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**LIFE+ Nature project**

# LIFE16 NAT/SI/000644

# Project title: Urgent measure to conserve nearly extinct species *Protochondrostoma genei*

Project acronym: LIFE for LASCA.

Name of the Member State: Slovenia and Italy

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# Summary

# 1 SPECIES DESCRIPTION

## 1.1 Distribution area

The species is endemic in the Po-Veneto district but it extends its areal to the basin of the Vomano River (Abruzzo).The species has been introduced in Tuscany, Liguria, Umbria and Lazio (thyrrenian side). In Umbria it was found in the middle and upper stretch of the Tiber River and in the downstream stretches of Chiascio, Paglia and Nestore rivers; it has also been signalled in the artificial lakes of Corbara, Alviano and Recentino (Lorenzoni *et al*. 2010). In Lazio, it was found, with fairly structured local populations, in the Fiora, Paglia, Mignone and Marta rivers and, less frequently, in the Treja, Torbido and Liri rivers (Tancioni and Cataudella 2009; Colombari*et al*. 2011; Sarrocco*et al*., 2012).
Its introduction into the Tiber River basin dates back to the 1970s and in a short time the species has acclimatized in many watercourses of the hydrographic network and is still expanding its distribution range. Here it seems to have found the ideal conditions for its expansion, as opposed to the original area.

## 1.2 Conservation status in Italy

The species has almost completely disappeared along the middle and lower course of the Po, mostly due to the interactions with the alien species introduced and the river fragmentation that limits reproductive migration. Strong regression throughout Piedmont and Lombardy, especially in the middle and lower stretch of the main waterways (Adda, Ticino). The last populations of Emilia-Romagna are now permanent in the hilly parts of rivers. Some Adriatic marginal populations (Marche Region) remain stable in Tenna, Esino, Metauro, Foglia and Tronto rivers.
Currently, the state of conservation of the Lasca in Italy is rather critical, with an estimated range of distribution in the origin areas that varies between about 25 and 60% compared to the reference one. The rivers fragmentation and the presence of exotic species are the main causes of its decline. Furthermore, the species appears rather sensitive to the degradation of water quality and to anthropic interventions that modify the morphology and in particular the composition of the watercourses bottom.
The Lasca migrates upstream during the reproductive period to areas with more turbulent and oxygenated waters. The presence of obstacles to such migrations or the absence of suitable areas for reproduction, therefore has an impact on the survival of the species. The presence of barriers or the simplification of habitats negatively affects this species, affecting it in a crucial phase of its life cycle.
In addition to the alterations of the physical habitat, the explosion of exotic species in Italian rivers and in particular of the Wels catfish has negative effect to the species conservation. This form of pressure, which can be defined as a real warning light, assumes the character of irreversibility and constitutes a strong threat to the survival of the species, whose lowland

populations are also subjected to the predation of cormorants, in constant expanding phase since decades.

### 1.2.1. Ticino and Po River basin

Currently, the knowledge of the distribution of this species mainly concerns the middle plain portions of the left tributaries of the Po and the middle part of the right tributaries. *There is a need for a more detailed knowledge of the status of each population.*

In Lombardy, the original reference range of the species, equal to 1,757 km, corresponds to 33.5% of the natural regional water network (5,246 km). The current estimated range is equal to 1,175 km, equal to 27.4% of the aforementioned grid; for 204 km of water courses the current range is not known. The overall contraction that has occurred in recent decades concerns, net of water bodies with an unknown situation, about 25% of the original area. In reality, the current contraction of the species distribution range is much greater, as many of the populations indicated as currently present (River Po, lower course of the Adda and Oglio rivers, Mincio, Mella, Secchia, etc.) consist of sporadic and occasional individuals and are therefore close to extinction.

It should also be remembered that historically there was a source population of considerable size along the Po, which in spring migrated upstream along the main tributaries for reproductive purposes. Today this source population has in fact disappeared and only residual populations remain, more or less permanent, in the middle course of the tributaries.

Considering all of the above, the spatial contraction of Lasca populations is more likely to be 60%. As mentioned in relation to the isolation of populations, most rivers and streams are affected by the presence of anthropic works (weirs, dams, etc.) which tend to separate the water bodies into segments, even in the face of an apparent continuity along the watercourse and between lateral courses; in such cases the isolation is defined as partial. The construction of transversal works on rivers contributed to the contraction of the Lasca populations, preventing the reaching of the reproductive areas on the tributaries. Within the Po basin, completely isolated populations can be identified on the Oglio River upstream of the lake and on the Tidone River (upstream of an artificial reservoir).

Furthermore, the spread of exotic species is also to be considered among the first, if not the first factor, in the extinction of Lasca populations on the Po River and on the terminal stretch of the main tributaries.

