Deben

recording less than 30%. That extreme spell broke unevenly across the area, with north-west and parts of north-east Norfolk continuing dry through to November.

Most catchments experienced average or slightly above average rainfall during the autumn, a pattern that continued into early January 2023. A period of more intense rain in late November and December 2022 resulted in soil moisture deficits falling rapidly, conducive to a rapid river response and some recharge of groundwater in most aquifers south of the Wensum.

A rapid change from mid-January 2023 led to an exceptionally dry spell to early March, seeing the lowest February totals since 1959 and an interruption of groundwater recharge – some groundwater levels even fell.

Conditions turned wetter in early March with all catchments recording over 200% of average rainfall, largely mitigating the dry February.

Rainfall / Soil Moisture Deficit

Overall rainfall totals for the October-March period were above the long-term average in Suffolk and notably high in Essex. Slightly below average rainfall totals were recorded in an arc from Norwich to the North West Norfolk coast, with the remainder of Norfolk seeing average totals.

Soil moisture levels have been low enough for a strong field drainage response on the heavier clay soils and for the recharge of groundwater since mid-December 2022. The area soil moisture deficit increased to 20mm (above the long-term average) in February but reduced to around 10mm in March and remains below the long-term average as of mid-April.

Severe established droughts are often associated with very early drying of the soil in February/March (1976, 2022) leading to a prolonged annual recession of baseflow. This is not the current situation as of mid-April.

An average rainfall pattern of 80% of long-term average between April and July has a significant probability of 1 in 3 and has a 1 in 5 probability of continuing into late August.

Extremely low rainfall (60% or less) between April and early summer has a reduced probability of occurring at around 1 in 10 and has a 1 in 20 probability of continuing into late summer.

River Flows

Most average river flows fell to a notably low or lower levels in February. The river flows recovered in most catchments in March due to higher than average levels of rainfall with the exception of the Burn and the Black Ditch where the river flows recorded below normal. Several river flows were notably high, and the Wensum, Deben and Stour all recorded exceptionally high March averages.

Late spring / early summer rainfall totals above 100% of the long-term average should result in fewer water supply or low flow related incidents and irrigation prospects are currently ‘moderate to good’ under this scenario. Flow rates in Essex and Suffolk coastal rivers would be expected to be close to normal. Rivers with a strong baseflow (groundwater) component including the coastal crag and North Norfolk rivers are likely to remain below normal but above formal abstraction restriction thresholds i.e. for Section 57 spray irrigation.

Under an 80% rainfall scenario, irrigation prospects are ‘moderate’. By July, the accumulated deficit could result in some catchments experiencing moderately low flows, particularly in the areas where groundwater has not fully recovered. Suffolk crag and Norfolk groundwater dominated rivers are likely to be notably low and we may request voluntary restraint to limit abstraction during exceptionally hot weather. The risk of requiring formal Section 57 restrictions is not significant if regular summer rainfall limits abstraction demand. However, during drier periods, river support and augmentation schemes are likely to be operational.

A 60% rainfall scenario would have significant consequences, with overall irrigation prospects ‘moderate to poor’. Parts of Suffolk and Essex would be moderate where groundwater has recovered to normal or above

levels while poor in most other aquifer-dominated catchments and in runoff-dominated rivers south of the Yare which do not benefit from river augmentation schemes, and can experience very high combined demands for irrigation direct from the river. Most catchments would, at some point, experience flow rates that would certainly initiate voluntary abstraction reduction requests, and possibly formal Section 57 spray irrigation restrictions during an embedded prolonged hot dry spell. Partial recovery of groundwater in the baseflow-dominant rivers of north Norfolk and Suffolk would expose these areas to a much greater risk in the event of a repeat of the extreme 2022 weather patterns. Catchments with higher than normal groundwater levels in 2022 would be less resilient following subdued recharge over the 2022-23.

Groundwater

The re-wetting of the soil by mid-March resulted in a second period of groundwater recharge, which has been particularly strong in the southern catchments – Suffolk and Essex chalk recovering to normal/near normal levels. The response has been weaker in the Suffolk crag, Norfolk chalk and crag aquifers which remain below normal.

Currently there are no areas of exceptionally low groundwater. We expect monitoring to show some further improvement in groundwater status by the start of May, though a dry late April would see little additional recharge beyond that.

Forward look

Our assessment of prospects for Anglian streams in the east is therefore locally dependent on hydrological conditions: 'moderate to good' for parts of Essex and Suffolk that have experienced a significantly wetter autumn and winter, tending to 'moderate to poor' in the Norfolk coastal rivers and streams where groundwater levels remain below normal. Our current hydrological indicators for flow and groundwater levels do not show an established drought, although recovery is fragile. Another hot dry summer could result in locally significant environmental deterioration, and we will be prepared to act to limit demands when and where appropriate. The risk of significant local interventions remains low at around 10%. But this is elevated above the unbiased risk for April when we would expect a forecast of abstraction restrictions for the year ahead once every 20 years or (5%).

Please contact for more information:

Tim Wojcik – East Anglia East
easterniep@environment-agency.gov.uk

Peter Willett – Technical Specialist – Hydrology
peter.willett@environment-agency.gov.uk

Environment Agency - East Anglia (West)

The overall summer prospects for water resources availability for spray irrigation in East Anglia (West) are currently MODERATE.

