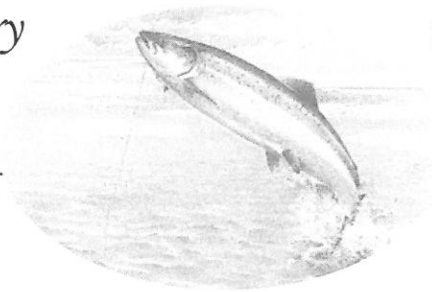
The Dee Fishery Association

An Association dedicated to the welfare of the River Dee and its rod Fisheries.



Cymdeithas Genweirio Dyfrdwy

Cymdeithas er lles Afon Dyfrdwy a'i Genweirio

Ty Cerrig
Pwllglas
Ruthin
LL15 2PD

25.03.2017

Mr Tim Jones
Executive Director for Operations North and Mid Wales
Ffordd Penlan
Parc Menai
Bangor
Gwynedd
LL57 4DE

Dear Tim

Following our meeting at Carrog, I was pleased that you agreed to examine and reconsider the NRW Board decision, firstly to close hatcheries and more significantly to prohibit all third party mitigation stocking. I have since held several meetings and discussion groups with many of the Dee Stakeholders together with representatives of other river systems affected by the hatchery closure decision.

I now attach herewith a single sheet of bullet points which very clearly and concisely show that the hatchery closure decision taken by the NRW board was ill informed and without a clear scientific evidential base, I am not at this stage proposing to make any comment about the "consultation" aspect, but needless to say this was criticised by all of the stakeholders.

There is also attached herewith a detailed analysis giving support to the bullet points, inevitably this is more lengthy, however it does contain clear evidence that the NRW board decision was based very largely on opinion and economic strategy bolstered by an enormous amount of largely irrelevant statistical data.

As I mentioned at the close of our meeting, I am making the feelings of this Association as public as possible and I confirm that the bullet points and detailed refutation will be circulated as widely as possible within the press, public and political arenas.

I look forward to hearing further from you in the near future.

Yours sincerely

John Roe
Chairman

enc

Lack of evidence of harm from stocking
Prepared by Chris White: CPWF Conservation Officer (Jan 2017)

Closure of NRW and Third party hatcheries

The claim by NRW that hatcheries and stocking of salmon and sea trout is harmful does not stand scrutiny i.e. there is no evidence of harm from the use of local broodstock to stock rivers in Wales.

- The basis of the claim that hatcheries are harmful comes from an opinion expressed based upon a genetic study carried out by Swansea University into the decline in salmon and sea trout in the rivers Taff and Ely. The effects of the Cardiff Bay barrage were not considered and yet it is known that there is significant predation of smolts (young salmon) in slow moving sections during their migration to the sea.

- In order to influence the decision makers on the NRW Board a bibliography of over 200 research papers was compiled none of which claimed that using local broodstock and good hatchery practice was harmful. The most damaging was an addendum paper, prepared by NRW staff, which sets out to compare 25 pairs of wild fish with 25 pairs of fish taken to the hatchery. This paper claims that by taking fish to the hatchery there would be a net loss to the river of some 97 fish. The figures as presented to the NRW Board cannot be substantiated and do not make sense. It is clear that the sole purpose of this paper was to influence the decision makers.

- The insistence that due to the evidence of harm from the use of hatcheries in the addendum paper presented to the NRW Board, that as well as NRW hatcheries all third party hatcheries in Wales must also be closed. This is despite the lack of evidence of harm. When NRW were challenged about the lack of substantive evidence it was claimed there is 'emerging evidence' from as yet unpublished research. This research paper was presented in Dublin but as with the majority of the research papers it contains no evidence just opinion based upon post graduate research. As with much of the research the study was too small to draw any conclusions, it just contains observations and opinions. To date no evidence has been provided which support the opinions expressed.

