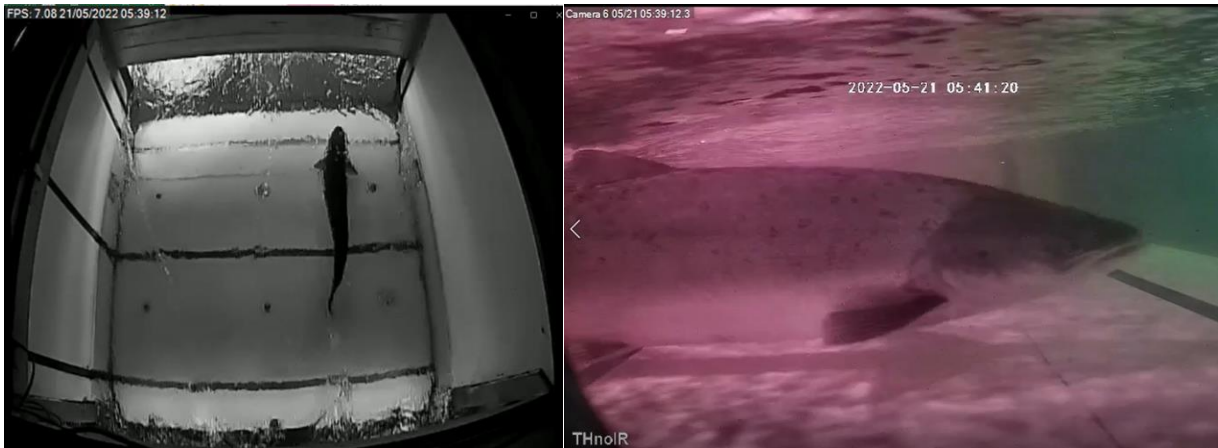


## Hampshire Avon Fish Counter at Knapp Mill



A couple of images showing a large salmon moving upstream through the Turbine House back in the spring.

### 2022 Q4 Final Update

The counter at Knapp Mill has continued to operate well since the last report was sent out, although, at the beginning of the year there was around a week's downtime due to an electrical fault so the counters needed replacing. Based on the number of fish movements in the days leading up too and following this period it is unlikely that many fish passed through the counter, which thankfully means the impact was low.

After an exceptionally dry summer the rain eventually arrived and with that, as expected, the fish were triggered to move upstream towards the spawning grounds. In fact, between the 1<sup>st</sup> of November and the 31<sup>st</sup> January 309 fish passed through the counter, which represented 141.2% of the Long-Term Average (LTA) for this period.