Background

Following the extremely dry spring and summer of 2022, rainfall across the area since September has been close to average or above average. The highest totals have been recorded across the Bedford Ouse, where the seven months period from September to March has seen 125 per cent of the long-term average. In north-west Norfolk and the Wissey catchments, September to March rainfall has been close to the long-term average. The Bedford Ouse recovered during the autumn and early winter, and despite the dry spell in January and February, has continued to respond well to the heavy rainfall during March. North-west Norfolk is taking longer to recover, with a soil moisture deficit persisting into 2023 and groundwater levels recovering later and more slowly. This is due in part to the lower rainfall there and also to the geology and soils. The Ely Ouse has shown a response that lies in between those catchments, with the Cam and Lark recovering during autumn and winter and the Little Ouse and Wissey taking longer.

Rainfall / Soil Moisture Deficit

Rainfall between March and August 2022 was only 50-60% of the long-term average, leading to exceptionally dry conditions across all catchments. Between September 2022 and March 2023 rainfall totals were 100-125% of the long-term average, with the highest volumes in the Bedford Ouse catchment and the lowest accumulations in the Fens, west Norfolk and north-west Norfolk. High totals across the Area in November and March compensated for a very dry period in the second half of January and throughout February. March rainfall was more than 200 per cent of the long-term average, and in some locations it exceeded 300 per cent. Rainfall in the first half of April has been relatively healthy, particularly across the Fens and in NW Norfolk, where the long-term average for April has already been reached. Soil moisture conditions remain close to field capacity and are wetter than usual at this time of year due to the high rainfall totals over the past six weeks.

River Flows

Some gauging stations recorded very low flows in the summer of 2022, including record lows in the Little Ouse catchment. The rivers of the Bedford Ouse catchment and the Cam, Lark and Snail recovered during the wet autumn of 2022. In the Little Ouse, the Nar, and the other catchments in west Norfolk, the recovery in flow has been slower. The delay reflected the lower rainfall totals, the persistence of a soil moisture deficit through the autumn, and the reduced baseflow in those baseflow dominated catchments. When recharge stalled in the second half of January and throughout February, flows receded. Not all farm reservoirs across the area have been able to fill as a result, especially given the low storage carried over from last summer. With the heavy rainfall in March we have seen a marked increase in flow at all gauging stations.

Groundwater

Groundwater levels began recharging during late autumn in the Sandstone aquifers and across the chalk in the Ivel, Cam, Snail and Lark catchments. Groundwater in those catchments had reached approximately normal levels by January. Levels receded at some of those sites during the dry weather in the second half of January and throughout February, but have since shown further recharge during March and into April and are currently relatively healthy. In the Little Ouse and catchments of west and north-west Norfolk, recharge began later and groundwater has not yet recovered to normal levels. Throughout the dry weather between mid-January and the end of February, the groundwater levels at most of the sites used as hydrological indicators continued to rise, showing the delay between rainfall and recharge there. That gives us confidence that, following the heavy rainfall in March, we will continue to see recharge at those sites for some time yet.

Forward look

The overall summer prospects for water resources availability for irrigation in East Anglia (West) are currently MODERATE. It is likely that local water management actions, using existing licence conditions, will be required in the Fens during the irrigation season. Even in average conditions any dry periods during the summer can result in some form of local water management actions. These actions will most likely be required in the Middle Level, South Level, Counter Drain and/or the Hundred Foot catchments.

Elsewhere, average rainfall across the spring and summer would not lead to widespread restrictions on spray irrigation licences. However, many licences that abstract from surface water during summer have hands-off flow conditions, and periods of dry weather during the summer could lead to those conditions coming into effect. The risk this summer is now no higher than the usual risk in the Bedford Ouse catchments, including the Ivel, and in the Cam, Lark and Snail catchments. In the Little Ouse, Wissey, Nar, Heacham and other west Norfolk catchments, hands-off flow conditions are more likely to come into effect than in most summers. If there is a prolonged period of severely hot and dry weather, those standard licence conditions might not be sufficient to relieve the environmental stress, and licences without hands-off flow conditions could be requested to make voluntary reductions. Under more extreme conditions there would be formal Section 57 spray irrigation restrictions applied to surface water licences. The probability of formal restrictions to surface water licences is around 10% in the catchments of north-west and west Norfolk, and lower elsewhere in the Area.

Formal Section 57 spray irrigation restrictions are very unlikely to be used on groundwater licences across the Area this summer. However, a request might be made for voluntary reductions to groundwater licences if the spring is dry and prolonged hot and dry conditions follow this summer. The request is more likely in the catchments of west and north-west Norfolk where groundwater levels are lower.

Please contact for more information:

Catherine Keey, East Anglia (West) Integrated Environment Planning Team

iep_ang_central@environment-agency.gov.uk

Environment Agency - East Midlands

The overall summer prospects for water resources availability for irrigation in East Midlands Area are currently GOOD to MODERATE.

Background

East Midlands experienced a very dry spring and summer in 2022 which led to the area being in drought status from August 2022 until January 2023. February 2023 was very dry, but this was followed by above long term average rainfall in March.

Rainfall / Soil Moisture Deficit

Monthly rainfall totals for February 2023 were classified as notably low or exceptionally low across East Midlands relative to the long term average. In contrast, exceptionally high rainfall was recorded in all East Midlands hydrological catchments in March compared to the long term average. The three month rainfall totals (January to March) were recorded as normal.

67% of the April long term average rainfall has been recorded in the Trent Basin during the first half of April.

