Remotely Wild Salmon

by Richard Davies

So, I'm the salmon guy who lost and found a tiny screw on BBC's latest Attenborough series, Wild Isles.

It started as a curious child with a fascination for the Atlantic salmon.

I recently achieved a lifelong dream to film on an Attenborough presented series. It was not always a realistically held ambition, given my main income is not from camera work. Indeed, if truth be told, my income from camera work pays for the toys I use and little else.

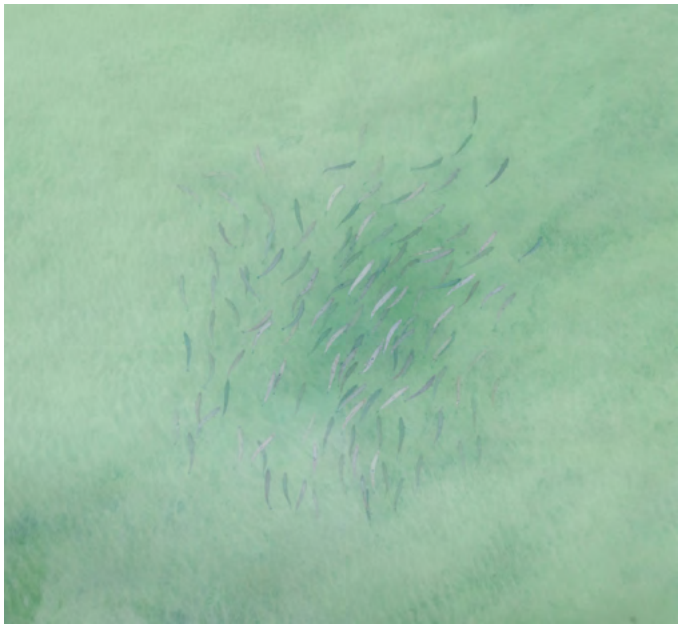
For as long as I can remember, I have been mesmerised by the underwater world. Not in the way true divers are, immersed in the sensations and freedom of movement. I am a fraud! No, I was always drawn to the ambiguous and mysterious place between two worlds. Not above or beneath but the mystery of the meeting place at the surface. The reason for this was fishing. Fly fishing for salmon and sea trout, to be precise. This mystery plane is where our lures are sometimes met by something from beneath where the fish breaks the surface momentarily to get a closer look. And then it's gone into the invisible depths once more.

As a hunter I've wondered about what we can't see and what we can't therefore understand about our "prey" and its habitat. There will be some deep, long forgotten evolutionary benefit to this train of thought. For years this invisible shield between underwater and above created a challenge and one I had attempted to overcome using traditional methods of scuba gear or snorkel and mask. This approach had inherent flaws that made it impossible to get as close and as controlled as I'd like to wild salmon and seatrout, especially in shallow muddy bed rivers. The challenges in relatively shallow freshwater are very different to deep open water. Either I'd sink and cloud the water, have

Me trying to control the ROV and the midges

The Chasing M2 ROV has 8 thrusters, is very manoeverable and has the ability to track sideways

An aerial shot of salmon swimming over the beach in Uig, Isle of Lewis



Without the ability to swim sideways, ROV shots would all end up being like this

Head on salmon shoal that disappears into the distance. An impossible shot for a human to take.

to adjust position, move and thus spook the fish, struggle to continue swimming against the current, or the space just didn't allow a human form to be there. It was never going to yield the secrets of how the fish behaved naturally. Frightened yes, but not naturally.

My first attempt at automation and using remote technology to observe below started with aerial drones. I'd long marvelled at salmon leaping in the sea and was frustrated that the glare from the surface prevented any view at all and certainly not the ability to count fish in a shoal. At the time this was useful for management purposes. When you look directly down off a bridge you can see into the depths but as soon as the angle of observation gets too great in relation to the surface, reflection obscures what lies beneath. When aerial drones were released, I was an early adopter with the sole aim of being able to look down on shoals of fish at sea in front of my house. Effectively moving the "bridge" with me to where the fish were. This proved fruitful and I then decided to gain my professional UAV (Unmanned Aerial vehicle) licence, which lead to interesting television and film work and created a learning curve for remote operation of cameras and visualising in 3D.

Aerial drones are reasonably easy to control and, given that we can see what is above the surface and can imagine quite easily what the drone sees and how to manoeuvre around the sky, is a relatively simple skill to learn. When we look at the broadcasted image on our hand-held controller, we can tell where the drone is, even without keeping eye contact all the time.

