Global Re-introduction Perspectives: 2010

Additional case-studies from around the globe

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Conservation of a unique bullhead population in Flanders, Belgium

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Introduction

Bullhead is a small, bottom-dwelling freshwater cottid. Based on molecular and morphological data fifteen bullhead species can be distinguished in Europe (Freyhof *et al.*, 2005). In Belgium only two indigenous species occur: *Cottus perifretum* in the Scheldt River drainage and *Cottus rhenanus* in the Meuse River drainage (Volckaert *et al.*, 2002). Formerly bullhead was common in Flanders, the northern region of Belgium. Due to water pollution, habitat degradation and fragmentation however, it declined dramatically. Consequently bullhead is listed as IUCN susceptible in the national Red List and fully protected. It is also listed in Annex II of the Habitats Directive. Nowadays only very few small and fragmented *Cottus perifretum* populations remain in the Scheldt River drainage. To prevent further substantial losses in genetic variability within this species, management should aim to protect and conserve as many populations as possible. Until 2003, *Cottus perifretum* was thought to be extinct from the entire Demer River basin, a river basin belonging to the Scheldt River drainage. That year a unique relict population of this bullhead species was found in the Dorpbronbeek. The status of this population is extremely precarious because of the small living area and population size and the recent deterioration of the habitat.

Goals

- Goal 1: Educate authorities about the need to protect this relict population and advise them to take measures to conserve the relict population *in situ* by restoring and protecting the habitat.
- Goal 2: If feasible re-introduce cultured progeny from the relict population to other suitable locations within the same river basin in order to preserve the gene pool *ex situ*.

Recaptures one year after release

- Goal 3: Secure the gene pool in captivity for conservation purposes in the event that the wild relict population becomes extinct

Success Indicators

- Indicator 1: Develop captive breeding techniques to allow the reliable production of bullhead for re-introduction purposes.
- Indicator 2: Find suitable locations to re-introduce the bullhead.
- Indicator 3: Good survival, growth and breeding of the released animals in the wild.
- Indicator 4: Establishment of a viable, self-maintaining population.
- Indicator 5: Expansion of the species' range from the initial releasing sites.

Project Summary

Historical data show that bullhead formerly was common in the entire Demer River basin and that it declined dramatically due to pollution, habitat degradation and fragmentation. In 1957 the last bullhead was observed. For a long time it was believed to be extinct from the river basin. However, the Flemish Environment Agency (VMM) caught a bullhead in the Dorpbronbeek in 2003. Subsequent monitoring by means of electrofishing revealed that a small bullhead population still occurs in this small tributary over a short distance of about 200 m. The status of this population is extremely precarious because of the small population size and living area and the recent habitat deterioration. Immediately after the discovery of the relict population, the Research Institute for Nature and Forest (INBO) informed the authorities about the existence of the bullhead population and advised them to take measures to conserve this population *in situ*. INBO also launched together with the Agency for Nature and Forest (ANB) a re-introduction program to protect and conserve this population by re-introducing its cultured progeny to other suitable waters within the same river basin.

Feasibility: The feasibility study consisted of a genetic study, a captive breeding program and a habitat suitability study. Genetic research using microsatellites revealed that the discovered population indeed concerns a relict of the bullhead *Cottus perifretum* in the Demer River basin (Horemans, 2006). Moreover, the population has five private alleles. To prevent further genetic erosion within *Cottus perifretum*, the conservation of these unique genes is extremely important. A captive breeding program was developed at the fish culture centre of INBO to spawn and rear bullhead in captivity in order to provide enough stocking material for a possible re-introduction. The brood fish were collected from the source population in the Dorpbronbeek. The program started in 2004 and has become increasingly successful with time. In 2007, INBO assessed the macrohabitat suitability of seven waters within the Demer River basin with a sufficient to excellent chemical and biological water quality. The key habitat requirements for bullhead were obtained from the literature. The potential re-introduction sites were assessed in order to find the most suitable location for a re-introduction of bullhead. The habitat in the Dorpbronbeek was used as a reference biotope because of its similarity to the other locations within the same basin. Finally the Zevenbronnenbeek, a small tributary within the same subbasin as the

Dorpbronbeek, was selected as the best re-introduction location. A qualitative electro-fishing made sure that no remnant bullhead population was present.

Artificial spawning substrates

Implementation: In October 2008, ANB released 1220 cultured young of the year bullhead to the Zevenbronnenbeek over a distance of 1,600 m. The length of the released animals averaged 5.5 ±0.9 cm (3.1 cm - 8.0 cm) and the weight 1.9 ±1.2 g (0.2 g - 6.9 g). To enhance the habitat at the releasing site even more, 68 ceramic tiles were added to the stream as additional artificial spawning substrates and shelter (Knaepkens *et al.*, 2004).

Post-release monitoring: In 2009 the success of the re-introduction of bullhead in the Zevenbronnenbeek was assessed. During sampling by means of electro-fishing in March, August and September 2009, re-introduced bullhead were always successfully recaptured. These fish were in good visual condition and showed good growth. From January 2009 on, the ceramic tiles in the Zevenbronnenbeek were checked monthly for the presence of egg-clusters underneath them. From the end of February until the end of April, sexually active, territorial males were observed underneath the tiles. By the end of March, also bullhead egg-clusters were found. Throughout the natural breeding season about 40% of the tiles were occupied by territorial bullhead and in total 19 egg-clutches were found. Also natural substrates like hollow woody debris were used by bullheads to lay their eggs. Natural recruitment was a success since young of the year bullhead were sampled In August and September. The juveniles averaged 4.3 ±0.5 cm (3.6 cm-5.4 cm).

Major difficulties faced

- The relict population is still facing problems. It seems difficult to incite the authorities to implement protection measures, even for an Annex II species of the Habitats Directive.
- Securing adequate funding for all the phases of the re-introduction program.
- Finding suitable re-introduction sites, since the ecological quality of most of the headstreams is still insufficient.

Major lessons learned

- The ecological quality of most of the headstreams is still insufficient.
- Re-introduction of a sensitive species like bullhead is feasible.

Success of project

Highly Successful	**Successful**	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- Successful and reliable captive breeding.
- The released fish are still present at the releasing sites.
- The re-captured fish show good growth and are in visual good condition.
- Natural recruitment was successful.
- Urgent measures should be taken to improve the habitat quality of the Dorpbronbeek in order to protect and conserve the relict population.

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