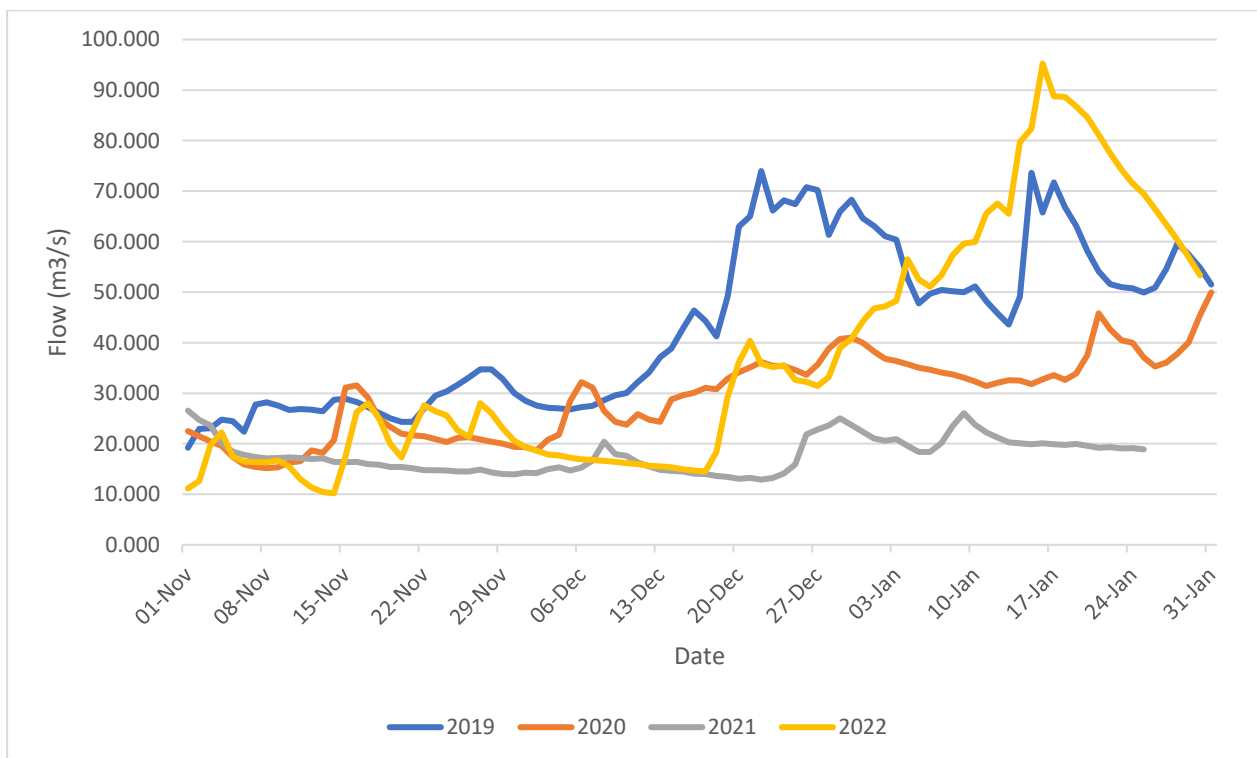
When it comes to calculating the final run figures, this year we based the species split on images collected from the turbine house. Last summer we experienced very low flows which meant an adjustment to the hatch protocol was necessary. Although this change meant that passage for fish was greatly improved, unfortunately it meant the flow was passing through a channel with no cameras so no images were collected during this period. A more detailed explanation of species apportionment can be found later in this report.

### Looking at extreme conditions...

This year, we have had extreme conditions in both the summer period as well as the winter period. In the summer we reached drought conditions where there was a total of 45 days where the temperatures exceeded 19°C. Between July and October, the flow was the lowest

flow seen at Knapp Mill going back 17 years. Comparatively, the flow between October and February has been above the Long-Term average. Wessex has received an average of 530mm of rainfall across the four-month period between October and February, making it the eighth wettest for this four-month period since our records began in 1891. Throughout the month of October, the average flow was 6.7m<sup>3</sup>/s and the maximum flow was 12.3m<sup>3</sup>/s, which was reached on the 25<sup>th</sup> of October. At the beginning of October flows were low and only 7 fish were record moving through the counter during this period. The flows began to rise on the 22<sup>nd</sup> of October which saw 186 fish migrating upstream between the 22<sup>nd</sup> and the 31<sup>st</sup> of October, making it clear that the fish were waiting for the flows to increase to stimulate their migration upstream.

Looking at graph 1 below it shows flows from the beginning of November to the end of January, you can see multiple high flow events (peaks) which are highly influential in triggering salmon movements. The data for 2022 (yellow line) indicates these peaks continued from the end of October and into January, resulting in the 4<sup>th</sup> highest number of fish migrating between this period since 2006. In January there was 118mm of rainfall, which is 133% of the Long-Term Average (LTA). Most of January's rain fell in the first half of the month with the second half being predominately dry. It was during this period of increasing flows that 16 fish passed through the counter. All upstream migration for 2022 had finished by the 16<sup>th</sup> of January. The rainfall that fell in January is roughly 22.3% of the rainfall that fell since October.



