Virtual Fisheries Forum 12/07/2022 (Hot & Dry Weather Fishery Management).

Q&A session

To view the slides for the WADAA monitoring system presentation CLICK HERE

Q. What kind of dissolved Oxygen meter should I buy and how much can I expect to pay for one that is industry standard quality?

A. (Kye) £400 is a good figure to aim for which ensures you'll receive a quality piece of apparatus. There are models out there for considerably less but you'll find they are not as durable or accurate in the field. The OXYGUARD models are commonly used.

A. (Paul) I would echo that, the OXYGUARD Polaris and Polaris 2 are the models which the IFM recommend for absolute reliability. They are self-calibrating and will measure % saturation also. Another option is AJS Fisheries have released a water testing kit which is getting good feedback.

Q. Who is the company that supplied the DO monitoring system which WADAA used?

A. (Nick) I assume this refers to the clam unit, which was a company based at Manchester University called the "Salamander Group". We have a Clam RT unit which primarily is used in water treatment/mining industries, so they are commonly installed and left to remotely monitor sites outside angling & fisheries purposes.

Q. What water temp should the water be for a keepnet ban?

A. (Kye) I would advise that no fishery should be allowing keepnets in the summer months (Early June-Late August) unless there is a very good reason to do so. If there is an insisted use then having multiple nets spaced out in a good depth of water is the best practice to reduce

localised oxygen demand and amount of fish retained in individual nets. It is tricky to suggest a water temperature but as a rule of thumb if it is difficult for the angler to fish in the heat, then the continued use of keepnets should be reviewed. Use of keepnets increases risk of mechanical damage and bacterial infections which are more frequent in the warmer months.

A. (Paul) I agree, you have to think about where these keepnets are, i.e. In the margins/shallowest part of the fishery often. Localised DO demand risks and fish stress result. Especially with some of the high match catch weights commercial fisheries produce where you have 4-5 keepnets full of carp sometimes.

A. (Alex) Some of the questions about keepnet bans and closure of fisheries relate to fisheries with barbel, any particular guidance for these fisheries?

A. (Kye) Definitely, do not have barbel in keepnets during the summer months, especially in stillwater fisheries where barbel are stocked like many are now. I know of such stillwaters that have continued using keepnets during the summer months and barbel were lost. Prevention is better than cure when it comes to fishery management, so it is the best practice to simply not put sensitive fish species like barbel into well stocked stillwater fisheries which are higher risk for dissolved oxygen issues.

Q. During hot weather periods would you recommend aiming to take DO readings every single day?

A. Yes, it's very important to spot trends which allows you to both spot when things are going downhill, but also predict it too which means you'll have more time to plan. It's very important to measure oxygen twice daily. In the morning (ideally at first light) when oxygen levels are at their lowest, and then again late afternoon when oxygen levels are at their highest after plants and algae have been photosynthesising all day. These two results will tell you everything you need to know.

Q. How important is it to have as a reference, DO readings taken at different times during the day, and are there typical values or is each venue different?

A. (Kye) We get this question often and it's a good one because there is no point collecting data when you don't understand what it is you're looking at. DO meters are great for tracking and being able to predict what is happening within a fisheries Oxygen situation. A really good way to do this is understanding the typical/natural ranges of fluctuation that occur within a fishery environment over the course of a day by taking readings at intervals (Morning and Evening). In the Morning Oxygen levels should be at their lowest and in the evening, they should be at their highest. If you notice the range of DO between these levels increasing (very low early morning and very high in the evening) then there is grounds to predict you've got a flourishing algal community and be aware that's there's a risk of a potential Oxygen crash developing. If that crash happens – that's when you would get the aeration equipment in to assist assuming you're prepared.

A. (Nick) As a fishery manager you get to know what to expect from a typical diurnal cycle in terms of DO so you'll quickly be able to recognise when a problem is developing. Through using the WADAA monitoring automated systems year-round i have even noticed DO dropping considerably in the depths of winter when you wouldn't expect it to be problematic.

A. (Kye) To answer the part about a DO threshold after which dropping beneath will cause stress, 40-50% saturation is when I'd start to be concerned, but fisheries can operate quite happily if that's the lowest they get – even regularly – but it's a good value to encourage you to keep a closer eye on things. Below 30% fish will be starting to struggle, perhaps visibly struggling and below 15% is fish kill zone. Carp are the last fish to die from falling DO once it drops to below 10% saturation whereas Barbel can die as early as 35% saturation.