The UAV has superb GPS ability, hovers even in strong wind, thanks to this and if left without input, remains stationary and even comes home and lands by itself should the need arise.

Moreover, sensor sizes are excellent, with my current Mavic 3 pro having a micro 4/3 sensor along with two other cameras in a 60 mm squared box hanging off a fold up drone that flies 50mph. You couldn't make it up. The tech is truly outstanding.

Underwater, things aren't as straightforward and the technology isn't as advanced yet. Firstly, regardless of ROV manufacturer, there is currently no accurate positioning system on smaller, affordable ROV's.

GPS does not work and wireless image transmission and control is not possible. You have to have wires following the ROV in currents or around obstacles and without any automatic control.

When you've wanted to film fish in their environment without human interaction, these are small things to overcome. It gets even more complicated in small freshwater streams with faster flows and shallow operating depth. The wire can come into shot and creates drag and snags from time to time, both on the bank and in the water, the ROV is buffeted around and often gets stones stuck in thrusters, but again, small frustrations to overcome to get footage impossible any other way.

In higher end productions a cinematic feel, by having both moving subject and camera add to the immersive experience for the viewer and this was something I had always wanted to master. The alternative method of getting close to, in the case of my Wild Isles remit (more on that shortly), Atlantic salmon, is what I call lobster potting. This is where you place several small, weighted action cameras into a location and hope fish come into shot after you have left.

Local knowledge of where fish rest helps of course. Collecting the cameras is like lobster potting. Did I catch a shot? This can prove fruitful and using a Ken Burns effect on larger resolution images can give an illusion of movement of shot but limits output quality.

The final challenge underwater and with nearly all ROV's available is light and sensor size. Handheld dive rigs allow for superb optics and sensors to be used, picking up all the available information in the light available. It's still the go to method where depth and space and disturbance of the subject isn't an issue and I think may always be so.

ROV makers, for whatever reason, have chosen to use tiny sensors, which are awful as regards picture quality. Some have auxiliary cameras available but inexplicably, these are no better than the main enclosed camera. It is infuriating.

As a result, my rig consists of a pretty good compact ROV, the Chasing M2 (I have two back-up Mini's, in case of breakdowns on location) and a plate that holds two auxiliary cameras. The M2 has eight thrusters and pretty good stability as a result. It can also look up and down or rotate to keep the shot level even if currents mean fish are at an angle. Other small ROV's don't have the ability to track sideways against a current either and for this assignment, this was a must, to hold station sideways onto the action.

As with all equipment underwater, maintenance is key and I have no end of issues with stuck thruster motors. No matter how you clean them, corrosion gets in. I've also had the odd leak but by and large Chasing have been great at sending chips or parts to repair damaged components. I wouldn't think everyone would want to strip down and solder but it's part of what it takes to keep the equipment going.

The auxiliary cameras I have reluctantly fallen on using are the Insta360 ONE R 1-inch editions, with one-inch sensors onto the top. Not huge as regards sensor size but superior to the onboard camera and small enough not to require a larger ROV. They are modular so are prone to leaking and I went through 4 of them

I've become intimate with the M2!

during the shoot for Wild Isles alone. It's a technical juggling show and I cannot find any way of improving it at present.

The downside of the system is image control. You have none once the record button is pressed on land and the ROV sets sail. As a result, a lot of time learning light conditions and camera settings for a location has to happen before being confident enough to try and get the professional shot. I tend to hedge by having the ISO slightly different for each auxiliary camera, in effect, bracketing.

I should point out that while this is about photography, I rarely

Myself, Steven, Chris and Lindsay

take photographs. Salmon, like most fish, are so elegant in movement that photographs don't always do them justice. I also sell most footage or get commissioned for video work and tend to give away my photographs to organisations attempting to protect the Salmon's habitat. The species has become my life passion and is under threat thanks in a large part to our awful treatment of our waterways.

I've been filming salmon for twenty-five years and underwater for nearly as long. Before Silverback Productions got in touch, I'd been experimenting with ROV's for several years and had supplied footage to pretty much any natural history series involving Atlantic salmon. None of us remember how we connected, but I was excited to be involved in showing the salmon to the masses and, let's face it, to have Sir David describe your footage.