- The closure of the Third Party hatcheries in use in order to mitigate for impoundments which do not have fish passes is contrary to the requirements of the Salmon & Freshwater Fisheries Act (SAFFA) as amended by the Environment Act. In Section 9 of SAFFA it requires all obstructions to migratory fish to be provided with a fish pass which must be maintained by the owner. The closure of three hatcheries, the Twi, Cleddau and Rheidol which operated in lieu of a fish pass on the dams means that the owners are now guilty of an offence under SAFFA.

- The NRW alternative mitigation programme is nothing more than habitat improvement as it does not mitigate for the loss of spawning areas above dams which do not have fish passes.

- The alternative mitigation on the Tryweryn is simply restoration of the damage caused due to the migration of gravels downstream after 50 years of impoundment. The installation of a gravel trap and importation of gravels from the lower river (above the Bala weirs) does not mitigate for the loss of the spawning grounds above the dam. The need for a hatchery in lieu of a fish pass was recognised by Parliament in the Liverpool Corporation Act (now repealed). In 1960 this responsibility was transferred from Liverpool Corporation to the then 'river board' which according to the minutes was to be 'in perpetuity'. The failure of NRW to provide alternative mitigation which is equally as effective as using a hatchery (as defined in the Act of Parliament) means that they are guilty of an offence under Section 9 of SAFFA.

- There is no evidence that enhancement stocking is harmful when using local broodstock and semi natural rearing ponds or scotty boxes.

Lack of evidence of harm from stocking

At the NRW Board meeting at Menai Bridge a presentation given by Peter Gough on behalf of the NRW Fisheries division claimed that stocking was harmful. In preparation for this Board meeting a Bibliography of fisheries research papers was compiled purporting to support the theory that hatcheries were harmful. Having evaluated some 200 of these papers NONE claimed that using local broodstock for stocking results in harm. In closing his presentation Peter Gough said and I quote "this is what we believe" – belief is NOT evidence.

Those of us present at the Board meeting (there were 6 of us) as members of the public were not permitted to make comment on the proceedings. The majority of the NRW Board members said that they were not in a position to comment on the findings and it was left to Lynda Warren to support the closure of the NRW hatcheries and she insisted that she believed there was evidence of harm from stocking the decision to close NRW hatcheries should be extended to all third party stocking. As a result stocking of migratory fish in Wales was banned irrespective of the effect on successful stocking schemes and the loss of jobs at these third part hatcheries.

During a coffee break following Peter Goughs presentation we challenged both Peter Gough and Mike Evans to produce 'the evidence of harm' only to be told there was 'emerging evidence' from as yet unpublished research (being carried out by Swansea University), TO DATE NO EVIDENCE OF HARM HAS BEEN PROVIDED ONLY OPINION.

The majority of the research papers in the Bibliography did not draw conclusions they merely had 'discussion sections' suggesting that further research was needed.

The following are the main areas purporting to indicate harm by using a hatchery:

Hatchery fish lack Fitness

The claim that hatchery fish 'lack fitness' is primarily based upon the effect of commercial hatcheries used to support the commercial sea fisheries on the West coast of the USA and Canada where returning shoals of Pacific salmon are netted at the mouths of their natal rivers.

There was no mention of the successful stocking of Pacific Salmon on the Island of Hokkaido in Japan; this hatchery has been in existence for over 100 years and is used to support the marine harvesting of Pacific salmon or Icelandic success with both stocking and ranching.

The term lack of fitness relates to the size of the returning adults with no explanation of why the naturally occurs on some river systems and is absent from others. There are papers (which were ignored) which explain a 'lack of fitness' in hatchery derived retuning adult fish this is due to early sexual maturity brought about by overfeeding in the hatchery i.e. hatcheries were producing smolts which were three times heavier than a natural smolt. Early sexual maturation of Pacific Salmon, due to enriched feeding in the hatchery, meant hatchery derived fish only spent 2 years at sea instead of the 3 years of a natural smolt. The loss of one years sea feeding meant the returning adults were smaller.