A. (Paul) Like Kye mentioned about the daily fluctuations in DO, you want to be on your fishery at dawn. During June-August this would be 3-5am and is when you will see the lowest reading and pick up on any steep Oxygen crashes. Obviously monitoring at these times regularly is tricky which is where dividing up effort between volunteers or these remote sensing DO systems such as what Nick talked about come in.

Q. Barley straw extract in a trout fishery - has anyone used it and what was the outcome?

A. (Paul) Barley straw extract as a commercial product I believe is now restricted under the herbicide regulations. You can still make it yourself for use.

A. (Nick) One of the things we have learned when attempting to fix a problemed fishery is to not change too many parameters all at once because then you won't know which has had the desired effect should the situation improve. This is what happened for us with Barley straw in the case study I spoke about. We used it but I can't definitively say it was the barley straw that made the positive difference. My view is that for the ease at which it can be implemented it is not worth not doing in case it is beneficial.

A. (Kye) Barley straw is the thing that people use wrongly more often than anything else. Barley straw only works when it is rotting down as this is when it releases the agent which breaks down algae before it blooms. Barley straw needs to be implemented long before the algae is present to work. Putting in the barley straw once a bloom is present is too late. Also, to make Barley straw to be as effective as possible – you need to think about surface area! A bail of straw has a tiny surface area compared to that same bail being broken up and held in long sausages (the best way of deploying straw is to use Christmas tree netting) – this will ensure it is most effective. Aim to get the sausage in late Feb/early march, and ideally deploy a quarter to a half of the lakes perimeter. After six weeks add a second sausage – keeping the original in place.

Six weeks after that (12 weeks from initial deployment), remove the original sausage and replace that with a new one – then move forward replacing the oldest sausage with a new one, every 6 weeks.

Barley straw is a decent method of inhibiting algae growth on small fisheries typically of an acre or less, beyond that it's just not that affective due to the body of water and the associated level of work needed to cover the required area.

If you leave it in to rot the straw will simply add to the fishery's nutrient load and make the bloom issues worse in time. And definitely do not add a whole bale – that's a total waste of time!

A. (Alex) I recall you covered barley straw in great detail at the last dry weather virtual fisheries forum we did together titled “Preparing your stillwater fishery for the summer months” on 11/05/2021 with the PRESENTATION and Q&A DOCUMENT available to view.

Q. Although monitoring is great, are there any preventative measures that fisheries can take to prevent conditions that support algal blooms during hot, summer months - for example reducing nutrients through silt traps and reed bed systems on inlets?

A. (Nick) Besides from the barley straw just spoken about I mentioned about how we have also used floating islands at our WADAA fisheries. These have been superb and were put together with guidance from Richard Bamforth (Angling Trust Fisheries Management Advisor). These islands sit on top of sunken gabion baskets providing fish refuges from predation as well as habitat enhancement/nutrient reduction by the plants. Within a year our floating islands root systems had spread right down through the gabion baskets and to the bed of the lake. The blueprint to how we created our floating islands is AVAILABLE HERE.

A. (Paul) Yes, installing floating vegetational islands can be advantageous. They provide shade and shelter for the fish; the root systems of the growing plants help to reduce the nutrient load from the water, and where a protective cage is incorporated, they can offer a degree of protection for shoaling silvers from predation. In some scenarios e.g., where large carp are present, they may be viewed as creating potential hazards leading to concerns surrounding fish welfare. But planting new and maintaining established marginal vegetation is essential to good fishery management as again they act as a nutrient sink, provide a natural soft engineering defence against wave erosion and also intern provide widely beneficial habitat not only to fish, but to a range of other wildlife. Reed beds, sedges and flag iris are great examples.

A. (Paul) There is a guide to constructing floating islands on the Environment Agency YouTube channel also with Andy Eaves (Available here)

A. (Kye) One issue I see a lot more now in terms of nutrient loading at fisheries is Canada Geese. They can have a drastic input towards algae

blooming! There is some guidance from Natural England on managing Geese available here. Also for weed and algae control, use of dyes is very effective where permitted. You can put in dye even once an algae bloom is established with it still being effective by restricting light availability.

A. (Paul) There is different options with dyes as well so if you do not want the standard blue colour dye which some find an eyesore you can use the "lake shadow" variety. From what I have seen the effectiveness of dyes can go either way. Some places respond well and others not so much but it is a cost effective strategy to try regardless.