We were a small "in the field"

You wouldn't expect to see much, but you can below the turbulence

Lindsay McCrae balancing the slow-mo camera rig above the falls

Salmon gathering beneath the falls before their brave leaps

team comprising Chris Howard, producer, Steven McGee-Callender, camera operator and drone pilot, Lindsay McCrae, BAFTA award winning camera operator, Raymond Besant, camera operator, and myself, camera, drone and underwater camera.

Apart from our own team, to meet Doug Anderson at Loch Eriboll, while he was on location was a privilege and to work alongside the team was a great experience.

Lindsay, I found out, is a keen fly fisher like myself, so we had plenty to talk about during the waiting periods. Chris is remarkably talented, and Stephen braved midges like I have never known anyone do before and achieved a dream drone shot too. Raymond was so patient and focussed and supplied technically stunning footage and braved terrible conditions in the snow while after otters at –15C. I, on the other hand, needed plenty of light for underwater, so focussed on nice days at sensible times of day and enjoyed a glass of rosé in the evening, just as Chris and Steven would be heading out to try and get otters in the gloaming and midges. I did say I was a fraud!

As regards what we wanted to achieve, I think Sir David Attenborough put it perfectly, "No one will protect what they don't care about; and no one will care about what they have never experienced". So the approach we took was to try and be immersed with the salmon, so people could connect, almost emotionally in their struggles, and we hope care more about them. This was my focus and am proud to say I put in at least double the hours I was paid for to do all I could to ensure the salmon got centre stage. Ultimately, in the final edit, it did. Salmon also made the "making of" section, which was a personal goal and always my favourite part of the big series when viewing. Poor Chris Howard, producer of two episodes including freshwater, had constant earbashings about why the salmon should be centre stage and be the focal point of freshwater. He said he'd do his best and delivered. I couldn't be happier.

Besides the normal shots of salmon swimming in a river or ascending a waterfall, we wanted to do things never seen before and this is where I came in. Newness is something all big budget BBC Attenborough series aim to achieve. I promised Chris I could get a few special shots and, over several years, had found ideal locations to get them, even if I had not yet managed them in my own time. This was mainly because technology was catching up with my ideas, one of which made the "making of" and that was filming salmon leaping a fall from below.

With a team and time paid to focus on it I knew it could be done. The white water would put most camera operators off but knowing that salmon need solid water, rather than aerated and less dense water to grip their tail against, I had figured there

Natural migration. When water clarity is good, the fish stand out

Swimming along with a shoal of salmon of the Caithness coast

To add to the thrill of capturing something I had dreamt of for years, my friends, Tony Inglefinch and Professor Eric Verspoor, a geneticist who has spent 30 years studying salmon, were with me for the day helping manage the ROV tether cable.

must be solid water below the white froth for high leaps and so it proved to be. The results you can all see for yourselves on the Freshwater episode, dark and a little grainy but something very different and intimate.

For the first year of the filming in the three year production, I tagged along (unpaid) on some shoots, helped Chris and Raymond understand the locations and did some recceing of my own and sent clips back to Chris to illustrate what we could get.

During this time I was improving the set up and investing in what was needed and seemed to be breaking cameras on a weekly basis. It was frustrating but you cannot ever give in. It also isn't that easy finding an abundance of salmon, which makes filming that much easier. They are becoming rarer, so my years of filming experience and past guiding experience helped find the right locations at the right times.

