

Appendix to the 'River Otter Beaver Trial' Science & Evidence Report:

An Investigation into Fishing and its Economic Activity in the River Otter Catchment, and Reported Impacts of Eurasian Beaver (*Castor fiber*) Presence on Fishing, Prior to Spring 2019

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EXECUTIVE SUMMARY

- This report seeks to profile fishing activity within the River Otter, explore the economic factors and detail the reported impacts of Eurasian beaver (*Castor fiber*) reintroduction seen up until the time of writing (Spring 2019).
 - Further to this report, other research looks at both perceptions and the ecological effects of Eurasian beaver reintroduction; as such these areas are **not** the focus of this piece of work.
 - Fishing in the River Otter catchment is largely recreational brown trout or sea trout, with a limited amount of coarse fishing.
 - Engagement with fisheries and syndicates throughout the catchment and publicly accessible data held by the *Environment Agency* are used to examine key economic focal areas including: fishing licence sales; fishing rents/rights; syndicate memberships; day/guest fishing tickets; fishing effort; fish stocking; insurance; individual angler expenses; capital value of fishing rights and other factors.
 - It is identified that a true total economic value of fishing within the catchment is difficult to obtain due to a number of limitations which are described. However, it is assumed that the annual figure is likely to be at least a six-figure sum, as well as the capital value held in fishing rights. The flows between the different economic aspects of fishing are described.
 - The impacts of beavers on fishing within the River Otter catchment that were reported up until the point of writing are outlined. These are so far limited and have occurred both directly as a result of beaver activity and indirectly through interactions between fishing and 'beaver-watching' activities.
 - The research presented within this report enables the identification of the method by which the economic variables in fishing may be effected if beavers were found later to impact on recreational fishing activity, either positively or negatively. This is identified by first influencing an individual anglers' activity, which in turn could impact on factors such as syndicates, riparian rights holders, insurance companies and businesses.
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1. Introduction and Data Sources

The River Otter catchment in East Devon and Somerset is subject to a licensed Trial reintroduction of Eurasian beavers (*Castor fiber*) until 2020, having begun in 2015. Detailed within the licence agreement issued by *Natural England* are the needs for research into the activity of fishing in the catchment and the potential impacts of Eurasian beavers (hereon referred to as 'beavers') upon it. Fishing within the River Otter catchment area is largely recreational brown trout or sea trout fishing, with a small amount of coarse fishing.

The scope of this report is to independently and impartially profile the current fishing activity within the River Otter and explore the economic factors involved, prior to then detailing the impacts of Eurasian beaver (*Castor fiber*) reintroduction which have been reported up until the time of writing (Spring 2019). This report does **not** seek to detail the potential attitudinal or ecological aspects of beaver reintroduction as there is further research within the 'River Otter Beaver Trial' and elsewhere.

The data that is drawn upon within this report comes predominantly three sources. The first is publicly available data held by the *Environment Agency*. Where this data is used, they are explicitly stated and a reference list is provided at the end of the report. Second, the researcher has engaged with identified representatives of fishing syndicates/clubs/fisheries throughout the catchment where possible (an overview of these is provided later in the report). Finally, some details have been provided by up to eleven individual anglers from within the catchment. This is specified on each occasion, and engagement occurred either through a face-to-face interview or through email communication.

All respondent identities and personal data are treated as confidential, as such contributions have been made anonymously. At times, data was provided which was identified by the contributor as commercially sensitive. Where this is the case, the information itself is not reported so as to remain confidential, but it is specified as to which factor this data would contribute to. Finally, the ethical statements through which this work was conducted and to which respondents agreed is provided in [Appendix I](#).

2. Fishing Licence Sales in the Otter Catchment

The *Environment Agency* (EA) sells two types of fishing licence: 'Salmon and Sea Trout' and 'Non-Migratory Brown Trout and Coarse Fishing'. In this section, the average sale numbers and values of these licences between 2010 and 2016 are presented.

It is important to recognise that the sales of licences within the catchment is unlikely to be directly reflective of the number of anglers who fish in the Otter catchment as licence-holders may fish in different catchments, and licence-holders outside of the catchment may fish in the Otter. The licence sales are however a significant economic factor which should be recognised.

