# Restocking of the European catfish (*Silurus glanis*)

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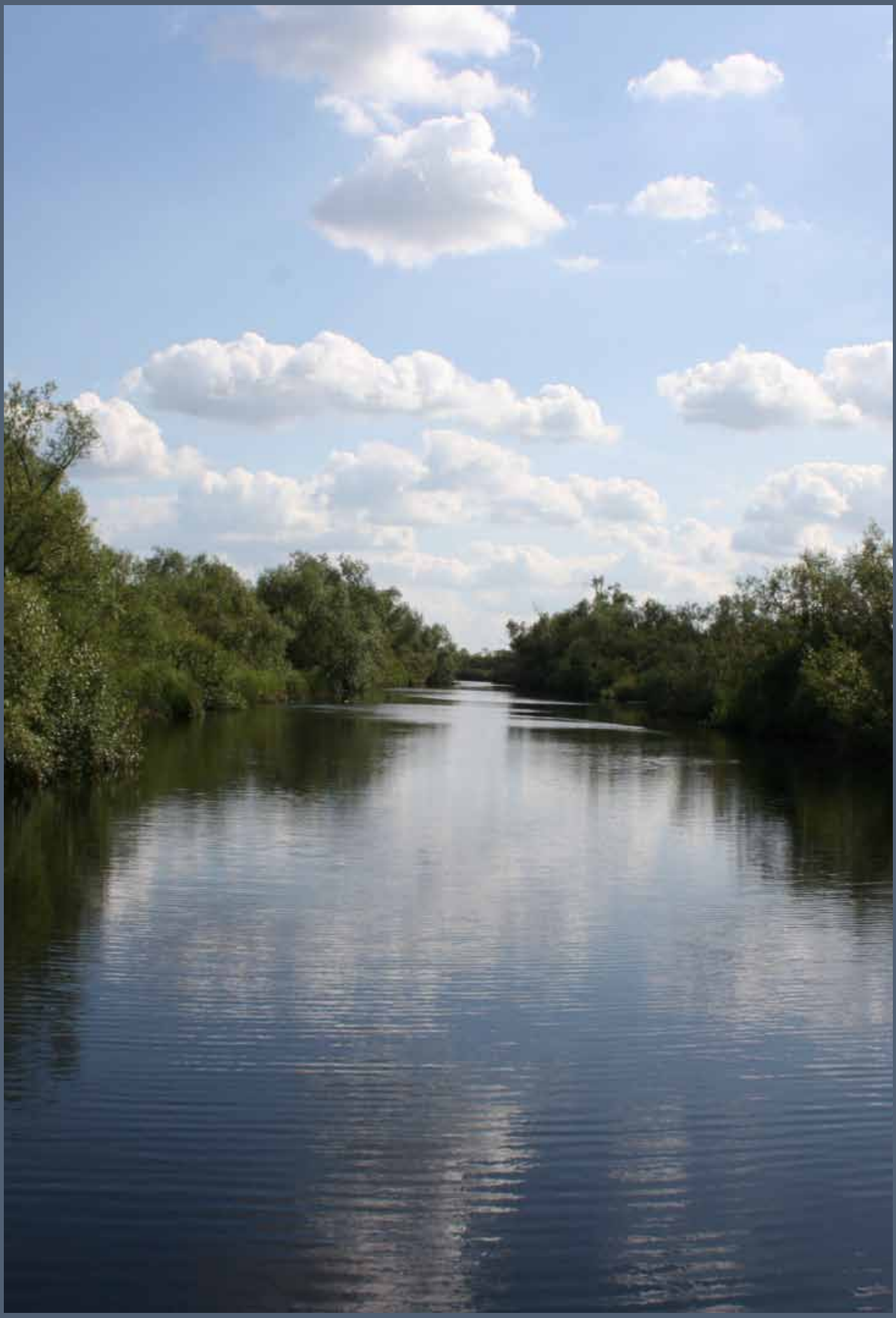
The European catfish (*Silurus glanis*) is one of the world's largest freshwater fishes. It has an elongated body with a smooth skin. The head is flat and it has two long barbells on the upper jaw and four short ones on the mandible. The catfish is slow growing in Sweden because of the relatively cold climate, so it does not get as large as its southern conspecifics. The record in Sweden is a catfish that measured 3.6 meters standard length and weighed about 180 kg. The species is considered to be nocturnal and an opportunistic predator eating both fish and other freshwater organisms.

The European catfish is found from Germany in the west to the threatened Aral Sea in the east and from Sweden in the north to Turkey and northern Iran in the south. In Sweden the European catfish is considered to be a post-glacial relic migrating to these northern areas during the Boreal age, about 10 000 years ago. During this era the temperature was higher than today, which was ideal for this species since it prefers warm water temperatures. However, when the temperature decreased so did the species distribution. Over the last 100 years regulation of rivers,coupled with other anthropogenic impacts on the environment, has led to a large decrease in the Swedish catfish population. This freshwater giant is now listed as Endangered on the Swedish red list and today only four natural populations exist. These are located in the south of Sweden, in the water systems Båven, Emån, Helgeå and Möckeln. In Helgeå the species was restocked in 1999. Recent studies have also shown that the remaining Swedish population is genetically unique.