Q. How is dye best applied to lakes?

A. (Kye) Do not worry about spreading it around. Simply make sure you have the recommended quantity for the size of the water using the calculator available here and pour it in the lake. Within a few days it will have dispersed.

A. (Nick) We received our dye in PVA bags so you take them out into the lake by boat and chuck them over the side or throw them in the margin and they'll dissolve releasing the dye.

Q. Is use of dye treatments harmful to insects/invertebrates?

A. The dyes are vegetable based and will not pollute a fishery. However, there will be a visible change in colour. Dye's inhibit sunlight penetration which affects photosynthesises – so plants and algae. Less aquatic plants will therefore carry less invertebrates, but I've never seen this affect fish negatively. However, if a very weedy lake has supported a large population of fish then I would be nervous because you'd essentially be cutting off some of that food supply... so think carefully – perhaps removing some fish would be beneficial in this scenario.

Dyes also tend to have a relatively slow impact on both algae and plants so reduces the risk of a sudden crash or die off. They really are a good idea if your fishery has no outflows (you'll have to spend more keeping the colour present in fisheries that have an outfall).

Q. What is Nick planting on the floating islands? We have had no joy growing on ours and also did Nick have issues with birds breaking what was growing on the islands?

A. (Nick) I bought what is called a prepared Coir Pallet which are widely available pre planted with aquatic vegetation from different suppliers. Some suppliers offer a standard planting mix of things like yellow flag iris whilst other suppliers can include more specialised plant mixtures according to your wants/needs. We have had no problems with no problems whatsoever with birds damaging our plants.

A. (Kye) I have worked with loads of clubs who have benefitted from floating island installations and the things that I have seen cause the most problems are them going into really deep waters where they drift around a lot even despite a heavy anchor and rope to try and secure them. The other issue is wind erosion on big windswept water where waves can basically knock the Coir Pallet apart. There is a dedicated round of the Angling Improvement Fund to support fisheries with projects/developments such as floating islands although it is not open now with the current AIF round focusing on invasive species and biosecurity projects at fisheries.

A. (Paul) I have seen issues with Geese destroying floating islands but the only things you can do is put mesh over them or use more mature vegetation.

A. (Nick) Our local fisheries officer recommended a ballpark figure to aim for 5% cover of a fishery's surface area which has worked for us at WADAA.

Q. Water levels in a pond I manage are low currently and I want to extract up to 20,000 Litres per day from the Trent to top up the pond. Is it correct I can just do this without obtaining an abstraction licence?

A. (Kye) Yes you would not need a licence for that volume of water. Please be considerate with the amounts you abstract as we are about to enter a prolonged dry weather period.

Taking water from a surface source (such as a river, stream or canal) or from an underground source is called abstraction. **If you plan to take more than 20 cubic metres (20,000 litres) a day, you are likely to need an**

abstraction licence from the Environment Agency. Read here for more information

Q. Part of our fishery is affected by brackish/salty water. Does this contain more or less oxygen than fresh water?

A. (Kye) Saltwater tends to be more dense which results in the saltwater dropping to the bottom of the water column and freshwater sitting at the top. Freshwater fish do not particularly like brackish water but will put up with it. Prymnesium parvum (Golden Algae) is a type of algae which loves brackish water. We get it in many fisheries proximal to the coast and it irritates the fish plus spreads very aggressively. If you manage a fishery near the coast and your fish appear to be struggling yet DO levels are fine then Prymnesium algae will likely be the issue.

Q. Is there a recommended minimum depth for a sunken diffuse aeration system?

A. (Kye) For an aerator system you need enough depth for the air to disperse widely as it rises up through the water column. If you have more than 6ft of depth, injector aerators are brilliant as they power air towards the lakebed but are not powerful enough to cause issues with silt disturbance which would result in shallower water using the same system. Aerators are not the fix all solution in my view.

A. (Paul) As you say Kye people think that turning on an aerator will just saturate the water with Oxygen but this is not the case. An aerator will simply flatten the DO curve so the fluctuation is less severe and increase the average DO over a diurnal period slightly. They can also cause bank erosion issues so make sure you carefully consider when you use your aerator and the type of system used is suited to the venue.

A. (Kye) Nick's case study of what WADAA have done with fishery habitat and water quality improvement is textbook "prevention is better than cure" fishery management. With focus and investment on developing these things you should rarely need to spend money on replacing fish or powering aerators.