At the end of February soils were drier than at the end of January, due to lack of rainfall. The change in the weather in March meant that by the end of the month soil moisture deficits had decreased to below the long term average for East Midlands, meaning soils were very wet.

River Flows

Monthly surface water flows in March 2023 were normal or above normal across East Midlands in comparison to the long term average.

Groundwater

Groundwater levels at indicator sites at the end of March 2023 were recorded as ‘normal’ or higher compared to historic March levels.

Good recharge was observed in the fast-responding limestone aquifers in response to autumn rainfall. Levels have remained good throughout winter.

Seasonal recharge was first observed in the slow-responding sandstone aquifer during January and February. Although February was dry, continued rainfall through March and April means that a good response in groundwater levels is expected.

Prospects are good for groundwater.

Forward look

Prospects across East Midlands Area are GOOD to MODERATE for 2023.

Please contact for more information:

East Midlands Integrated Environment Planning team at WaterResources.DBNTLS@environment-agency.gov.uk

Environment Agency - Greater Manchester, Merseyside and Cheshire

Background

The current situation is normal and if we have average rainfall in the coming months then the irrigation prospects for the summer are likely to be GOOD.

Rainfall / Soil Moisture Deficit

Rainfall for the last three months ending February 2023 was 95% of the long-term average and was classed as normal. Soil moisture deficits were relatively low across Greater Manchester, Merseyside and Cheshire by the end of February, and as expected for the time of year. Although February rainfall was low (30% of the long term average) and classed as notably low, the first two weeks of March 2023 were wet, with precipitation in the form of rainfall and snow.

River Flows

Greater Manchester, Merseyside and Cheshire area has quick responding rivers and therefore the situation can change relatively quickly with an extended period of hot, dry weather.

Groundwater

There are no concerns regarding irrigation from groundwater.

Please contact for more information: Integrated Environmental Planning IEP_GMMC@environment-agency.gov.uk

Environment Agency - Hertfordshire and North London

The overall summer prospects for water resources availability for irrigation in Hertfordshire and North London are considered MODERATE.

Background

Rainfall amounts have exceeded the winter seasonal average at 136% for the period 1 October 2022 to 31 March 2023. This has allowed soils to become fully saturated, which has supported recharge to the groundwater and benefited river flows. Rains have continued into the start of April which has scope to extend the recharge period.

Rainfall / Soil Moisture Deficit

The Soil Moisture Deficit (SMD) reflects rainfall. The current SMD data show soils are fully saturated despite a very dry February. The effective rainfall (that which soaks through the soil) stands at 148% within the Area for the winter period. This has contributed towards raising groundwater levels.

River flows

Monitoring locations are generally showing flows are within their normal range for this time of year. In the chalk catchments, monitoring locations indicate flows are within their normal range. There are still some sections where flows have not occurred on river Misbourne (between the Chalfonts), the river Ash (low flows upstream of Much Hadham) and the upper reaches of the river Ver. The clay-based rivers did see several peak flows recorded due to recent rainfall. These clay-based rivers can quickly decline once rainfall rates cease and drier conditions appear.

Groundwater

Groundwater levels at our key indicator sites in the Mid-Chilterns chalk and the Upper Lee chalk are within their normal range. Higher than normal levels would have offered greater resilience to an extended dry summer period. The latest projections indicate the decline in groundwater levels could be more gradual, but river flow implications could still occur depending on the weather pattern over the next few months.

Forward Look

Prospects for Hertfordshire and North London are considered MODERATE.

A greater likelihood of warmer and drier conditions could bring forward the demand for irrigation watering, which in turn could result in our flow and level constraints being activated. Abstractors will be kept up to date with emails listing the latest weekly constraint data. Individual abstractors can contact us should they have any irrigation concerns over the summer period.

We will continue to monitor river flows and groundwater levels. This data is published and available to irrigators via https://www.gov.uk/government/publications/water-situation-local-area-reports

If you would like further information please contact Alastair Wilson at HNLenquiries@environment-agency.gov.uk

Environment Agency - Kent, South London and East Sussex

Over the winter period (Oct 2022 to Mar 2023) we received 141% of the Long-Term Average (LTA) rainfall. As a result, in Kent South London and East Sussex (KSLES) Area the water resource availability for the 2023 irrigation season is: GOOD.

Background

The Kent South London & East Sussex Area experienced moderately dry conditions over the 2021/22 winter period (86% of LTA rainfall). These conditions were exacerbated by the exceptionally hot and dry weather experienced across the Area in the summer, leaving many river baseflows vulnerably low.

The KSLES area experienced wet conditions early on in autumn with widespread intense periods of rain over the winter period (Oct 2022 to Mar 2023) particularly in November, December, January, and March, with February being exceptionally dry. The rainfall supported early onset of groundwater recovery, resulting in normal to above normal levels. This has resulted in normal flows in groundwater dominated catchments and rapid river responses in impermeable clay catchments. Water level dependant areas are considered healthy, heading into this irrigation season. Due to the antecedent rainfall over the winter months, water resources across all catchments are in favourable condition heading into the irrigation season, with no imminent concerns.

Rainfall / Soil Moisture Deficit

Following successive months of above average rainfall (except for February) the winter period (Oct 2022 to Mar 2023) received 141% of the LTA rainfall. The winter ended with March rainfall recording 203% LTA - the 4th wettest March on record. Rainfall in April so far (24th) is 141% of the areal LTA. The wet weather throughout March and April has allowed Soil Moisture Deficits (SMD) to zero, enabling groundwater recharge to temporarily resume.