Some rivers flowing into the Atlantic naturally produce a high proportion of grilse which are declared as 'lacking fitness' by the scientific community due to the abundance of food in their natal streams. A good example of this are West Coast Irish rivers, the richer the feeding in the spawning streams the more grilse are produced. This is a natural phenomena and once identified was easy to rectify by simply changing the feeding regime in the hatchery. Pacific salmon spawn in glacial rivers which are impoverished, as a result all adults die after spawning and their decomposing bodies provide sustenance for fry once they hatch from the eggs. The majority of Pacific salmon smolt early due to the lack of food and achieve accelerated growth once they reach the rich feeding grounds in the North Pacific, it then takes three years for them to reach sexual maturity when they return to their natal rivers.

Lack of evidence of harm from stocking

Hatcheries produce genetically inferior fish

The ability of researchers to identify genetic differences does not signify harm, in most cases the differences that can be detected are too small to be statistically relevant. It may be possible to trace the stream origins of fish in much the same way that humans can be traced to where they grew up but this DOES NOT SIGNIFY HARM, it simply shows that it is possible to trace the origins of individuals. Atlantic salmon are known to wander between river system, from radio tagging and floy tagging, the Celtic sea trout project also demonstrates the wandering tendency.

Within the UK there is little genuine genetic integrity of salmon as eggs and fish have been stocked from various river systems (mainly to improve the commercial net fisheries) in the late nineteenth and early twentieth centuries.

In some instances eggs from larger fish taken from continental rivers e.g. Rhine have been introduced into UK rivers to try and improve the size of the returning fish. Most of these stocking schemes failed as it is now known that the size of returning fish is dependant on the length of time in the marine environment and that is dependant upon the growth rate of parr in their natal streams i.e. if there is rich feeding to accelerate growth in the freshwater phase then adult fish in the marine environment reach sexual maturity early and return to their natal rivers smaller than their parents.

The studies carried out by Swansea University from tissue samples from the Taff and Ely on behalf of NRW simply identified that hatchery fish were interbreeding with wild fish. There was no mention that the wild fish being analysed were from hatchery origin in the first place. Theories were then put forward that this interbreeding was causing the decline in the salmon populations of the Taff and the Ely, the reality is that the declining runs in the Taff and Ely are due to the effects of the Cardiff bay barrage which results in high levels of avian predation in the lagoon and marine predation by avian predators and sea fish which now shoal at the base of the fish pass when smolts are migrating. It was convenient to blame the decline in salmon on interbreeding from hatchery fish – THERE IS NO EVIDENCE TO SUPPORT THIS THEORY. We would refer you to the press releases from the NRA and Chris Mills who was then head of fisheries for the EA in Wales, the effect of the barrage on migratory fish was well documented prior to the construction of the barrage. ALL OF THIS WAS IGNORED and the whole theory of harm was developed based upon the declining runs of salmon in the Taff and Ely.

Lack of evidence of harm from stocking

Claim that stocking hatchery fish result in a loss of returning salmon.

This is the information presented to the NRW Board which claims that hatcheries produce less returning fish, -97 in this instance. It was this which was used by Lynda Warren to convince NRW Board members that all hatcheries should be closed including third party hatcheries as there is clear evidence of harm. The information has been tabulated to demonstrate the lack of clarity and accuracy of this information. These figures make no sense and do not align with data included in the paper produced by Chris Utley when he reviewed the EA(W) hatchery operations. We have produced a commentary below on each row. It has to be concluded that this data was presented with the sole purpose of influencing the decision makers and it is impossible for conclusions to be taken as evidence. River systems which have 100% entrapment (upstream and downstream) do not support the data below, in fact one such paper is included in the Bibliography. Whilst stocking may not be economic IT IS NOT HARMFUL.