The data indicating the number of licences sold is available annually from the *Environment Agency* by *Environment Agency* area, in this case the South West. It is not however readily available by river catchment. Therefore, to obtain data for the River Otter catchment, data was obtained through a Freedom of Information request for postcode districts EX9, EX10, EX11, EX14 and TA20¹. This data is only retrievable until 2016 as, from 2017 onwards, the author was informed that it is not possible to obtain licence sales figures for postcode districts due to a change in the recording system at the *Environment Agency*. Thus, the estimates for the catchment by these postcode districts is only

available between 2010 and 2016. Using the figures from between these years the average estimates are calculated.

The proportion of sales in the South West are also presented here, calculated using figures from the *Environment Agency 'Annual Salmon and Freshwater Fisheries Statistics for England and Wales Reports'*². These are available from 2010 onwards, with the latest available being for 2017. (South West licence sales data is available in [Appendix 2](#).)

2.1. No. Licences Sold

Licence Type	2010	2011	2012	2013	2014	2015	2016	AVERAGE
Disabled Concession – Full Annual	0	0	0	1	1	1	2	1
Full Licence – 1 Day	11	13	21	14	12	8	12	14
Full Licence – 8 Day	7	4	0	8	2	0	1	3
Full Licence – Full Annual	44	47	48	51	47	38	41	47
Junior Concession – Full Annual	13	6	6	9	7	3	4	7
Senior Concession – Full Annual	25	27	25	24	32	30	35	27
TOTAL	102	98	100	108	102	82	96	98.29
% of Sales in South West²	2.507	2.365	2.459	2.866	2.798	2.218	2.710	2.590

Licence Type	2010	2011	2012	2013	2014	2015	2016	AVERAGE
Disabled Concession – Full Annual	46	41	34	31	31	29	26	34
Full Licence – 1 Day	288	303	265	254	252	319	298	282
Full Licence – 8 Day	63	65	36	66	49	56	58	56
Full Licence – Full Annual	658	664	598	544	527	526	526	594
Junior Concession – Full Annual	153	149	115	92	72	61	48	104
Senior Concession – Full Annual	184	192	211	218	218	219	208	203
TOTAL	1392	1414	1259	1205	1149	1210	1164	1256.14
% of Sales in South West²	1.380	1.410	1.416	1.359	1.301	1.357	1.330	1.284

2.2. Value of Licences Sold

The values of each licence type sold across all of these years were as detailed in Table 3².

Licence Type	Salmon & Sea Trout	Trout and Coarse
Disabled Concession - Full Annual	£48.00	£18.00
Full Licence - 1 Day	£8.00	£3.75
Full Licence - 8 Day	£23.00	£10.00
Full Licence - Full Annual	£72.00	£27.00
Junior Concession - Full Annual	£5.00	£5.00
Senior Concession - Full Annual	£48.00	£18.00

If these values are applied to and multiplied by the sales frequencies, the total values in the Otter catchment per year for all licence types are then as follows in Table 4, or as follows in Table 5 when the sales values are adjusted to account for inflation between each respective year and 2018.

TABLE 4. OTTER ESTIMATED VALUE OF LICENCES SOLD							
2010	2011	2012	2013	2014	2015	2016	AVERAGE
£29,063.00	£29,559.25	£27,338.75	£26,445.50	£25,651.00	£25,030.25	£25,218.50	£26,902.32

TABLE 5. OTTER ESTIMATED VALUE OF LICENCES SOLD ACCOUNTING FOR INFLATION UNTIL 2018							
2010	2011	2012	2013	2014	2015	2016	AVERAGE
£38,509.01	£34,787.40	£34,276.61	£30,770.93	£29,085.96	£27,923.76	£26,781.50	£31,733.60

2.3. Licence Data Conclusions

From these figures, the sales from within the Otter catchment accounted for an average of 2.59% of Salmon and Sea Trout licence sales in the South West (98.29 sales), and 1.284% of Trout and Coarse licence sales in the South West (1256.14 sales).

The average value of licences sold in the Otter catchment was £26,902.32. Accounting for inflation until 2018, the average value of licences sold per year was £31,733.60.