River Flows

Following a relatively wet winter, flows remain seasonally high across the Area with groundwater dominated catchments recording normal to above normal flow and impermeable clay catchments generally notably high for the time of year. Impermeable catchments will typically be more susceptible to the impacts of drier conditions should they occur with subsequent abstraction constraints invariably following. Catchments where the summer flow component is predominately composed of groundwater base flow should remain resilient if drier warmer conditions become more prevalent in the summer months.

Groundwater

Following the return of above average rainfall in March, groundwater level declines slowed and, in some catchments, had started to rise again. Groundwater recharge is expected to temporarily persist until the end of the recharge season, which usually finishes as spring conditions take hold. As a result of the normal groundwater conditions water resources are relatively healthy heading into spring. We are therefore unlikely to expect abstraction constraints for those irrigators dependent upon boreholes this summer.

Forward look

The latest Met Office three-month weather outlook for April to June (dated 27/03/2023) indicates that warmer and drier conditions are more likely than normal.

As a result of the winter antecedent conditions typical abstraction constraints in the water level marsh supported areas and rainfall sensitive catchments have been delayed. If hot dry conditions persist this summer Hands off Flow (HoF) conditions are likely to be progressively triggered from later spring into the summer. In catchments such as Medway, Mole, Rother and Upper Stour, HoF conditions for agriculture abstractors will be reached in late spring to summer and remain in place as typically experienced.

Groundwater supported catchments such as the Lower Stour and Darent are unlikely to experience irrigation constraints. Supported marsh water level dependant areas will benefit from the retained waters and groundwater seepage but can potentially expect HoF constraints in late summer in the Rother Marshes, with more favourable conditions expected across the Stour marshes supported by greater spring baseflow. Groundwater abstractions and those with antecedent rainfall constraints are not expected to see abstraction constraints applied this summer.

As a result, irrigation prospects for the summer are considered GOOD across the Area.

Please read the latest Water Situation Reports via https://www.gov.uk/government/publications/water-situation-local-area-reports to view the KSL Area water resource situation in more detail.

For further updates or advice please contact your local environment officer or the Groundwater Hydrology team at: ksl.gwh@environment-agency.gov.uk

Environment Agency - Lincolnshire and Northamptonshire

The overall summer prospects for water resources availability for irrigation in Lincolnshire and Northamptonshire area are currently GOOD to MODERATE

Background

A wet autumn in 2022 helped to improve the overall situation following a very dry start that saw the area go into drought. Normal levels of rainfall in both December 2022 and January 2023 helped to solidify the improvement. All months from August 2022 to January 2023 had normal levels of rainfall or better, which

then saw the area move from drought to recovering drought status at the end of January. However, an exceptionally dry February, which only sure 30% of the long term average (LTA) rainfall, brought a halt to the recovery and prospects for 2023 were looking moderate for 2023.

Rainfall / Soil Moisture Deficit

March saw a drastic change in weather patterns, with rainfall averaging 181% of the LTA for the area, with some hydrological catchments receiving over 200% of their LTA rainfall. This meant that March's rainfall was classed as exceptionally high in most hydrological catchments (a complete contrast from the exceptionally low levels in February). Following the wet March, longer term rainfall trends (3-months,6-months and 12-months) are all now showing normal levels or higher during these periods. At the end of February, SMD was above normal to notably high levels and rising, but because of the wet March they ended the month at below normal levels. Rainfall has continued into April, with the area already receiving 48% of the LTA as of the 10th. With more rain having fallen since and the forecast suggesting wet weather in the coming days it looks likely there will be at least 100% LTA rainfall in April. Following the wet start to April, SMD has continued to decrease and is now at notably low levels for the time of year.

River Flows

Following a dry February, all rivers were at below normal to notably low. A wet March, saw fairly significant improvements throughout March, with most rivers ending March with monthly mean flows of above normal levels or higher. The only notably exception was the River Lud in the chalk aquifer that remained at below normal. Chalk rivers aren't as responsive as rivers in the limestone aquifers to one month's heavy rainfall, as they tend to respond slowly, reflecting the longer-term rainfall trends. By the end of the month, daily flows in the river Lud were at normal levels and as of mid-April the monthly average so far is in the normal range for the time of year. The relatively wet start to April has meant that most river flows are still at above normal for the time of year.

Groundwater

Groundwater levels ended February at below normal to normal. The exceptionally dry February appeared it might have brought the groundwater recharge season (October – March) to an early end with levels declining at the end of the month. However, thanks to the exceptionally wet March, there was further groundwater recharge, reversing the declines being observed at the end of February. By the end of March most groundwater sites were at normal to above normal for the time of year, with some still going up in April. Although levels are normal in the chalk aquifer, and in some cases still raising, one site is at the low end and showed limited recharge during March. It is expected that the chalk aquifers will recover more slowly than the limestone aquifers, so there may just be a delay in seeing the impacts of the wet March. However, the low levels seen in the chalk could also be due to the dry start to 2022 with these effects being relatively long lasting.

Forward look

Prospects across Lincolnshire and Northamptonshire area are GOOD to MODERATE for 2023.

With 100% of the LTA rainfall over the summer, we are likely to see normal to above normal river conditions and normal groundwater conditions in the limestone aquifer. In the chalk aquifer we are likely to see normal to below normal groundwater levels which will result in normal to below normal river conditions (bottom end of normal/top end of below normal in both rivers and groundwater).

