Vissennetwerk– Salmonids in the Meuse basin

Friday March 1, 2019, 's Gravenvoeren, Belgium

Chairman of the day: Tom Buijse (Deltares)

Words of welcome by the chairman of the day T. Buijse.

Short introduction by **Patrick van der Broeck (dijkgraaf Water Authority Limburg)**.

For a healthy ecosystem and water quality in the Meuse a lot of effort from many partners is needed. The need for co-operation of international partners working on e.g. fish migration is emphasized. The Water Framework Directive is a good tool to achieve the goals. Good examples of successful international cooperation are projects like "Vissen Voor Verbinding" (project on fish migration in the northern part of the Netherlands) and the project in the Roer and Geul (Salmon in the Geul).

Xavier Rollin (Fisheries Service, Nature & Forest Department, Public Service of Wallonia) - *Using genetic tools to inform management in salmonids in the river Meuse basin: the example of Wallonia*.

Genetic research in Wallonia is a tool for salmonid management in the Meuse basin. Genetics are used to distinguish between different groups. This method showed that returning salmonids originated from Loire Allier (most individuals) and Irish origin.
Further analysis - parental assignment (the combination of the different alleles is specific to each individual = genetic imprinting) showed that semi-wild salmon (salmon caught in the river Maas/Roer as mature fish) had a much higher percentage returnees in 2018compared to captive stocks. Powerful tool to measure part life-cycle fitness and stocking strategy.
For brown trout the analysis demonstrated that there was a farmed group and a river group and also each river as his own population. For brown trout it is important to protect the last native populations by regulating brown trout stocking for fisheries purpose and its potential negative effect on the remaining natural populations.

Questions:
Johan Coeck: Is there collaboration with Rhine system parties? Xavier: There is contact. Some Rhine salmons enter the Meuse and the other way round. Sometimes these fish cannot be allocated to stocking, therefore it must be strayers.
Karin Camara (LANUV) wants more collaboration on parental assignment.
Harriët Bakker mentions that genetic samples are taken from salmons in fish passes in the Meuse, but they are not analysed yet.

Johan Coeck (INBO & International Meuse Commission - Fish expert group) - *International Masterplan for migratory fish in the Meuse catchment.*
The Master Plan was started in 2011. There are 6 common goals and actions. Yearly, a report of the actions performed is made. Lately there is a focus on downstream migration

of salmon and eels. Escapement of smolts from R. Meuse catchment to the sea is currently very low (1 to 2 % of the R. Ourthe smolts) resulting in still low return rates for adult salmon in the river. Same figures for eels. Prospects for the future are good: Kier, improvements in up- and downstream migration, doubling of stocking since 2012 and as a result of more stocking more returners since 2015. Johan ends his presentation with the question: *Will the next decade bring us the great leap forward for migratory fish in the river Meuse?*

Gereon Hermens (Ingenieurbüro Floecksmühle) is there no downstream protection at the hydropower plant? In Lixhe there is one, but it is not functioning. The intention is to create fish protection systems at hydropower plants. Hans Brinkhof (RWS): weirs in the Meuse will be optimized for up and downstream migrating fish.

Michaël Ovidio (ULiège) and Patrick Kestemont (UNamur) - *The Meuse salmon project. Achievements and new challenges.*

Migratory fish species disappeared due to constructing weirs and hydropower plants. The Meuse salmon project emerged in 1983 when sea trout individuals were captured in the Berwinne. Achievements: the water quality improves, fish passages are constructed, also in the tributaries. Inventory of spawning and nursing grounds has been done and a spawning centre in Érezée is constructed. Now there is stocking of eggs, juveniles and smolts. In 2000 the first returner was captured. Since 2015 the number of returners has increased.
There are still some major problems (downstream migration, effect of a temperature gap between river and tributary, the Albert canal and the ship lock at Lanaye). Smoltification process is very sensitive, desmoltification could happen due to warmer water? Spawning in the Meuse basin already?

Questions:
Harry Tolkamp: Stocking of restricted numbers of larger individuals (if capacity is limited) – more yield (numbers).

Xavier: the quality of the fish must also improve.
Tristan da Graca (Visadvies): is there cooperation with NASCO (North Atlantic Salmon Conservation Organization)?
Michaël: No direct cooperation.

René Collin (Minister of Agriculture, Nature, Forest, Rurality, Tourism, Heritage in Wallonia) gives a short speech about Salmonids in the Meuse basin. Salmon is the flagship species. In 1983 first seatrout returned in the Berwinne. Then the first projects of reintroduction of salmonids started. The Ourthe became accessible for salmon in 2009. Great achievements have been accomplished in the past, more action is needed in the future.

Karin Camara (LANUV- Landesamt für Natur, Umwelt und Verbraucherschutz Nordrhein-Westfalen)) - *Smolt run: Experiences from research projects and the North Rhine-Westphalian migratory fish program.*

Project in the river Wupper. >7000 fish marked with RFID (Radio-frequency identification) transponders. High variation in fish migration, upstream and downstream, occurs in every season. Downstream migration occurs mostly at dusk and night. 80% of the fish migrate with the main flow via the hydropower plant. A permanently open migration route with high discharge is preferred. A 12 mm horizontal rack seems effective. Only 1/3 of the downstream migrating smolts reached the river Rhine. High losses due to cormorant predation.

Questions:
Niels Brevé (Sportvisserij Nederland) asks if a comparison between wild and farmed smolts was made? Karin: No comparison possible, because only farmed smolts from returners were used.