3. Fishery and Syndicate Details

During the course of this work, four major fisheries and syndicates were identified as active within the River Otter catchment, as well as a number of smaller syndicates or individually rented stretches in the middle reaches. It was possible to engage with the four major fisheries in the course of this research.

At the headwaters of the River Otter, Otterhead Lakes fishing falls under *Taunton Fly Fishers* as one of six of their beats (the remaining five beats are outside of the Otter catchment). This operates on a membership basis. *Deer Park Country House* operates a fishery with four beats in the middle reach of the river. This operates by the sales of day tickets. Neighbouring the Country House both up- and downstream, the next fishery is the *Otter Fly Fishers Association* which runs on a membership basis, as do the syndicates operating furthest down the catchment on the four beats owned by *Clinton Devon Estates*. This section of the report is the result of engagement with at least one representative of each of these four bodies.

The lowest reach of the River Otter is free for members of the public to fish as a philanthropic gesture by its owners *Clinton Devon Estates*. Additionally, the compiler of this report heard of small amounts of fishing activity on the River Tale (a tributary of the River Otter within the catchment) and of a small syndicate in the middle reaches of the catchment, but was unable to identify appropriate contacts with which to engage. These are therefore not referenced from this point forth, but it is important to note that there is likely to be further economic contributions from these areas.

3.1. Rent/Rights Estimate

Three fisheries/syndicates identified that they rented the rights to fish particular reaches of the River Otter. The values were identified as commercially sensitive and therefore are confidential data. This information cannot therefore be reported upon here in detail, however the value of each rental sum paid was a four-figure value. On one occasion, a representative further specified that fishing rights were obtained in return for access to a number of days fishing on other beats.

The lowest reach of the river is owned by *Clinton Devon Estates* and is open for members of the public to fish for free (provided they hold a valid licence).

3.2. Memberships

Of the fisheries/syndicates which offered memberships, there are approximately 55 paying members. At Otterhead Lakes, the fishing is managed by a syndicate which also manages five further fishing beats outside of the Otter catchment. It was estimated by the representative of this syndicate that Otterhead Lakes is used by approximately 20-30 of its syndicate members.

The value estimate of members' fees was estimated by multiplying the number of paying members by the value of a full adult membership price at the respective syndicates. (For Otterhead Lakes, this multiplied 20 and 30 by the syndicate membership price, then the obtained value was divided by 6 to reflect the fact that the Lakes are one of six beats). The resultant value estimate for memberships alone was therefore £9625-9775.

At *Deer Park Country House*, the access to fishing is administered through the sale of day tickets rather than through memberships. The number of day tickets sold was not quoted so a quantified value estimate is unavailable (see [Section 3.3](#) for notes on pricing.)

Also of note, one fishery/syndicate identified that they also have 4 non-paying lifelong members, and two syndicates identified that they also charge joining fees for new members.

3.3. Day/Guest Tickets

Two fisheries/syndicates identified that they allowed members to bring guests. One indicated that this was free to do, and the other charges £2 a day (the number of guest tickets sold was not available). None of the three syndicates sold day tickets to the general public.

At *Deer Park Country House*, day tickets are charged at £35 a day (the number of tickets sold was unavailable). Season tickets are also available, yet the price was identified as commercially sensitive and is therefore confidential.

3.4. Effort Data

3.4.1. Effort Reported By Syndicates/Fisheries

Two syndicates identified that they do not collect effort data or were unwilling to share the information that they did have. The reasons cited for this were: a lack of trust in returns; that some anglers won't share details of where they fish; that some anglers are not bothered to complete returns; inaccuracy of reporting - including the difference in reporting of fish size between kept and returned fish (due to speed of measurements) and that the effort of chasing return forms was too high when the administrative tasks were undertaken on a voluntary basis.

Deer Park Country House did however state that a record book is kept, into which it was estimated about 60% of anglers complete. The author of this report however was unable to view the information.

Of note, brown trout and sea trout were cited by respondents to generally be in decline. One noted that the fish in the past year have been smaller than usual, cited as being possibly due to environmental conditions or perhaps due to dominant trout holding the area. One representative cited that they can block the use of certain beats when they believe it needs to recover from environmental disturbance.