With 80% of the LTA rainfall over the summer, normal to below normal river conditions and normal to below normal groundwater levels in the limestone aquifers are forecasted in the chalk, below normal to potentially notably low (higher) groundwater levels are likely, which would result in below normal to potentially notably low river conditions.

Local water management actions are probable across the area during the irrigation season, particularly in our chalk aquifers. Even in average conditions any dry periods during the summer can result in some form of local water management actions.

Please contact for more information: Drought.LNA@environment-agency.gov.uk

Environment Agency - North East Area

The overall summer prospects for water resources availability for irrigation in North East Area are currently GOOD to MODERATE

Background

After a dry spring and summer in 2022, the wet weather returned in September, with monthly totals above average for the first time in 6 months. The wet weather continued throughout the winter with an increase in river flows during this period. Soil moisture deficits decreased in response to the wetter weather and all soils were fully saturated by mid-December. Reservoirs began to refill during October and November and, although they fell slightly from mid-January to February, most stocks have increased over the last two weeks of March. Levels are low at Derwent reservoir where stocks are around 19% below average for the time of year. Overall total reservoir stocks are generally healthy and are about 2% above average for the time of year.

Rainfall / Soil Moisture Deficit

Rainfall across most of the North East, over the 12 months up to and including March 2023, has been in the normal to below normal ranges, with cumulative totals below the long term average. Rainfall in March was variable, but above average in all catchments. The Tweed and Northumberland catchments are the driest in the North East with rainfall within the normal category in March and below normal over the last 12 months.

For much of last summer soil moisture deficits were in the normal or dry ranges, rising to very dry in August. By October soil moisture deficits had started to decline and by the end of November all soils fell within the wet category, where they remain.

River Flows

River flows were generally within the normal to above normal range over the 5 months from September to January. Over the past 12 months mean river flows have frequently been below average with the lowest observed during the hot and dry spring/summer. Generally, the lowest flows were recorded in July and August with some flow sites registering just 20% of their long term average (LTA). Recovery began in September and continued throughout autumn and winter with normal or above river flows in January. February was quite dry with monthly mean river flows below average at all indicator sites. River flows increased in March, ranging from below normal to notably high.

Groundwater

Groundwater stocks are all in the normal range for the time of the year. In general, groundwater levels are stable, although reduced rainfall totals throughout 2022 and in February 2023 have resulted in lower than normal aquifer recharge rates. Some increases in groundwater levels have been observed in the more responsive parts of our aquifers, in line with heavier rainfall during March 2023. More confined parts of our aquifers are yet to receive this recharge and some level increases are expected into late spring/early summer 2023.

Forward look

Prospects across the North East area are currently GOOD to MODERATE for 2023.

The Met Office 3-month outlook (issued at the end of March) for the UK suggests that over the period April to June there is an increased likelihood that high pressure will have a greater influence than normal and this favours drier and warmer than average conditions. During April wetter spells of weather are still likely at times.

It is possible that the implementation of hands off flow conditions will be required across the area during the irrigation season as even in average conditions any dry periods can result in some form of local water management actions.

Irrigators with licences that include cessation conditions associated with river level or flow (i.e. Hands off Flow conditions) will be contacted by EA area staff when restrictions are in place.

For more information on licence conditions, please contact:

Water Resources: water.resources.northeast@environment-agency.gov.uk

Environment Agency - Solent and South Downs

The overall summer prospects for water resources availability for irrigation in Solent and South Downs (SSD) remains GOOD.

Background

Overall, the winter has been wet and SSD has made a good recovery from the effects of the hot dry summer experienced in 2022. The September to January 5 month period is the 5th wettest on record so overall recharge has been above average. SSD is heavily dependent on groundwater so prospects for summer rely on the extent to which the chalk and greensand aquifers are replenished over winter. February was exceptionally dry, but March was very wet with 202% of LTA.

Rainfall / Soil Moisture Deficit

Rainfall in September and October was above average and November was one of the wettest on record. December started dry but ended very wet, while January was the opposite with a wet start and a dry finish. Despite the dry periods in December and January, overall rainfall totals for both months were above average. The dry end to January meant that soils were drier than average but ended March wetter than average.

River Flows

At the end of January 2023, the majority of reporting sites had normal or higher monthly mean flows. The higher than average recharge has helped to increase baseflows in the catchments with chalk and greensand aquifers. More responsive rivers dominated by impermeable geology, which only make up a small part of SSD, have summer flows largely dependent on the immediate weather conditions. At the end of March river flows were higher than average at nearly all reporting sites.

Groundwater

The wet autumn and winter up to the end of January meant that recharge was above average and most reported groundwater levels were higher than normal (as of 31 January). The dry February caused groundwater levels to quickly decline but March has seen a significant recovery in the levels at all reporting sites.

Forward look

Prospects across Solent and South Downs are currently GOOD for 2023 unless there are significant dry and warm conditions over the next few months.

Please contact for more information:
Tony Byrne or Bethan Davies: HydrologySSD@environment-agency.gov.uk

Environment Agency - Thames

The overall summer prospects for water resources availability for irrigation in Thames area are currently GOOD to MODERATE for 2023.

Background

At the end of March, river flows and groundwater levels in Thames were normal or higher for the time of year at the majority of indicator sites. This is due to higher than Long Term Average (LTA) rainfall through the winter period (October to March). The winter rainfall conditions have resulted in flow and groundwater levels across catchments in Thames being in a better position than in April 2022, ahead of last year's hot dry summer.