**Graph 1: November to January flows on the Hampshire Avon over the past four years (2019, 2020, 2021 and 2022).**

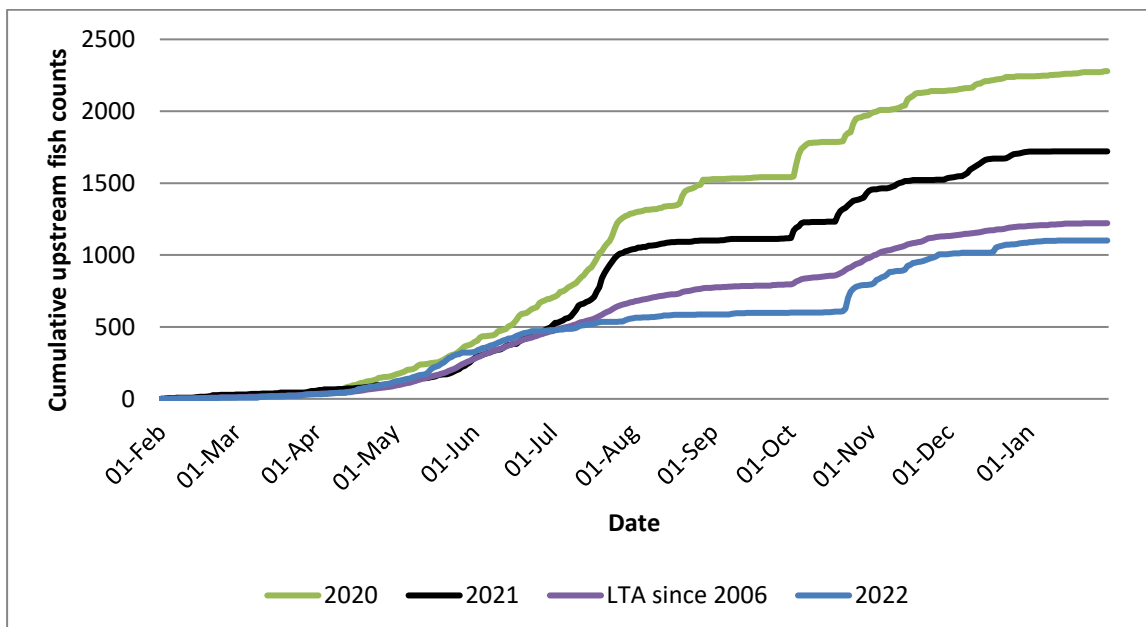
The 309 fish recorded between October and January were added to the final total to give us a final figure of 1101 which is lower than both the 2020/2021 and the 2021/2022 runs. Possible reasons for this will be discussed later in the report.

## Year in summary....

I have now completed my first year running the counter on the Hampshire Avon. February was an exciting time for me as I was able to review the counter year and collate the previous 12 months data which then feeds into the national reporting on salmon stocks within the UK.

Despite the difficulties with operating the site itself the numbers of fish have remained high. After collating the data, the combined upstream count for both salmon and sea trout was **1101**. I must remind you that the counters are not designed to count all the small fish of around 30cm or less so the actual number of sea trout is almost certainly higher than the figure reported. The data we get that is surplus to the salmon counts is very much a bonus although as we move forward, we are continually looking at ways that will enable us to count a greater proportion of these smaller fish without compromising the overall data set.

The total count is 120 fish below the LTA since 2006, which is 1221 upstream fish. This LTA excludes the years 2013, 2014, 2016 and 2018 as there was considerable periods of downtime within these years. Overall, the 2022/23 year represents the 7<sup>th</sup> highest year on record since 2006. This is highlighted by Graph 2 below, showing cumulative totals for all years. When apportioning this total between salmon and sea trout the final figures are; 837 salmon and 264 sea trout. The calculations to reach these figures are detailed later in this report.