3.4.2. Environment Agency Effort Data

3.4.2.1. Number of Fishing Days

An estimate has been calculated for the number of days fished in the River Otter catchment utilising data held by the *Environment Agency*.

Although it is not a requirement for Non-migratory Brown Trout licences, Salmon & Sea Trout licence holders are legally obligated to submit an annual return detailing their fishing effort including: number of days fished, where they fished and what was caught and returned. It is important to note that fewer returns are received than the number of licences issued and that the data may possibly suffer from the limitations which were identified by the syndicates/fisheries as outlined above in [Section 3.4.1](#). However, these are the best available data at present and it is this data that is used in this section².

The data available in the *Environment Agency* reports between 2010 and 2017² for the number of days fished for Salmon & Sea Trout in the River Otter and in the South West are presented in Table 6. (The number of returns with effort data is reported in [Appendix 3](#)).

TABLE 6. REPORTED NO. DAYS FISHED FOR SALMON & SEA TROUT²									
REGION	2010	2011	2012	2013	2014	2015	2016	2017	Average
River Otter	283	363	151	179	275	237	233	175	237
% of South West Days Fished in River Otter	1.22%	1.51%	0.74%	0.97%	1.7%	1.31%	1.51%	0.99%	1.24%
South West	23206	24008	20482	18385	16221	18129	15418	17717	19195.75

Note: It is possible that licence holders who did not submit their returns may fish for a further number of days.

This data is not available for the fishing of brown trout and coarse fish. However, in 2005 the *Environment Agency* released the most up-to-date of its 'Economic Evaluation of Inland Fisheries' Reports³. This report used the results of a telephone ($n=3000$) and internet survey ($n=4000$) of fishing licence holders. This report uses their results to estimate the number of days that were fished across England and Wales (See Appendix A³ within the report).

The figures estimated for the South West region are presented in Table 7 below, alongside the percentage increase in days between Salmon & Sea Trout fishing and fishing for Brown Trout and Coarse Fish. (The report is broken down into the Environment Agency regions, therefore the figures are not available specifically for the River Otter.)

FISHING TYPE	Salmon & Sea Trout	Brown Trout	Coarse Fish
No. Days Fished	43,000	455,000	2,182,000
% Increase in number of days from fishing for Salmon & Sea Trout	-	958.12%	4974.42

To estimate the number of days fished for brown trout in the River Otter catchment, the number of days reported for Salmon & Sea Trout fishing² detailed above were adjusted by the percentage increases in number of days calculated from the 'Economic Evaluation of Inland Fisheries' report³. The number of estimated days' effort in the River Otter are therefore as follows in Table 8. We have not calculated the number of days in the same manner for coarse fishing as this activity is limited within the River Otter catchment and such a calculation would be likely to misrepresent the level of coarse fishing activity in the area.

FISHING TYPE	2010	2011	2012	2013	2014	2015	2016	2017	Average
Salmon & Sea Trout	283	363	151	179	275	237	233	175	237
Brown Trout	2711.48	3477.98	1446.76	1715.04	2634.83	2270.74	2232.42	1676.71	2270.74
TOTAL	2994.48	3840.98	1597.76	1894.04	2909.83	2507.74	2465.42	1851.71	2507.74

Note: It is possible that licence holders who did not submit their returns may fish for a further number of days.

Further, the 2005 report estimates the proportion of days spent fishing by residents and visitors for the three types of fishing as detailed in Table 9.

FISHING TYPE	Residents	Visitors
Salmon & Sea Trout	86%	14%
Brown Trout	73%	27%
Coarse Fish	76%	24%

If these proportions are applied to the estimated number of days in Table 8, the average estimated number of days fished by residents and visitors between 2010 and 2017 (excluding coarse fishing for reasons outlined above) are thus as detailed in Table 10.

FISHING TYPE	Residents	Visitors
Salmon & Sea Trout	203.82	33.18
Brown Trout	1657.64	613.10
TOTAL	1861.46	646.28

3.4.2.2. Estimated Value of Visitor Fishing Days

The 2005 'Economic Evaluation of Inland Fisheries' report³ deduces from its results that, in the South West, the average expenditure on a visitors' fishing day in the region was £176 for Salmon & Sea Trout and £40 for Brown Trout (and £36 for Coarse Fish). With this value applied to the estimated number of visitors' days fished from Table 10, the estimated values of visitor expenditure in the River Otter between 2010 and 2017 are presented in Table 11, which also presents the values when adjusted to account for inflation from 2005 (when the *Environment Agency* report was published) and 2018 (£256.69, £58.67 respectively).