Rainfall / Soil Moisture Deficit

Over the winter period, Thames received over 144% of the Long Term Average rainfall. The effective rainfall for the same period was 157% of the LTA. During March, the area received 134mm of rainfall, equivalent to 228% of the LTA. At the end of March, soil moisture deficits (SMD) across the area were marginally lower than the LTA, meaning soils were wetter than normal for the time of year. Up to 17 April, the Area on average has received 78% of the LTA for the month, showing a positive outlook of total rainfall for April.

River Flows

At the end of March, most flow indicator sites were classed as between normal and notably high, with the exception of Cassington on the River Evenlode which recorded below normal.

Groundwater

At the end of March, groundwater levels at 6 of the 11 indicator sites were normal for the time of year. Groundwater levels at one chalk site – Stonor Park, was below normal following a delayed start to recovery. Groundwater levels at three other chalk sites, Gibbet Cottages, Rockley and Tile Barn Farm were normal for the end of March. Groundwater levels at Ampney Crucis and Fringford in the quicker responding Oolites were both exceptionally high, with Marcham notably high at the end of March.

Following a dry February, groundwater level recovery at most chalk sites slowed, or levels started to decline through March. However, in response to the above average rainfall over March and onwards, groundwater levels are back to an increasing trend at the majority of our indicator sites.

Forward look

Rainfall through the winter period (October to March) was higher than the LTA, and in response flow and groundwater levels are normal or higher at most sites leading to a reasonable position for irrigation into the summer. While the groundwater at the majority of the indicator sites increased to normal or above normal levels for the time of year, there are still areas that remain below normal for the time of year. While this does not pose an imminent threat to water resources, it indicates that the resilience of water resources may be limited towards the end of the summer, particularly if there is an early transition to hotter and drier conditions.

On this basis, irrigation prospects across Thames area have been assessed as GOOD to MODERATE for summer 2023.

Please contact for more information:

Tom Entwistle and Jie Shi

IEP_THM@environment-agency.gov.uk

Environment Agency - Wessex

The overall summer prospects for water resources availability for irrigation in Wessex are currently GOOD.

Background

Good rainfall over winter has greatly improved the situation and the outlook for 2023.

Rainfall / Soil Moisture Deficit

Whilst February 2023 was the driest February for 30 years, March was the opposite with 205% of long term average rainfall. It was the third wettest March on record and in the last 6 months Wessex has received above average rainfall. The soil moisture deficit remains close to zero.

River Flows

All rivers in Wessex are at or above normal flows for the time of year. There is a clear divide between rivers in the North and West of Wessex and those in the South and East. The Hampshire Avon, River Wylye and River Piddle are all on permeable chalk aquifers and current flows are normal for the time of year. In contrast, those rivers on less permeable ground in the North and West, such as the Bristol Avon and the Parrett and their tributaries, have much higher flows. This is in response to the wet March.

Groundwater

All groundwater aquifers have responded to the March rainfall and levels have increased and all of our monitoring boreholes are at or above normal for the time of year.

Forward look

Prospects across Wessex are GOOD for 2023 and we are in an improved situation when compared to this time last year.

Due to the high rivers flows and normal groundwater levels, there are currently no licences restricted from abstraction and all winter storage reservoirs are expected to be full.

Please contact for more information:

Jonathan Gilling, IEP, Area Drought Coordinator, jon.gilling@environment-agency.gov.uk

Environment Agency - West Midlands

The overall summer prospects for water resources availability for irrigation in West Midlands Area for 2023 are currently GOOD to MODERATE.

Background

As we have seen in recent years this situation can change quickly and result in the need to restrict abstraction licences from early to mid-summer. Please ensure you plan accordingly and maintain resilience in your water supply.

Rainfall / Soil Moisture Deficit

During October and November 2022, most catchments received above average rainfall. From December through to the end of January 2023, almost all of the area received normal rainfall compared to the long term average (LTA). However, during February 2023, rainfall totals across the whole of the West Midlands were low, ranging from 12% to 25% of the LTA for the month. The majority of catchments experienced less than 20% of the LTA rainfall. February was followed by a wetter than average March, with all catchments experiencing exceptionally high rainfall totals, ranging between 178% and 231% of the month's LTA. As a result, the three month rainfall totals from January to March 2023 were recorded as normal in nearly all catchments compared to the LTA for the same period, as highlighted in the regional Water Situation Report for March.

Up until October, soils were drier than the LTA because of the drought experienced during the summer. However, as a result of the above average rainfall from October to November, soil moisture deficits returned to normal by December. Soil moisture deficits started to increase at the end of February due to a lack of rainfall, resulting in drier soils. However, the above average rainfall totals during March have resulted in soils being at or near saturation by the start of April.

River Flows

Following above average rainfall throughout March, the majority of sites are now recording above normal flows or higher. The monitoring sites recording the lowest flows are situated in the Lower Wye and Severn Vale catchments. However, these are still at normal flows compared to the LTA.

Groundwater

Groundwater supplies (e.g. springs) can help support watercourse flows during the summer, which may be needed if the coming months are dry. Currently most sites are normal or above for the time of year.

The principal aquifers of the Permo-Triassic sandstones in the West Midlands are a large store of groundwater and relatively resistant to drought conditions. Half of the key indicator Permo-Triassic sandstone sites are within normal or higher ranges for the time of year. Only one key indicator site is below normal compared to the LTA for the time of year. This indicates that there has been some recovery over the winter, although the effects of the drought in 2022 continue to be observed.