**Catfish fry**

The main reason for the decline is the lack of suitable habitat, such as large lowland rivers with a natural river environment. These habitats have been severely affected by human interference such as drainage of wetlands, water regulation, diversion of water, physical impact on the beach and bottom habitats and pollution. The action plan for the conservation of the European catfish was determined by the Board of Fisheries and the Swedish Environmental Protection Agency (SEPA) jointly 1998. However, the current programme is under revision.

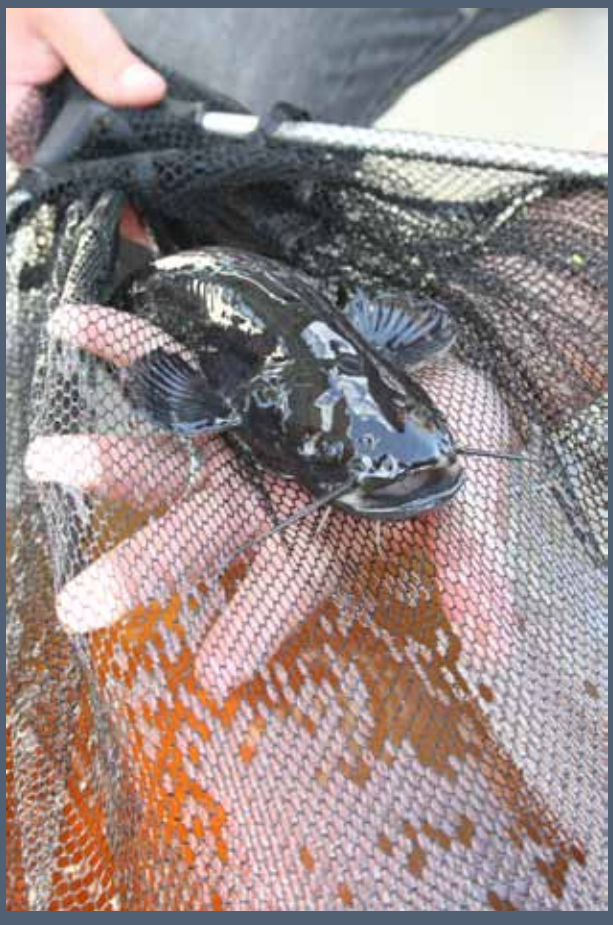
Nordens Ark (Director Dr Lena M Lindén) is a non-profit foundation aiming to provide self-sustainable viable populations of threatened species in the wild through conservation breeding and restocking programs. Nordens Ark was founded in 1989 and is situated at Åby Manor on the Swed-



ish west coast. The property of Åby Manor comprises a total of 400 ha, where 60 ha have been adapted to visitors. However, the large-scale breeding of our restocking species is carried out in specialized breeding facilities in an off-exhibit section. Nordens Ark has successfully taken part in breeding and restocking programmes for, among others, the white-backed woodpecker *Dendrocopos leucotos*, the Peregrine falcon *Falco peregrinus* and the green toad *Bufo viridis*.

Nordens Ark started keeping the European catfish in 2008 and the main goal was to inform our visitors about the species and the problems the population is facing in the wild in Sweden. We also wanted to see if we could find a way to make them reproduce under semi-natural conditions in captivity - something that has never been done before in Sweden. We constructed a large pond and received two adult individuals from the Board of Fisheries. The catfish is kept in the pond all year around and they lay dormant during the winter months as they do in the wild.
In the beginning of August in 2009, the animal keepers found catfish fry swimming around in the pond. We immediately started collecting the fry and placed them in aquariums in our breeding facility, to be able to ensure the best possible care. This was the first time the European catfish spawned "naturally" in captivity in Sweden; and probably the first time in a zoological garden, as far as we know.

In the wild the European catfish requires a water temperature between 18-22°C to spawn. The spawning often takes place in the beginning of July and it is the male catfish that will start to prepare a nest. The nesting site is generally in the shallow parts of the river to maximize the spawn's exposure to sunlight. If the female finds the nest site appropriate the couple will mate and the spawn will be attached to roots and water plants. After the spawning the male protects the eggs until they are hatched. The hatched catfish fry will stay in the nest for a couple of days before dispersing along the river. In cold summers in Sweden the catfish might not reproduce because the water temperature will never reach the required level. Females often don't reproduce every year because of this environmental restriction.