	Hatchery Broodstock		**Loss of Wild Broodstock**	
1	*25 pairs of fish taken and used in hatchery programme*	*50*	*25 pairs of fish taken and used in hatchery programme*	*50*
2	*125,000 eggs produce autumn 0+ parr*	*90,000*	*25 female at 5,000 eggs per fish eggs deposited*	*125,000*
3			*3% survival to 2 year old smolts migrating*	*3,750*
4	*Average annual trap catch (over 3 years) of hatchery origin fish adult offspring*	*42*		
5	*Average annual number of trapped adults assigned to hatchery parentage*	*6.25%*		
6	*Data expanded for part-time trapping effort:- 11 making total number of returning hatchery adults*	*74*	*4.58% return as 1SW salmon*	*171*
7	*Indicative return rate from stocked parr*	*0.08%*	*Indicative return from stocked parr*	*0.19%*
8	*This indicates a gross gain from stocking of 74 – 50*	*24*		
9	*Cost of the Taff hatchery process is £70k Therefore costs per adult in the river*	*is £946 overall £2,920 per (net gain) fish*	*Cost per adult in the river*	*£0*

This indicates a large net deficit in adult fish outcome from the stocking programme, compared to the estimated wild process of 171 – 74 = ***- 97 fish****.*
Generating adult fish by stocking in this example is therefore clearly more expensive than the increased wild production secured at sites where an ecosystem approach has resulted in migratory barriers and issues relating to habitat being addressed. This leads to the conclusion that stocking the Taff is ineffective and damaging.

Commentary on above table

Row 1 is a factual statement

Lack of evidence of harm from stocking

Row 2 is deliberately confusing as it shows the hatchery producing 90,000 0+ parr from 125,000 eggs, these are fish ready to smolt whereas for wild fish it only shows number of eggs laid down.

Row 3 uses a statistical 3% survival of wild salmon from egg to smolt, this is not compared with the hatchery which should show 90,000 smolts from 125,000 eggs.

Rows 4 and 5 this data is out of context and is a 'best guess' as there is not 100% entrapment of migrating smolts or returning adults.

Row 6 this merely provides the number of hatchery fish caught in the trap which is then compared to the theoretical return of wild fish. If the same percentage was applied to the hatchery fish then there would have been 41,220 hatchery fish returning i.e. 4.58% of 90,000 smolts.

Row 7 contradicts itself, is it 0.08% return from stocked parr or 0.19% there is no data to back up either statement or how these figures were arrived at; calculating the results from this data is impossible.

Row 8 this is a very simplistic calculation which simply cannot be substantiated unless there is 100% entrapment. If this were the case then restoration stocking would not work and the evidence from the Taff and Ely is that until the building of the Cardiff Bay barrage restoration stocking was seeing year on year improvements in returning adults.

Row 9 sets out to show that mitigation stocking is not cost effective:

The final paragraph is a deliberate manipulated attempt to show that stocking is harmful, the data presented in the above table is unintelligible (even to those who understand the process) and so this paragraph sets out to make it easy for the decision makers to see that hatcheries are harmful. The final sentence claims that stocking the Taff is ineffective and harmful and yet there is no evidence to support this only opinion and beliefs. There is no mention that this stocking scheme is paid from the Cardiff Bay barrage project to mitigate for its effects, the omission of this fact seems to have been deliberate in order to ensure stocking was ceased. Mitigation and third party stocking is not about economic returns it is about maintaining fish stocks.

It is apparent that the data presented to the NRW Board was based upon research on the decline in salmon stocks in the Taff and Ely, there was no mention of the effect of the Cardiff Bay barrage on these two rivers nor was there any mention of the success of third party stocking on other rivers affected by impoundments. The creation of a large freshwater lagoon into which the two rivers enter slows down smolt migration resulting in a very high predation rate from fish eating birds (studies on the Dee (Davidson & Cove) estimate a loss of approximately 40% of smolts in the slow moving section); this may be higher in a lagoon. The only exit from the lagoon is via the fish pass and this does not give smolts an opportunity to adjust to saline conditions and on top of this fish are tumbled down the fish pass. When they reach the sea the smolts are disoriented and large shoals of Cod and Pollack now wait to intercept those few smolts which survive the avian predation. Returning adults also have to endure predation by seals, and dolphins/porpoise as returning adults shoal at the base of the fish ladder.