Reservoir storage

By the end of March all reservoirs had normal or above normal storage compared to the LTA, with the majority having at or close to 100% storage. Clywedog reservoir is being managed according to agreed flood drawdown procedures and is at 98% storage as of the start of April 2023.

Forward look

Abstraction and irrigation is primarily controlled by licence conditions associated with river flow and level. Licence restrictions are triggered by notification from the Environment Agency of "Hands off Flow or Level" (HoF/HoL) or are monitored and managed by the licence holder. During an average year it is likely that some licences will be restricted during dry periods. The proportion of licences restricted in the West Midlands and the duration they are affected depends on how resilient the catchment is to changes in water availability and whether we experience drier than average conditions.

Information on how resilient your catchment is to changes in water availability can be found in the Abstraction Licensing Strategies Abstraction licensing strategies (CAMS process) - GOV.UK (www.gov.uk), by reviewing past restrictions to your licence and by contacting IEP_WMD_waterresources@environment-agency.gov.uk

Prospects across West Midlands area are GOOD to MODERATE for 2023.

If you would like further information please contact: IEP_WMD_waterresources@environment-agency.gov.uk

Environment Agency - Yorkshire

Prospects for water resources availability for irrigation in Yorkshire for 2023 are GOOD in the Don and Rother, Aire and Calder, Esk, and Swale Ure Nidd and Ouse catchments and are MODERATE in the Derwent and Hull and East Riding catchments.

Background

2022 was a record-breaking year on many counts. Yorkshire saw below average rainfall for March to September in addition to a dry January. Heatwaves in addition to low rainfall resulted in the most significant dry weather event in the county since 1995. Rainfall above average returned in September, with November being the most significant recharge month with 141% of LTA. During 2022 Yorkshire Area issued numerous drought permits to Yorkshire Water. In addition, many agricultural users may have encountered prolonged periods of “Hands off Flow” conditions on their licences. Following the summer of 2022, surface water stocks began to recover due to heavy rainfall events in the autumn. However, a further period of below normal flows affected the Pennine catchments in the first half of December. The wet weather at the turn of 2022-2023 meant the low flows seen in the middle of the calendar year were replaced by those in the normal range. Despite this, groundwater stocks are not at the elevated levels seen in winter 20/21, particularly in the east of Yorkshire, where rainfall hasn’t been as persistent or heavy.

The above average rainfall in autumn and early winter resulted in recharge, with many river flows and storage reservoirs refilling. Groundwater levels at the end of 2022 were mostly in normal ranges. 2023 began with most but not all storage reservoirs across the region at 100% full for all purposes (Navigation, Public Water Supply, and Agriculture).

Despite this, 2023 continued with an extremely dry February, stalling the recharge to surface and groundwater stocks. A wet March in West and South Yorkshire in particular, has resulted in the Pennine reservoirs that predominantly provide flow to all the major rivers and conurbations in West and Central Yorkshire (barring some reservoir safety schemes) being 100% full and spilling. This change means that we can revise the forecast for the Pennine fed catchments to GOOD from the previous forecast of GOOD to MODERATE. The East of Yorkshire has not seen the same recovery as the West. Groundwater levels in the chalk and limestone aquifers are near to or at below normal for the time of year. Wetwang located in the East Yorkshire Wolds is declining towards notably low, reflecting the rainfall of the last 12 months in East Yorkshire shown in the maps below.

January 2023 groundwater levels in the Chalk, Sherwood Sandstone, Magnesian Limestone and Millstone Grit were all normal for the time of year with the Corallian Limestone marginally below normal. In the February Initial Prospects for irrigation we said, “the remaining months of recharge will play a significant role in groundwater availability during late summer of 2023”. The rainfall difference between West and East Yorkshire means that limestone and chalk groundwater, and importantly watercourses fed from them, could still face restrictions via hand off flows and water availability issues during a hot and dry summer.

This is because the overall quantity of winter and early spring rainfall has not been sufficient to allow recharge to groundwater and levels are either below normal or just at normal. Currently river flows in the Upper Hull, Gypsey Race and Upper Derwent are sustained by the rainfall that has taken place in March. Once dry weather returns this will recede and there is likely to be a gradual decline in base flows for these watercourses. Currently, it is highly unlikely that any restrictions other than Hands off Flow (HoF) or Hands off Level (HoL) conditions on licences will be implemented. Abstractors in the mentioned catchments should be aware of their licence conditions restricting abstraction and stop when requested to do so. As mentioned in the February report “slow response time of some of the county’s groundwater supplies means that impacts of dry weather are 12 months behind the above ground event, apart from some limestone

sources that respond like a surface water system." It is likely that, the current east/west split in Yorkshire is a combination of the slow response time of the groundwater bodies in conjunction with rainfall in March that came via Westerly or Southerly winds resulting in the precipitation impacting the Pennines more than other parts of Yorkshire.