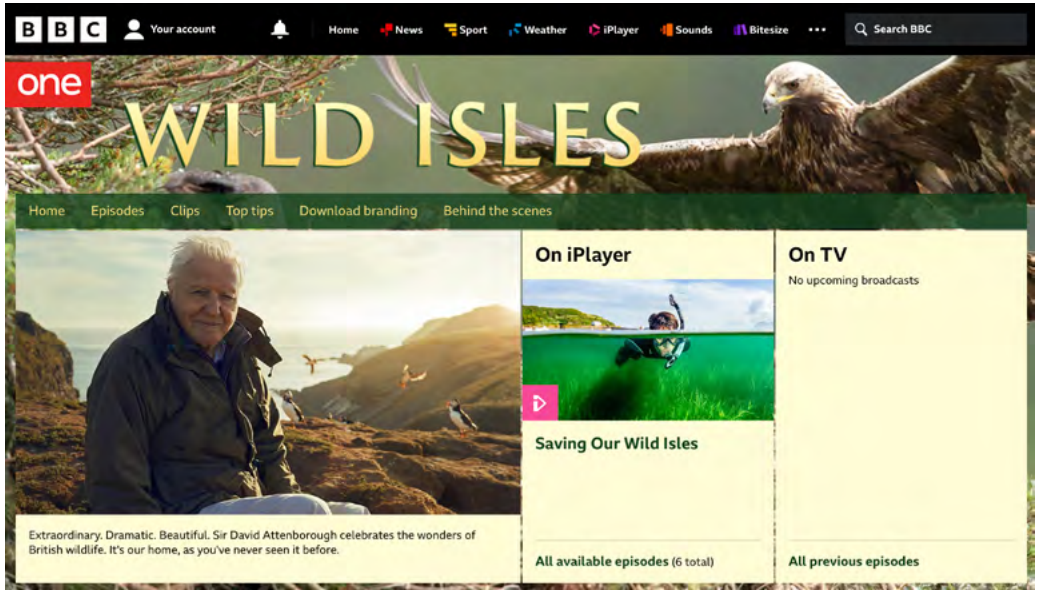
When it came to the actual shoots, we still had whole weeks of rehearsals on location prior to when the fish would be there, trying out different physical rigs and techniques we thought could work to achieve the angles we wanted. Often, events in nature only last a short time so you can't be finding out shots don't work while the action is happening. There really is an enormous amount of preparation into what might look like luck or simple techniques, especially underwater or in difficult locations. I can honestly say, we gave it everything we could and worked tirelessly.

The focus in the "making of" was on the falls leaping salmon, partly because this is the sexy bit an average viewer enjoys and in fairness, Lindsay's camerawork was exceptional and seeing salmon rocket into the unknown from below was also pretty cool.

My own personal highlight was capturing shoals of salmon swimming at sea. This was far more challenging on many levels. Firstly, sea conditions have to be quite calm for some time to clear the water, it needs to have been dry for a while so a head of fish are in the sea waiting. You then need to find them and then get a remote vehicle near them while they continually swim around. It was also important not to have the halocline of fresh water on salt. It had to be sea water.

Because of weather conditions and run timings, it is impossible to get shots like we achieved in three years out of four. It took a month of driving around, watching and waiting and this after twenty years of thinking about it.

Then it all clicked and, in a location, I only visited to get a lobster roll from -Tasty Toes Sea Food Shack (in Dunbeath – and they are exceptional lobster rolls)! I noticed a fish move in the harbour and



Salmon infected by a newly identified strain of Saprolegnia

spent some time observing and saw shoals off the coast and worked out their patterns and how and at what stage of tide to capture them on film. It still took four days before they behaved in a way that was photogenic for long enough.

The Silverback marine team were fascinated to learn how I managed it, having failed using traditional dive methods themselves. "You just can't get near the fish without spooking them" they'd said. That's where the little yellow submarine came into its own.

Despite the thrusters, to a fish's eye, there are no moving parts because they are enclosed and spinning too quickly to see. It is just a bit of driftwood that, if moved very carefully and slowly, can drift into their world and enable footage of fish behaving perfectly naturally and undisturbed. It sounds easy but it isn't quite as straightforward as that, but you get the idea.

For a specialist like me, there are not many opportunities to live out your dream assignment. I got lucky and conditions were on our side too. The end results were what we hoped for and that's good enough for me. I wonder if I will ever again have such a challenging shoot, over a whole migration season? I suspect not but I do have a few shots never before done I'd like to achieve.

It would be wrong of me not to include a word of caution. With a genuine biosecurity situation happening in UK freshwater right now, it's important to always clean all gear thoroughly with a disinfectant, like Virkon S or aquatic, after every shoot or before any change of location.

There's a newly discovered virulent strain of Saprolegnia, which may have been introduced around 2016. It is virtually wiping out salmon populations in some smaller rivers. It appears to be spreading, either by wild animals, anglers, or other water users like us. I would hate to ever be accused of being a spreader of something costing vital rural jobs and ecosystems.

So far it has not impacted too many rivers but let's keep it that way. Saprolegnia strains cannot live in saltwater, so have no fear there.

Also, bear in mind that you must seek permission from land / river owners before diving or swimming ROV'S in rivers where anglers have paid for fishing. The freshwater salmon shoots for Wild Isles were planned and arranged carefully on one estate where there were no anglers or other water users we would disturb.

Richard Davies
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