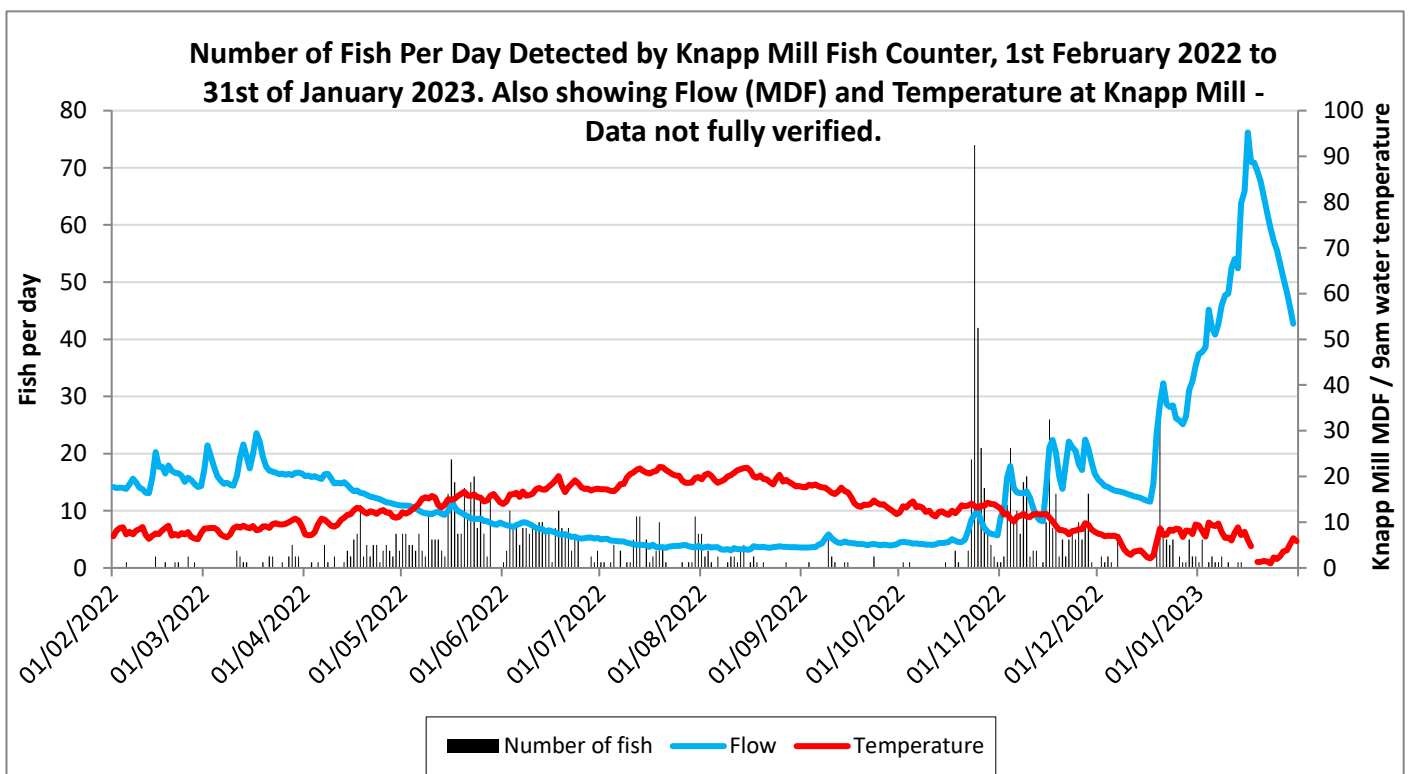


**Graph 2:** Cumulative totals for 2020, 2021, LTA since 2006 (excluding 2013, 2014, 2016 and 2018) and the current year between the 1<sup>st</sup> of February and the 31<sup>st</sup> of January.

As you can see from Graph 3 below, the counter operated effectively throughout the year with fish being counted in every month.

There was a total of 153 days where no fish were counted moving upstream. September was responsible for 23 of these days, although this lack of movement is a trend that typically occurs every year on the Hampshire Avon. As you can see from Graph 6 below the flow was steadily dropping from around June and remained low until late October, with very little rainfall. On top of this temperatures exceeded the 19°C cut off for salmon fishing on 45 days in 2022, the highest since the voluntary measure was introduced.