In general in Ticino the Lasca is now rare and reports of its presence are sporadic and mainly concern secondary waterways were some good nuclei are still present. The Ticino River is directly or indirectly connected to numerous lateral environments that form a large network of small streams, irrigation canals with a natural bottom and fountains, which could offer suitable habitats for the permanence of this species. Currently, there are no significant presences of Lasca in these habitats, probably due to the presence of invasive species and ichthyophagous birds that in these small environments can prey on this species more easily.

Since 2012, with the starting of Life project *Con.Flu.Po* followed by *Life for Lasca* project, the ichthyological activities developed by Ticino Park are focused in the support the

presence of lasca both with release programs and improving the conservation measures for this species.

*e 0-1. Examples of lateral environments of the Ticino River suitable for Lasca*

## 1.2.2. Threats to species conservation

### *1.2.2.1 Habitat reduction and fragmentation*

As anticipated, the reduction and fragmentation of habitats is an important factor that negatively affects all fish species including Lasca. These are caused by the action of man on waterways with the creation of various kinds of barrages (dams, weirs, etc ...), with water withdrawals or with the channeling and concreting of the river beds in response to different needs in the industrial or agricultural sectors.
The main consequence of the fragmentation of natural habitats is the subdivision of the population originally distributed throughout the territory into subpopulations not in contact with each other, each occupying a single or a few patches. In accordance with a notable number of scientific theories, such as the Theory of island biogeography (Mc Arthur and Wilson) or the Theory of metapopulations (Hanski), the reduction of the areas can lead to an increase in local extinctions while the greater isolation can cause a reduction in the turnover of individuals between isolated areas threatening their long-term mobility. Furthermore, in a fragmented environment, the habitat of a species is more in contact with the habitat of other species and this causes an increase in the rates of predation, competition and parasitism. That means that each of these subpopulations is subject to a greater risk of extinction and the absence of contact between the various patches prevents or slows the re-colonization of an area where the population has become extinct. The species therefore runs the risk of disappearing from an increasing number of patches until the chances of re-colonization become practically zero and the species can be considered extinct throughout the territory.

The study of the phenomenon of fragmentation is very complex, above all due to the difficulty of understanding how and to what extent it alters the functioning of the ecosystem. The initial habitat destruction leads, in fact, to the immediate loss of some species, but most extinctions occur much later. The effects of fragmentation are therefore reflected on the health of a population even many decades after the initial transformation of the environment.
As far as the Po basin is concerned, the Lasca nowadays finds several obstacles to migration, in particular in its tributaries, due to the various barriers present that prevent its ascent.
Along the Ticino River, from/to the Po River and the Lake Maggiore, Lasca today can freely migrate thanks to the presence of fish ladders at the two dams of Porto della Torre and Panperduto, that represent the only two existing dams located in the upper part of the riveralong the corridor Adriatic Sea – Lake Maggiore, towards the lake.

*Figure 0-2. Fish ladders along the Ticino River: Panperduto dam (left) and Porto della Torre dam (right)*

### *1.2.2.2. Invasive allochthonous fish species*

The presence of invasive alien species usually determines a series of effects on the autochthonous species and in particular alimentary competition, predation, competition for the habitats or their deterioration, hybridization and diffusion of pathologies and/or parasites. Their expansion is often due to greater resistance to stress and to an excellent ability to adapt to the new environment where they often find more favorable conditions. The increase in number of exotic species leads in a short time to effects strongly adverse to the autochthonous species with which they compete.
Lasca in the Ticino River and in the Po Basin undergoes the competition with many exotic species and in particular with predators such as the Wels catfish (*Silurus glanis*) or the Channel catfish (*Ictalurus punctatus*). It is likely that Lasca can also enter into competition with exotic species of the same Cyprinid family, such as the Gardon (*Rutilus rutilus*), the Crucian Carp (*Carassius carassius*) or the Carp Bream (*Abramis brama*), less demanding and more resistant species besides being well present both in the Po and in the Ticino.

From some reports received, it seems that in the Ticino River has appeared also the Common nase (*Chondrostoma nasus*), introduced in Friuli Venezia-Giulia by Slovenia from the Isonzo basin and with which Lasca and Savetta entered in competition, leading to a further contraction of the populations of these two species.

*Figure 0-3. The IAS Wels catfish and the Common nase (Chondrostoma nasus)*

### *1.2.2.3. Ichthyophagous bird species*

The presence of ichthyophagous birds strongly increased in the last twenty years all over Europe, in particular the Great grebe (*Podiceps cristatus*), the Cormorant (*Phalacrocorax carbo sinensis*) and the Grey heron (*Ardea cinerea*). This increase is mainly due to a greater protection of aquatic environments on a continental scale which led to an expansion of wintering and nesting areas. The rapid and massive return of these species led to an alteration of the balances established up to now and has negatively affected the fish populations, already threatened by various factors.
As gregarious species, Lasca usually frequenting shallow waters, suffers the effect of the presence of the ichthyophagous birds, of which it can easily be prey.