FISHING TYPE	Estimated Value	Estimated Value Adjusted for Inflation until 2018
Salmon & Sea Trout	£5837.92	£8516.97
Brown Trout	£24,524.00	£35,970.58
TOTAL	£30,361.92	£44,487.55

As stated above, we have not calculated figures for coarse fishing in the same manner. However, it should be noted that there may be a slight additional value from limited coarse fishing activity.

3.4.4.3. Reported Catch

The *Environment Agency* annual reports² detail the Salmon & Sea Trout catches reported within the River Otter. The data is presented in Table 12. (This information is not available for Brown Trout and Coarse Fish as it is only a legal requirement to submit a return for the Salmon & Sea Trout licences.) The number of returns containing effort data is reported in [Appendix 3](#).

YEAR	SALMON ROD CATCHES (All Released)	SEA TROUT CAUGHT (Releases in Brackets)	TOTAL REPORTED SALMONID CATCH
2010	-	91 (66)	91
2011	-	123 (101)	123
2012	-	27 (24)	27
2013	2	113 (103)	115
2014	-	152 (104)	152
2015	-	60 (49)	60
2016	-	79 (73)	79
2017	1	60 (56)	61

3.5. Stocking

All fisheries/syndicates that were engaged with reported that they no longer stock fish, except one which stated that it is reducing the number of fish stocked (see [Section 7](#)). Of those that had stopped stocking, the motivations for doing so were described differently. One cited the reason as being due to rising costs and that its members questioned whether there was still a need to undertake stocking. This organisation previously stocked 200-300 triploid brown trout annually until 2014. Another, which stocked approximately 100 triploid brown trout in the previous three years, will no longer stock from 2019 as the committee view is that there should be a 'wild fishery'. Another stated that they do not stock in order to "encourage the growth of locally spawned trout".

Finally, the last organisation stocked fish until Spring 2017, with the number stocked having been reduced over time due to rising costs. The reason for stopping was as the fishery's work was to now focus upon improving habitats and biodiversity in line with the wider business ethos and to provide "more wild fishing". The fishery/syndicate which still stocks inputs 1lb sterile brown trout from a fishery in Dorset. They and one of the smaller syndicates collectively stocked 300 in 2017 at a cost to the syndicates of £1200, and in 2018, 200 were stocked at a cost of £840.

3.6. Insurance

All fisheries/syndicates indicated that they paid a cost for insurance. Two confirmed the value as a three-figure sum. One identified that the insurance price was included in *Angling Trust* membership through *Fish Legal*, through which the price is dependent upon the number of members within a syndicate.

3.7. Other Economic Factors

One organisation indicated that it auctioned 2 days' worth of fishing a year for a *Salmon and Trout Conservation* auction, raising approximately £150 each.

Deer Park Country House previously ran 'Stay and Fish' packages and fishing masterclasses. These are currently not in operation, but are in consideration for the future.

3.8. Additional Notes

One representative stated that their operation is running at the "everybody is happy" level, but it could increase its economic potential through the building of fishing huts etc.

One fishery representative believed it important to recognise the mental health benefits that they believed fishing provided within this work. This included the act of fishing itself, as well as during the time spent making new flies. They reportedly quoted one particular angler who had previously suffered with cancer who stated that "the prospect of fishing in future was one of the things that gave him the strength to cope and fight on".