The whole basis of the NRW case for the closure of the hatcheries is based on the reduction in salmon in the Ely and Taff based upon research by Swansea University who attribute the decline to interbreeding with hatchery fish. It may also be related to the costs of mitigation stocking despite the fact that mitigation stocking was subsidised via abstraction licence monies. NRW has now declared that these monies do not have to be spent on fisheries and they are now being diverted in the NRW general operating budget. The whole of the case put forward by NRW is based upon a distortion of information from those within NRW who consider hatcheries to be harmful, evidence, such as it is, has been invented of manipulated to support their case.

Lack of evidence of harm from stocking

I say this as the Hatchery Business Review carried out for EA(W) by Peter Gough in October 2010 concludes:

"It is important to reiterate that fish stocking is a valid part of our core fisheries business and an operation which receives enthusiastic support from many of our influential stakeholders. Our ability to continue to rear and release salmonids for a range of purposes is a justifiable part of our remit, subject to resources and management need. It is crucial that we ensure consistent uptake of policy in all of our fish rearing and stocking operations".

The following information was suppressed from publication the reasons are not known however as it did not support the NRW Board presentation it seems that this was a deliberate action.

Contribution of Hatchery Fish to the River Taff

"Our evidence from the River Taff demonstrates that hatchery fish are poor in abundance and less than if the parent fish had been left in the river."

This statement is incorrect.

During the early years of stocking the Taff (1986-1996), pre- barrage construction, the survival of microtagged 2 year old salmon smolts averaged 2%. During and post barrage construction (1996-2007) the survival was reduced to below 1% (Figures taken from the NRW Review).

For a population to be stable, it must be able to achieve "replacement" (i.e 1 pair of adult fish spawning must produce one pair of fish surviving to spawn in the next generation). In reality is sometimes more and sometimes less but on average it will be replacement.

With the River Taff programme, collecting a typical 100,000 eggs target will require 25 hens and 25 males. Survival from egg to stocking will typically be 75% (75000). Roughly 50% of these will grow quickly and become become smolts, these are the fish that are tagged and fin clipped. At 2% survival in the early years) this gives 650 adult returns (32500 x 0.02). Just counting the tagged fish, the hatchery productions is **13 times** (650/50) more efficient than natural production. If you include the unmarked hatchery fish that cannot be identified then the true figure of efficiency is between 15-20 times greater than natural production.

For hatchery fish to perform worse than wild fish, the survival from eggs to adult returns would have to be below 0.05%.

Taking all the marked fish returns in later years (during and post barrage construction 1996-2006) gives an average return of 0.37%, taking into account trap efficiency. This is still 7.4 times better than natural spawning and does not include a large % of stocked fish that were unmarked and cannot be identified (approx. 71%).

This note was received as part of a Freedom of Information (FOI) request. The author of this note is anonymous but the information above is an accurate reflection of the stocking programme on the Taff and can be supported from data received via FOI requests in our possession.

Third party hatcheries

There were four third party hatcheries in operation, these were:

Tywi – Brianne (DCWW/NRW) (Private provider of stock).
Cleddau - Llysyfran (DCWW/NRW) (Private provider of stock)
Rheidol (agreement between NRA and successors to Powergen relating to HEP impact) (Private provider of stock)
Dovey – New Dovey Fishery (Private provider of stock)

There was no evidence that the operation of these third party hatcheries had any detrimental impact upon the wild populations. With the exception of the Dovey, all these hatcheries were operated in order to mitigate for impoundments which cut-off migratory fish from their

traditional spawning grounds. In the case of the Rheidol, closure of this hatchery will have a significant impact due to the lack of spawning areas below the dam. We believe that the closure of the third party hatcheries would not have been countenanced if the NRW Board had been provided with accurate, unbiased information. It is clear from the above that data has been manipulated and "spun" in order to demonstrate harm.

Production of the Bibliography

It was clear that by producing a Bibliography containing over 200 papers NRW set out to impress the Board members by weight of numbers. It is a pity that whoever was responsible for the compilation of the Bibliography did not take the time to read the papers; it appears they only read abstracts.