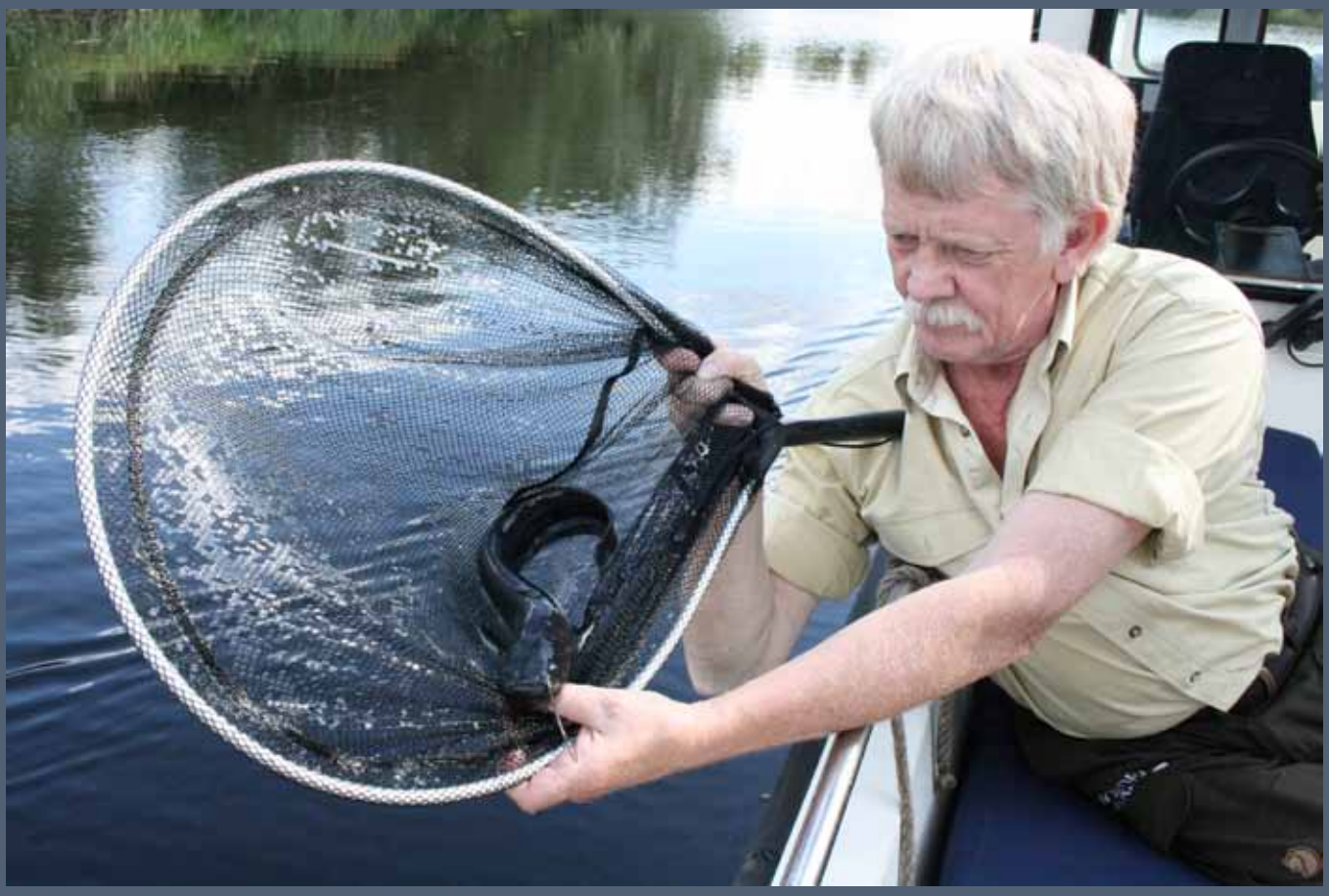
**Release into the wild**

The average growth rate during the catfish first year in the wild is approximately 5 cm. But when kept in aquariums with an average water temperature between 20-23°C during the whole year the catfish will grow twice as fast. When keeping the young catfish together it is important to keep a close eye on the growth rate of the individual catfish. Since the catfish is a predatory fish that basically eats all the fleshy food that it can fit into its mouth, it doesn't hesitate to eat its smaller siblings. In 2010 and 2011 the adult catfish spawned again. This time we were more prepared keeping a close eye on the water temperature and managed to find the nest and collected the spawn. The spawn was then hatched in aquariums and cared for the same way as in 2009.

**Opposite image: the River Helgeå**

This unexpected breeding success started a discussion between Nordens Ark, the Board of Fishery, Kristianstads Biosphere area and the County Administrative Board in Skåne about the possibility of a restocking programme. It was decided that a restocking trial should be made in Helgeå to strengthen the small population that is present in the river. Helgeå is one of Sweden's most species rich water systems, and the river holds freshwater species such as the Critically Endangered thick shelled river mussel (*Unio crassus*) and the European river lamprey (*Lampetra fluviatilis*). Kristianstads Biosphere area has restored some of the catfish natural spawning and nursery areas and made other improvements around the riverbanks to make optimal catfish habitats. During 2011 and 2012 Nordens Ark therefore released a total of 93 catfishes raised in our facilities. Prior to the release the young catfishes were injected with PIT-tags (Personal Identity Transponders) in their abdomen, making it possible to use mark-recapture samplings to estimate survival success. A small tissue sample was also taken from the pelvic fins for future DNA analysis.

Kristianstads Biosphere area and the County Administrative Board in Skåne are currently doing more extensive monitoring of the catfish population to measure the effect of the restocking and to see if the species has managed to establish in its former habitats in Helgeå. The restocking programme now awaits the final revision of the action plan before further restocking will be made.



**Release into the wild**