4. Individual Angler Expenses

A number of factors were also identified at the level of individual anglers following discussion with eight members of the angling community within the catchment. Table 13 aims to provide an indicative insight as to the types of economic factors which were cited by respondents:

TABLE 13. INDIVIDUAL EXPENDITURES REPORTED BY ANGLERS	
Economic Factor	Details
Gear/Equipment (Including Flies/Tackle)	<p>Broadly, these were cited as 'one-off' purchases, ranging between £400-700 per year to include baits, ties and tackle. One respondent identified that this may be higher if they needed to purchase more expensive equipment such as a new rod or pair of waders for example, likely to be on a less-than-annual basis.</p> <p>Respondents stated that gear may be bought either in a local shop or purchased online. Three anglers identified that they made these purchases in nearby Exeter.</p>
Local Hospitality Establishments	<p>Food or Drink purchases after fishing.</p> <p>Amongst the eight anglers spoken to, this was less regular as most would travel to fish from a nearby home and head back there afterwards.</p>
Local Shops	<p>Snack food and drinks for a fishing trip, cited by two respondents as approximately £5 a trip.</p>
Transport/Fuel To and From Fishing	<p>This is a variable cost dependent upon the distance a respondent travels. The syndicates identified that most anglers within the Otter catchment lived reasonably locally, but with a small number traveling from further afield.</p>
Fishing Holidays	<p>Two River Otter anglers identified that they undertake significant expenditure on fishing holidays away from the Otter catchment.</p>
Fishing Guiding/Teaching	<p>One angler identified himself as a fishing guide/teacher. They stated that this was paid but occasional as they were retired. The number of guides/teachers in the catchment is unknown.</p>

5. Capital Value of Fishing Rights

As well as the economic transfers outlined above which will occur annually (or are expected to occur regularly), further value is held in capital through the ownership of fishing rights.

The Secretary of the *River Otter Fisheries Association* calculated an estimate of the total capital value based upon historical sales of fishing rights. This was based upon three values for what may be termed the upper, middle or lower reaches of the catchment. The River Otter Beaver Trial 'Fisheries Forum' were presented with these estimates and agreed that they were appropriate figures. These estimates are thus outlined in Table 14.

(To note, the figures do not include the capital value of the fishing rights at Otterhead Lakes or the River Tale.)

TABLE 14. ESTIMATED CAPITAL VALUE OF FISHING RIGHTS			
STRETCH OF 'FISH ABLE RIVER	Estimated Figure Per Yard Double Bank (Based on historical sales)	Stretch Length	Estimated Value of Stretch (Estimated Figure x Stretch Length)
Upper	£20	7655yds (7km)	£153,100
Middle	£50	15,310yds (14km)	£765,500
Lower	£100	15,310yds (14km)	£1,531,000
TOTAL		38,275yds (35km)	£2,449,600

The Secretary added that it could be assumed that up to 20% of each stretch would be 'unfishable' (due to built-up areas and other obstructions). Therefore the estimated capital value held in fishing rights for the main part of the River Otter can be adjusted to **£2million**.

6. Economic Value of the Catchment

This study initially set out to gain an understanding of the total economic value of fishing within the River Otter catchment area. However, a number of challenges have been identified that limit the ability of identifying the true value:

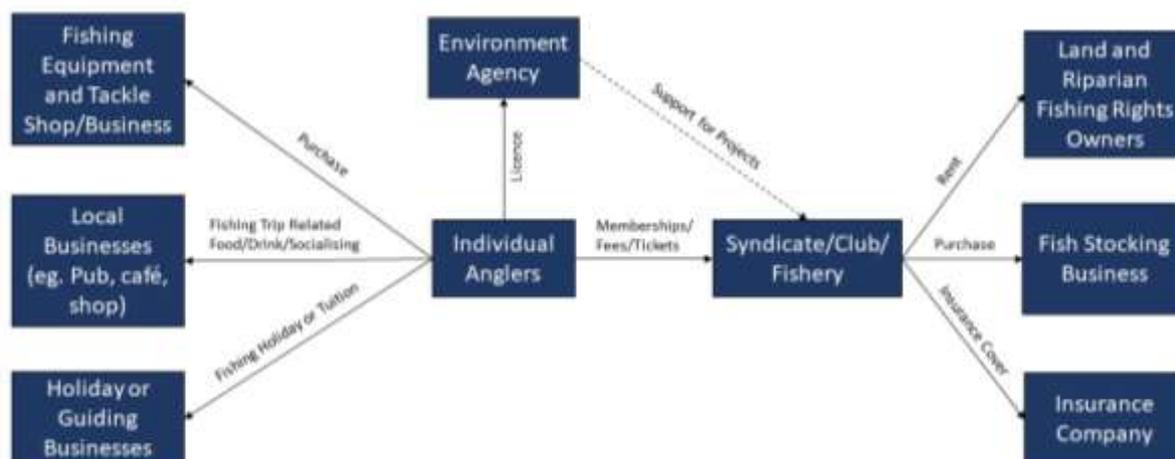
- Some information was withheld by fishing syndicate representatives. This was primarily stated as being due to the commercial sensitivity of the information and the intention of keeping the information confidential from other syndicates nearby.
- For some information, the data obtained was incomplete (for example, sales numbers of day or guest tickets in the catchment). Further, appropriate contacts could not be identified for some of the reported fishing such as in the River Tale or another small syndicate.
- This study could not question all anglers within the catchment about their economic activities. Partly, this is due to the ability to identify anglers and the importance of data protection from relevant organisations, or from the willingness to engage of potential participants.
- Where anglers could be questioned, there were limitations borne of a lack of information recording or other challenges, such as those also quoted by syndicates in chasing effort data (varied quality and accuracy of records or high effort in following a line of enquiry).
- Also of note, this study received good engagement from fishery committee members, for which the author is very grateful. In other similar studies however, it may be that data is unavailable dependent upon the willingness-to-participate of respective participants.