A. (Paul) To add on to what Kye said, to improve a fishery's performance and dissolved oxygen resilience it is also beneficial to take fish out of a fishery then to stock more in as well as the habitat/water quality improvement.

In terms of remote sensing water monitoring systems, the IFM have been working with a company called WATR that make in-situ monitoring units specifically designed for fisheries. These are fixed station solar powered units which monitor a range of water quality parameters and stream data via 4G network to an app which can download on a mobile device.

A. (Alex) Kye, would the AIF funding round which covers habitat improvement at fisheries cover installation of remote monitoring systems for water quality?
A. (Kye) My local Environment Agency team have funded floating islands and quality dissolved Oxygen meters for clubs/fisheries. Generally, if you speak to your local fisheries officer and explain the issues you are having plus what you are trying to do to mitigate it and help the fishery, they will try to help you get funding for it. What the Environment Agency do not want is fishery managers trying to get quick fix solutions to continue on with/extent unsustainable fishery management strategies.

Q. Where is the best place to put a DO probe at a lake?

A. (Paul) If you're using a handheld DO probe with a cable from the bank, firstly assess where it is safe to access the waterside ideally at multiple points around the site with varied marginal depth. Take readings from these sites and use the average. If you're using a fixed in-situ remote monitoring sensor then tuck them out the way if possible so there is a reduced risk of anglers encountering them whilst casting/playing fish etc. E.g. tucked round the back of an island.

A. (Kye) From a biosecurity standpoint be aware of checking/washing down/dis-infecting a dissolved oxygen probe if the same one is being used between different water bodies. If you plan to use your meter on more than one fishery – perhaps a complex of lakes – it's best to take a water sample with a bucket on a rope – dip the bucket and them pour the water on the ground - not back into the lake. A tip is that most DO meters work better when you agitate them slightly instead of leaving them static on the lakebed – we use a slow but steady figure of eight motion.

Q. Shouldn't the barley straw used at fisheries be organic?

A. (Paul) I was once told at a IFM workshop that obtaining truly organic barley straw is tricky because most farmers spray fields where it is grown to kill the black grass using weed killer which then contaminates the barley straw. I would suggest the amount of herbicide you get within a bail is pretty insignificant so not to worry.

Q. One of the main problems is clearly overstocking in enclosed stillwaters. Natural systems e.g. a canal have almost no problems with oxygen levels compared to aquaculturally stocked/enhanced fisheries. Isn't it about time that clubs/fishery owners should be realistic about the stocking density of ponds and prevent these incidents in the summer?

A. (Kye) Less fish can actually create a more productive fishery. The higher the population the more likely fish will be stressed to a lack of food, space and cover – and the more fish you have the more chance there is of a disease or parasite outbreak. Most fisheries reach a natural carrying capacity – but when we stock fish we alter than and then invariably end of needing to use fisheries management techniques to artificially support it – extra food, cover, aeration etc.

Removing fish (cropping as we term it), is a great way to freshen up the fishery. This could be the largest carp in a match water, the silvers from a carp water or simply excessive stock. The best time to do this is in the winter. Most fishery consultants will offer this, and likely take the fish (if there are enough) as payment. This is also a service the Environment Agency can offer if we can have the fish from free to stock other club waters.

Q. Can Nick explain how to set up the WADAA QR code catch return system please?

A. The step-by-step guide is AVAILABLE HERE

Q. Is it better for stable DO levels in a fishery to rake out/remove aquatic weed like elodea or leave it in?

A. Removing weed in the summer runs a very real risk of disturbing silts, which could then feed an algae bloom and then you have a much bigger issue to deal with. For a slow but certain impact dyes are a great thing to use in this scenario! Always avoid any activity that could disturb silt in the summer.

Key contacts from this forum meeting:

- Alex Clegg (Angling Trust National Angler Engagement Manager) alex.clegg@anglingtrust.net
- Sam Hubbard (Angling Trust National Angler Engagement Officer) sam.hubbard@anglingtrust.net
- Paul Coulson (Director of Operations at the Institute For Fisheries Management) paul.coulson@ifm.org.uk
- Kye Jerrom (Environment Agency Fisheries Technical Specialist) kye.jerrom@environment-agency.gov.uk
- Nick Butterfield (Fishery Manager For Windermere and Ambleside District Angling Association)
- Richard Bamforth (Angling Trust Fisheries Management Advisor) richard.bamforth@anglingtrust.net

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