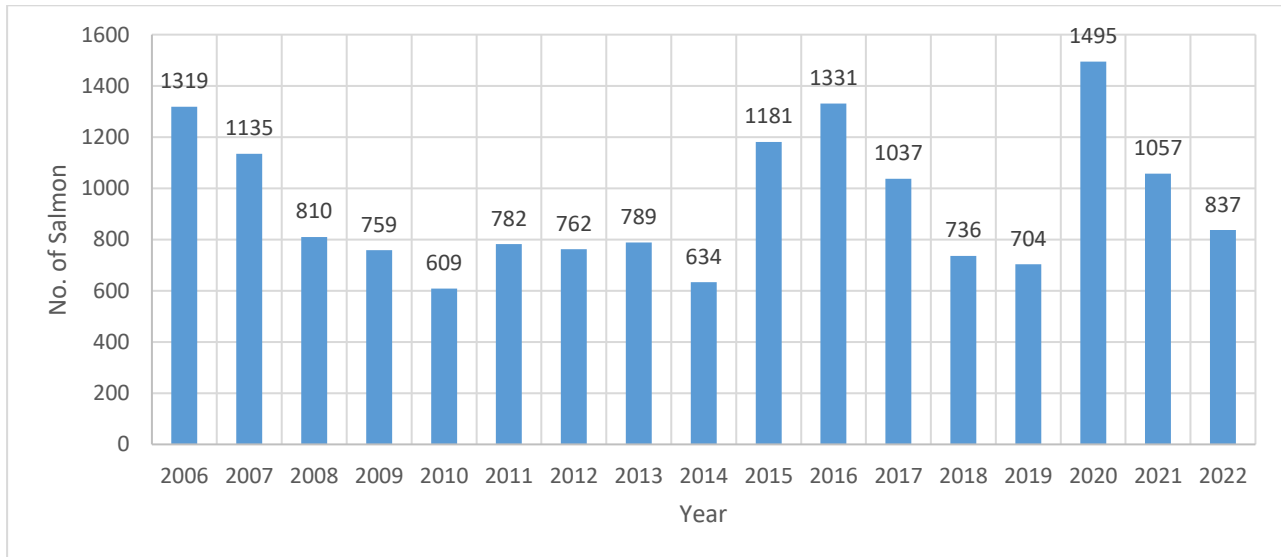
It seems the counts this year were largely a result of a good run of fish throughout May, June, October and November. Between the 1<sup>st</sup> of May and the 30<sup>th</sup> of June fish were counted moving upstream on 55 out of 61 days. Additionally, between the 1<sup>st</sup> of October to the 30<sup>th</sup> of November fish were counted moving upstream on 43 out of 61 days. Between October and November 407 fish moved upstream, which is 38 more than the number that moved between May and June (369). The best numbers were recorded over a 5-day period in October where 170 fish were counted. During this 5-day period we had 74 fish move on a single day, which ended up being the best individual day of the entire year. The best individual day was on the 24<sup>th</sup> of October, this is typical as it is at the end of summer when the rains arrive.



**Graph 3: 2022 daily upstream movements alongside flow and temperature.**

Furthermore, the graph below shows the final upstream salmon counts for the counter for the past 17 years, as you can see 2022 has the 8<sup>th</sup> highest salmon run. The 2022 figure is lower than the previous two years – 2020 and 2021. There are various factors that could

have influenced this trend, notably in 2022 we had high temperatures along with low flows and drought conditions, which put extra stress on the fish and therefore impacted the numbers. Although, the final total figure for both salmon and trout of 1101 is better than could have been expected due to the conditions, it was still below the conservation limit and below the LTA.