As such, the true value of fishing activity in the River Otter catchment cannot be identified fully accurately. From the information gained in this research however, it is reasonable to assume that the annual value could be at least a six-figure value, as well as the capital value held in fishing rights.

However, an understanding of the key economic areas has been obtained which provides a useful profile of the annual activity within the catchment. Through this information, it has been possible to

understand particular economic variables, and indeed of how economics flow within this catchment each year. Figure 1 presented here is a flow diagram demonstrating the annual economic transfers identified in this work. Each arrow is representative of financial flow.

Figure 1. Flow diagram of the annual economic transfers identified within the River Otter catchment.



7. Reported Beaver-Related Incidents Related to Fishing

This section reports upon impacts of beavers which have been observed within the Otter catchment by respondents to the Syndicate/Fishery research and individual anglers. To preserve representative identities, all fisheries/syndicates are referred to here as a 'fishery'.

This section states only observed impacts. Further research into perceptions of the potential impacts of beaver reintroduction in the catchment in relation to fishing is ongoing in a Q-Methodological study (the results of which will be attached as an appendix to the 'River Otter Beaver Trial' Science & Evidence Report following scientific peer review). Similarly, research into the ecological relationships between beavers and fish has taken place in the 'River Otter Beaver Trial' and elsewhere.

- 1) One fishery reported that there had been antagonistic behaviour and disturbance caused by people attempting to watch beavers on the riverbank. It was stated that numbers of visitors on the riverbank at any one time could exceed twenty people trying to watch beavers and that there had been incidents where members of the public had shouted at the anglers in the water. This includes one stated incident where an angler was reported to have been told by a member of the public to "stop fishing to protect the beavers". It was reported that the fishery had lost four paying members as a result, causing the fishery to have to replace them.

- 2) One fishery representative identified that two of the 'Beavers Live Here' signs (erected by the Wildlife Trust) had been damaged. One in particular had the line which asked members of the public to respect the rights of fishing in the river scratched out which the representative stated was "antagonistic behaviour towards the angling community" (see Figure 2). In response, the fishery estimated that approximately 40% of the beat had become unfishable due to the presence of beavers leading to 'beaver-watchers' disturbing their activity. This led to negotiation with the Estate which leases the fishing rights who reduced the rent in response by £200 in 2018.
- 3) The fishery which reported that it had had its area reduced by 40% in point 2 stated that this had led to the further decision to reduce the number of fish stocked in its reaches as, with reduced fishing availability, the representative reported that its members had questioned "is it worth it?".
- 4) A concern was expressed by a fishery representative who stated that "a number of 'beaver-watchers' have left litter on the riverbank".
- 5) A fishery representative reported that there had been some disturbance by 'beaver-watchers' in the evenings. However, they stated this had been limited and expressed their view that this impact would become less commonplace if beavers became more widespread as "currently they are a novelty".
- 6) One fishery representative stated that "impacts from the beavers had been limited as they are not really in our stretch."
- 7) One of the fishery representatives identified that there had been many signs of beaver activity within their beats, however they stated that there were no impacts of concern.
- 8) One of the fishery representatives reported that there had been some interest in the beavers amongst anglers in their stretch.
- 9) One of the fisheries stated that they had become used to beaver presence having known they were there since before the Trial began.
- 10) One angler expressed that a beaver-felled tree had obstructed the angler's ability to wade in the water: "This falling tree makes it difficult to wade up that stretch of river."
- 11) One angler stated that beavers are not necessarily effected by fishing following a sighting of one during a fishing experience: "I saw one before they were known about and there was no reaction from the beaver to my presence. (It would have been nice to have known that it was a beaver at the time though!)"
- 12) It was reported by one fishery representative that they had lost a member who felt intimidated by beavers and so moved to fish in another river catchment to avoid them.