It was also clear that several papers were repeats in as much that they were presented at more than one conference, the lack of diligence in preparing the Bibliography beggars belief unless of course it was a deliberate policy to support the stocking ban and hatchery closure.

NONE of the papers attributed harm when using local broodstock. In terms of genetics whilst it is possible to trace interbreeding this does NOT signify harm. Salmon wander between river systems and as such there will always be some genetic variance, rivers with massive runs of fish (West Coast USA & Canada) will generally have the same genetic characteristic as any 'wanderers' would be difficult to detect. Genetic variation does NOT signify harm.

Several of us were invited to attend a workshop in Cardiff to listen to two of the research scientists expound their theories on why hatcheries were harmful.

From this it was disclosed that the 'emerging evidence' was to be based upon research into the body shapes of salmon parr. The research paper was presented at a conference in Dublin, it was not evidence of harm and it simply showed that when well fed parr are removed from the hatchery and put into impoverished streams they loose weight and their body shape changes.

Those of us who have had experience of running third party stocking schemes using Semi Natural Smolt Rearing (SNR) ponds can show that smolts leaving the SNR are no different to the wild smolts as they are only fed occasionally in the ponds and have to forage for food as they would in the wild. An SNR pond cannot be compared with holding tanks at hatcheries; fish in an SNR are merely protected from predation and in all other aspects can be considered to be wild.

Many of the papers documented the failures of various schemes; most were due to stocking practices or the attempt to introduce non-native fish into rivers to which they are not suited. In the case of some of the USA East coast rivers the restoration stocking program did not make any habitat improvements or the removal of barriers to migration prior to stocking, they were therefore destined to fail. In many North Wales rivers there is no shortage of spawning habitat there is no single issue resulting in the decline in salmon numbers. There is diffuse pollution, forestry, water abstraction/regulated flow and perhaps most damaging avian predation. It was demonstrated on one East Coast Canadian river that the removal of avian predators resulted in an immediate increase in smolt survival. It was suggested at a recent NRW fisheries meeting that increased production would mitigate the effects of the avian predators, the most damaging of which are Goosanders and Mergansers which predate on eggs, fry and parr. These birds are alien to the UK with no known predators, this has resulted in an increase in their numbers, improving the food source will simple see larger flocks on our rivers.

We were shown a graph of the decline in both Pacific and Atlantic salmon stocks and it was claimed that this is due to climate warming. The reality is if you compare the graphs we were shown with the growth of open sea cage Atlantic salmon farms it can be seen that the growth of these farms is reflected in the decline in salmon stocks. Most of the 1 SW fish from the UK and Ireland feed around the Faroe Islands. On their migration route smolts pass several

hundred fish farms. When passing these open sea cage farms they are exposed to disease and parasite infestation. When they reach their feeding around the Faroe Island they are similarly affected due to the number of open sea fish farms operating. The faroe Islands are in the Atlantic Gyre current which brings nutrient rich water and food to the Faroe's from the Arctic Ocean, this is why the salmon feed there. The recent case of Amoebic Gill Disease (AGD) in three Scottish fish farms demonstrates the environmental damage these fish farms can cause to wild fish stocks, both migrating smolts and returning adults. IT IS A SHOCKING STATE OF AFFAIRS WHEN NRW EFFORTS TO BAN STOCKING AND CLOSE HATCHERIES APPEAR TO EXCEED THE EFFORTS MADE TO OBSCENE LEVELS OF DISEASE AND DAMAGE TO OUR STOCKS OF MIGRATORY FISH THROUGH THE UK. It is not unusual to catch a salmon in some East Coast UK rivers that are covered in sea lice, in one instance a grilse had over 200 sea lice on its body. If we are to make up for losses in the marine environment we need to make sure that more smolts go to sea, stocking can do this in the short term. If nothing is done to prevent disease and parasites emanating from open sea fish cages nothing we carry out in our rivers will halt the decline and perhaps extinction of the salmon in UK rivers.