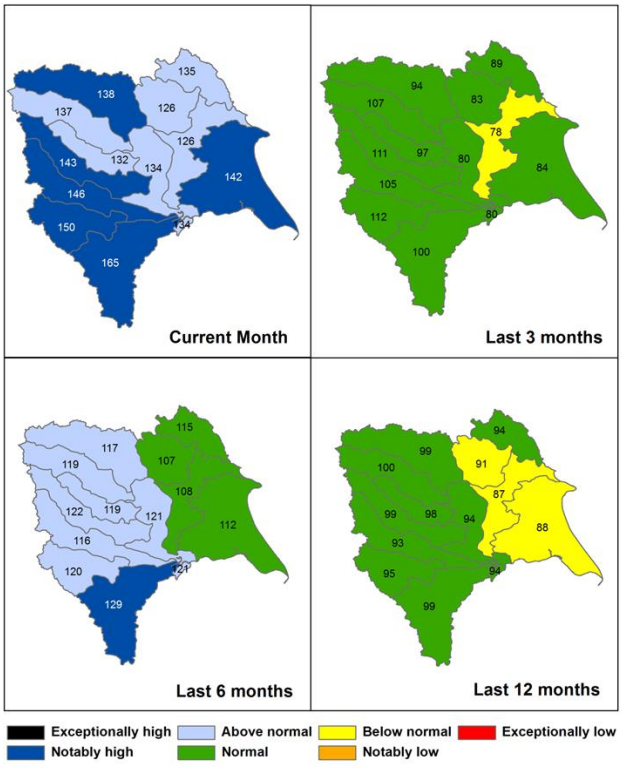
The Met Office is currently forecasting a mainly unsettled period going into May. In a similar way to the rainfall we have already seen it is likely that East Yorkshire will be drier than West and South Yorkshire. Longer term, there is a possibility of a more settled weather regime with temperatures more likely to be above average.

Forward look

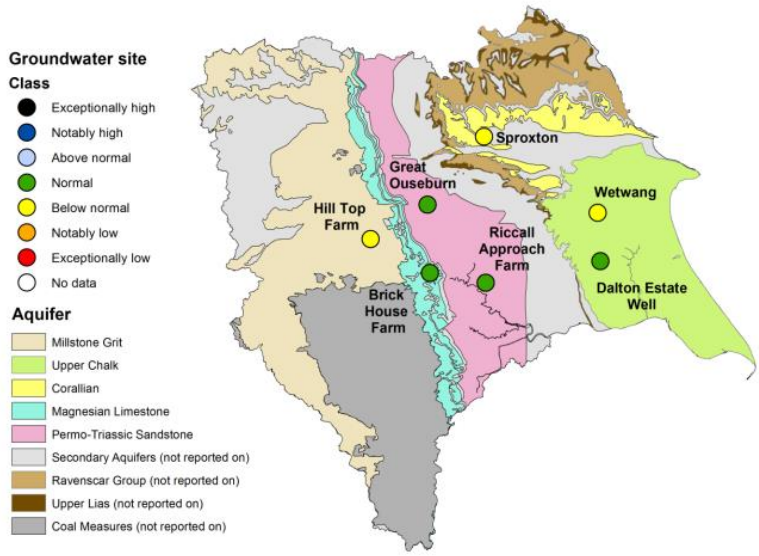
Irrigation prospects are currently GOOD in South / West / North Yorkshire and MODERATE in East / Northeast Yorkshire for spring/summer 2023.

The forecast has only been achieved by the rainfall of around 135% to 150% of LTA for March in many parts of Yorkshire. This is especially the case in the westerly reservoir fed catchments that are now around 100% full. Decline in these catchments can be very quick once hot and dry weather begins. Short duration rapid reservoir declines in 2018 and 2020 are good examples of how 100% full can be deceiving. In the Derwent and Hull & East Riding catchments the forward look is much more uncertain. Groundwater recharge specifically in the Chalk aquifer coupled with westerly wind and rainfall means that prospects have been downgraded from the initial report in February.

Abstraction in the region is primarily controlled by conditions on licences and licence holders must ensure that they always adhere to these. If a dry summer does materialise, it is still possible that we may need to implement HoF or HoL conditions on licences, as we would in any normal year.



N.B. The 'current month' in this figure is for March 2023 and the maps are using data up until the end of March 2023.

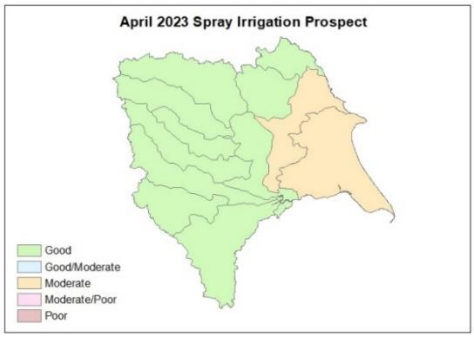


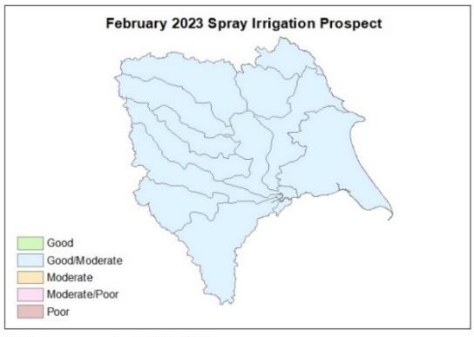
N.B. This figure is for February 2023 using data collected within February 2023.

For the most up to date water situation reports please visit our website here:
https://www.gov.uk/government/statistics/water-situation-report-yorkshire-and-north-east

Conclusions

The prospects for irrigation for spring - summer 2023 have been revised to GOOD in South / West / North Yorkshire and MODERATE in East / Northeast Yorkshire.





N.B. These maps were produced on 13th April 2023

For more information please contact us by emailing ie_ne_yorks@environment-agency.gov.uk