- 13) One angler stated that they had seen a beaver whilst fishing in the water and that it had, in their view, “improved my [angler’s] fishing experience”.
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8. Beavers and Fishing Economics

Within the scope of the ‘River Otter Beaver Trial’ there have been limited observed relationships between beavers and fishing thus far, however research is ongoing into the potential impacts that there may be of reintroducing beavers upon fishing. This report has however been able to provide an indication of the potential mechanism by which beavers could impact upon the economic factors in recreational fishing, if there are any impacts to be observed, whether positive or negative.

Step 1. Whether positively or negatively, it is most likely that the beavers would impact upon an individual anglers’ fishing experience in the first instance, as has so far been the case in the impacts outlined in [Section 7](#). These impacts could be direct, such as the felled tree in the river, or indirect, such as the presence of ‘beaver-watchers’ causing disturbance.

Step 2. Should this then alter an anglers’ fishing activity in either a positive or negative manner and lead to a change in their fishing activity, this could alter the financial contributions of the angler towards the other areas as described in Figure 1 (such as the *Environment Agency* [if they stop fishing altogether and no longer purchase a licence], fishing equipment/tackle shops, local businesses, holiday businesses and/or syndicate/club/fisheries [such by revoking membership, as reported to have occurred within one of the syndicates within the Otter catchment]. In the case of the latter, this would then by extension alter the economic contributions towards the fishing rights owners [as has once been reported in the Otter catchment], fish stocking businesses [also once reported in the Otter catchment] and/or insurance companies.)

As yet however, the potential impacts (if any) and the scale of those is uncertain. Further research into the perceptions held amongst anglers about the potential relationship between beavers, fishing and other factors in the River Otter catchment is ongoing, as is research into the ecological relationship between beavers and fishing.

9. References

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APPENDIX 1 – Ethical Statements

All respondents to this work were provided with the following statements in writing prior to making their contributions to this work.

- Taking part is entirely voluntary, and you may choose to withdraw at any time.
- Participation is anonymous and you will not be expected to provide any personal information. However if you choose to do so, this will be treated as confidential and not be used in a way that would allow for the identification of your individual participation.
- Should any data that you provide be identified as commercially sensitive by you, this will be treated as confidential and not shared elsewhere unless with your prior written permission.
- Data will be stored securely and anonymously at the University of Exeter and then, if appropriate, at the UK Data Archive, in order to make it available to other researchers in line with current data sharing practices. If data is not used, it will be held by the researcher for up to five years.
- This study is funded by the University of Exeter, Devon & Cornwall Wildlife Trusts and Plymouth City Council.

APPENDIX 2 – South West Licence Sales Data²

		886	935	984	1049	1095	1130	1153	
		870	911	817	661	588	728	671	
		211	199	215	209	179	192	186	
		1787	1786	1730	1581	1554	1468	1409	
		314	312	320	268	229	179	124	

		12169	12555	12910	13626	14165	14892	15270	
		30401	31658	25899	26903	27114	27706	27218	
		3631	3878	3565	3496	3503	3591	3666	
		46684	44930	40806	39604	39194	38960	37957	
		8019	7240	5758	5060	4367	3995	3426	

APPENDIX 3 – Salmon & Sea Trout Licence Returns Containing Effort Data on the River Otter²

YEAR	2010	2011	2012	2013	2014	2015	2016	2018
No. Returns with Effort Data ²	32	37	24	22	23	26	31	22