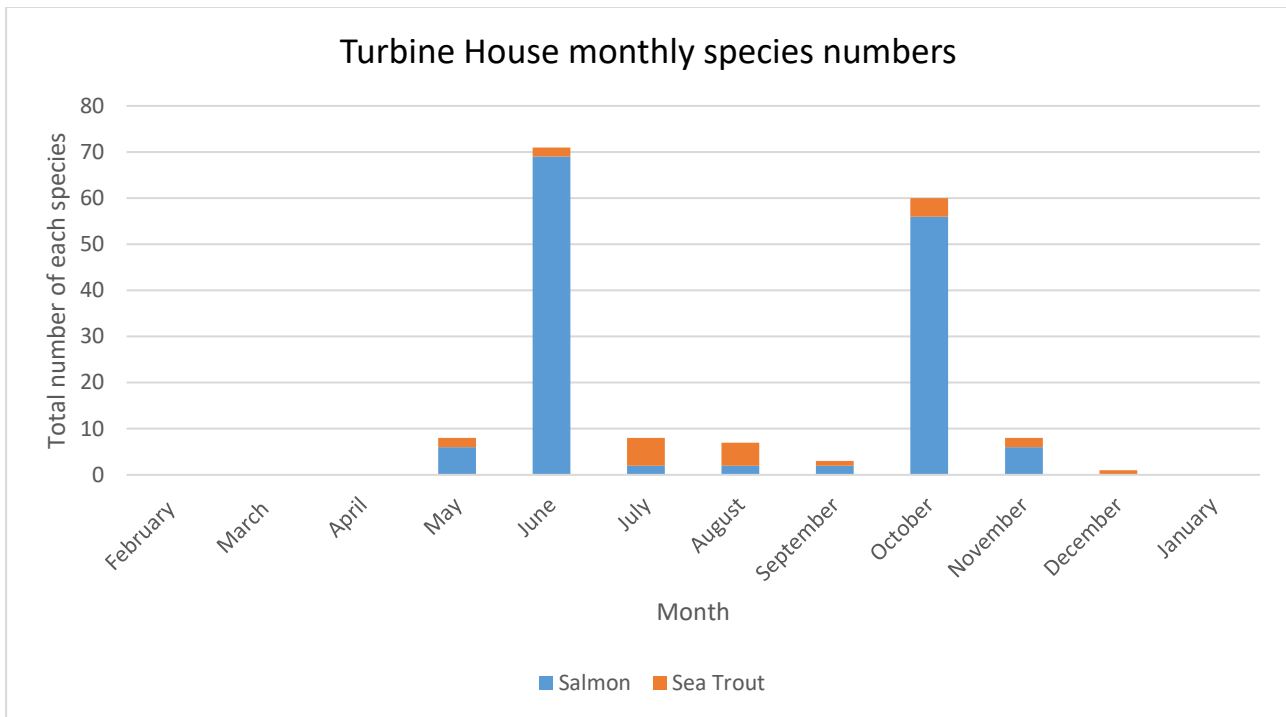


**Graph 4:** Graph showing the number of upstream salmon counts during the counter year (1<sup>st</sup> Feb 2022 to 31<sup>st</sup> of Jan 2023). The years of 2013, 2014, 2016 and 2018 had significant down time due to flood damage or the counter rebuild and for these years rod catch data was used.

## Species verification

This element of work was difficult this year due to the lack on images from the Great Weir, as a result from the change in the hatch protocol. For this reason, we used the data that was available to make the decision on how to best apportion the total between salmon and sea trout. In 2022 we collected 110 overhead and side images for the 167 events at the Turbine House. Graph 5 shows how the species split was apportioned in the Turbine House and the number of each species moving within each month. On the Great Weir we did not manage to get any images due to turbidity and then due to change in the hatch protocol, meaning our hatches with cameras were closed. For the Great Weir February, March, April, December and January were calculated using historic data and the other months were calculated using the current years turbine house data to calculate the species split. Table 1 below shows how each month was split and what data was used in the calculation to get this figure.

This is clearly not the desired way to process the data particularly after the success of the data in 2020/21 where huge numbers of images were collected. Hopefully the year 2023/24 will return to the normal hatch protocol so the confidence in the data split will be higher.



**Graph 5:** Turbine House fish movements in the year 2022/23 and the number each species within each month.

**Table 1:** Showing the monthly data collected at the Great Weir and how the totals were apportioned between salmon and sea trout.

Great Weir	Total Fish	Calculation Used	No. of Salmon	No. of Sea Trout
<b>Feb</b>	9	Historic	9	0
<b>March</b>	23	Historic	20	3
<b>April</b>	75	Historic	56	19
<b>May</b>	208	TH data 2022/23	149	59
<b>June</b>	82	TH data 2022/23	79	3
<b>July</b>	70	TH data 2022/23	18	53
<b>August</b>	25	TH data 2022/23	7	18
<b>September</b>	10	TH data 2022/23	7	3
<b>October</b>	133	TH data 2022/23	124	9
<b>November</b>	206	TH data 2022/23	155	52
<b>December</b>	78	Historic	57	21
<b>January</b>	16	Historic	16	0
<b>Totals</b>	<b>935</b>	<b>N/A</b>	<b>696</b>	<b>239</b>

## Other interesting images

This year we were fortunate enough to get some aerial images from a drone of Knapp Mill when the site is in flood. This year we have seen the Hampshire Avon in both drought conditions (right) through the summer as well as in flood conditions (left) in January 2023. This shows how variable the conditions can be on the Hampshire Avon not only from year to year but also within the same year.



These are aerial images of Knapp Mill when in the site was flooded January 2022

## For further information

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