Étienne Dupont (Natural & Agricultural Environment Studies Department, Public Service of Wallonia) - *Connection importance between a nursery tributary and the main river.* Connection is important to make a tributary accessible for spawners (more spawners =bigger cohort size) and the cohort size determines the amount of down swimming juveniles. Connection by a special fish passage (*stairs pipe*) constructed with baffles of 30 and 60 degrees at a slope of 5%. It mimics natural brooks and has also resting places. The tributary contribution to the main river recruitment increased.

Questions:
Xavier Rollin: What is the price? The price raised from € 60 (prototype) to € 400 per element because of reinforcement with wire.

Didier Lemmens (VBC Geul) – *Salmonids of the Gueule river: background, current status and future actions*. The Gueule is an international important river (Natura 2000 and Water Framework Directive). Water quality in the Netherlands and Belgium now good. The share of reophilic species increased to almost 100%. Probably the right time to re-establish the population of trout, salmon and grayling. Nowadays there is only catch and release fiesheries. The numbers of trout spawning places is increasing, but many have low efficiency because of sand load and migration barriers in small tributaries. Grayling is sensitive of high nitrogen load.

Salmon reintroduction is successful to some extend. Further improvements to be done: reduction of sediment, nitrogen and phosphorus, make small tributaries accessible, create more shade to reduce the increase of the water temperature.

Questions:
Nils van Kessel (BuWa) the temperature that is measured in Belgium and Netherland is different. The siphon is not a barrier for smolts, this is confirmed with RFID smolts that swim up and down.

Thijs Belgers (VBC Roer) – *The re-introduction of the Salmon in the Rur.*

International agreement between many parties. In 1996 first redd seen (maybe trout). Since then there was a yearly release of 100.000 fry in German Eifelrur. 2002 First salmon returner caught at ECI hydropower plant. After finding dead and heavily damaged fish, measures were taken, like a fish passage and vertical fine mesh screens for protecting downstream migrating fish. Monitoring every day (fish passage, bypasses). Since 2012 caught adult salmonids are transported to the Érezée hatchery. Problems with seriously injured adult salmonids due to entrance in the tailrace of a hydropower plant, this problem is also mentioned in international studies.

Questions:
Xavier Rollin: Can we get genetic samples of smolts for parental assignment with Érezée adults. Thijs: Of course possible.
Tom Buijse: Are there solutions for upstream migrating adult fish in tailraces? Thijs: Yes, in USA they have electric fences to protect fish swimming upstream in the tailrace of hydropower plant.

Aniel Balla (Rijkswaterstaat) –*The Haringvliet sluices ajar to improve fish migration.*

After the flood disaster of 1953 sea gates were closed by executing the Delta plan. All sea gates, including the Haringvliet seaway were closed. These sea gates were the entrance to the Rhine and Meuse. Now they are permanently closed, only the Haringvliet is open when the flow rate from the river is high enough. No salt water intrusion is allowed, because of agriculture and drinking water purposes. Before, fresh water fish could not turn back to the Haringviet when they were washed out. Now the Kier is ajar (Kier Haringvlietsluizen), sluice gates are opened and let in a limited amount of salt water to improve fish migration, creating a brackish transition zone and reduce the number of freshwater fish washed to the sea and improve possibilities to return to fresh water. In november 2018 the phase of Learning by doing started.

Questions:
Thijs Belgers: how about professional fisherman fishing there? Aniel: LNV is doing a study on the impact on fish population. Michaël Ovidio: How is de flow rate? Aniel: is measured but not very precise.
Nils van Kessel: is there a plan B for exceptional years? No not actually. But time of closing the doors can be postponed, which can be very effective. Thijs: are the fish sluices (visriolen) still operating? Yes, but main focus is on the dam.

Damien Sonny (Profish Technology) - *Atlantic salmon smolts and silver eel migration in the Belgian River Maas: from diagnostic to development of mitigation measures.*
EDF Luminus operates 6 HPP, LIFE4FISH project 2017-2022, emphasizes on fish survival (smolts, eels) after passage of the hydropower plant and downstream fish passage routes. Smolts: Bypasses have been designed for 2 pilot sites.
An electrical fence will be tested as a facilitating tool to concentrate smolts in the vicinity of the bypass entrance. It will be tested at 1 pilot site in autumn 2019. The migration warnings will lead to a reduction of energy production. EELS: An electrical fence and a

bubble curtain will be tested as facilitating tool to keep eels in the main migration axis towards the spillways. Efficiency will be tested in autumn 2019.

Questions:
Tim Pelsma: Silver eels were caught in the nets. Are they released immediately after operating? No, fish are released after 72 hours observation and normal behaviour.

General discussion
Thijs Belgers mentioned bringing smolts to the sea in big tanks with a ship (barging and trucking) as a management tool for the Rhine and Meuse system. During the way downstream the smolts imprint odours of the river. It is practised in the USA.
Damien Sonny: There is a lack of overview and synergy between research programs. Tom Buijse and Johan Coeck agreed to exchange knowledge once a year from now on especially for the Meuse.
Gert-Jan van Dijk: Use the same systems for e.g. marking fish if possible.
Damien Sonny notices that the system they use is less sensible for background noise.
Xavier emphasizes cooporation in the beginning of a project.
The chairman closes with the remark that he noticed that the communication in English was not a problem for the attendees.

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Johan Coeck thanks Mecheline Muts for organising 60 meetings! She will retire soon after this meeting.

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Thanks to Gerard de Laak for making the report.