*Figure 0-4. Ichthyophagous birds*

## 2. TICINO PARK ACTIVITIES TO SUPPORT THE SPECIES

The Ticino Park has developed a specific protocol to reproduce and breed this species, producing juveniles well adapted to survive in the natural conditions when released.

Specific documents were developed during this project Life for lasca on breeding (*Preparatory plan for the fish farm modification* – August 2018) and on release techniques (*Feasibility guidelines for lasca reintroduction in Soča river basin* – September 2018; *Indications for lasca specimens release in nature* – October 2019); here we report the description of the main phases of the protocol implemented by the Ticino Park to support this species.

### 2.1 Preparatory phase

The spawning stock resulting from the capture of wild animals must be collected far from the breeding season or in the autumn/winter preceding the breeding season. This allows the captured subjects to adapt to new living conditions, thus allowing a proper development of the gonads.
The protocol requires the use of breeding animals kept in artificial tanks, fed, if possible, with water taken from a natural waterbody that allows natural temperature variations that act as a stimulus to reproductive activity. In the absence of this, a water heating system must be set up, in order to vary the temperature gradually, reaching the values of about 16-18 °C.
The fish must also be exposed to natural photoperiod, an important factor that stimulates the reproductive process.

The tanks must be set up with boxes containing a layer of gravel, with stones of varying diameter between the 2-4 cm, of the thickness of approximately 5-7 cm, placed in an area with a good turbulence.

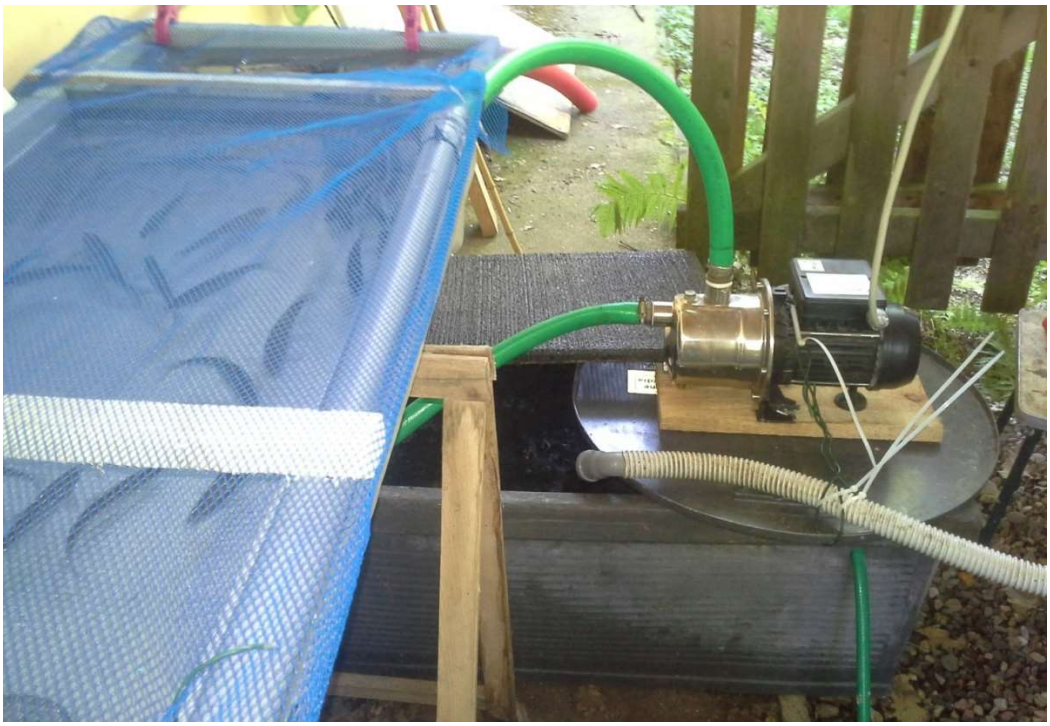
*Figure 0-1. Tanks for breeders, covered by net and receiving the sunlight*

In summary, as indicated above, in order to obtain the reproductive success of this species under artificial conditions, the following points are fundamental:

- exposure of the reproductive stock to natural photoperiod;
- gradual variation of the temperature of the water which reaches the value, in the reproductive period (second half of May), of about 16-18 °C;
- presence of a layer of gravel (diameter between the 2-4 cm and thickness of approximately 5-7 cm), placed in an area of the tank with a good turbulence.

*Figure 0-2. Tank equipped with gravel trays for laying eggs at the hatchery Fagiana*

*Figure 0-3. Tank for breeding stock*

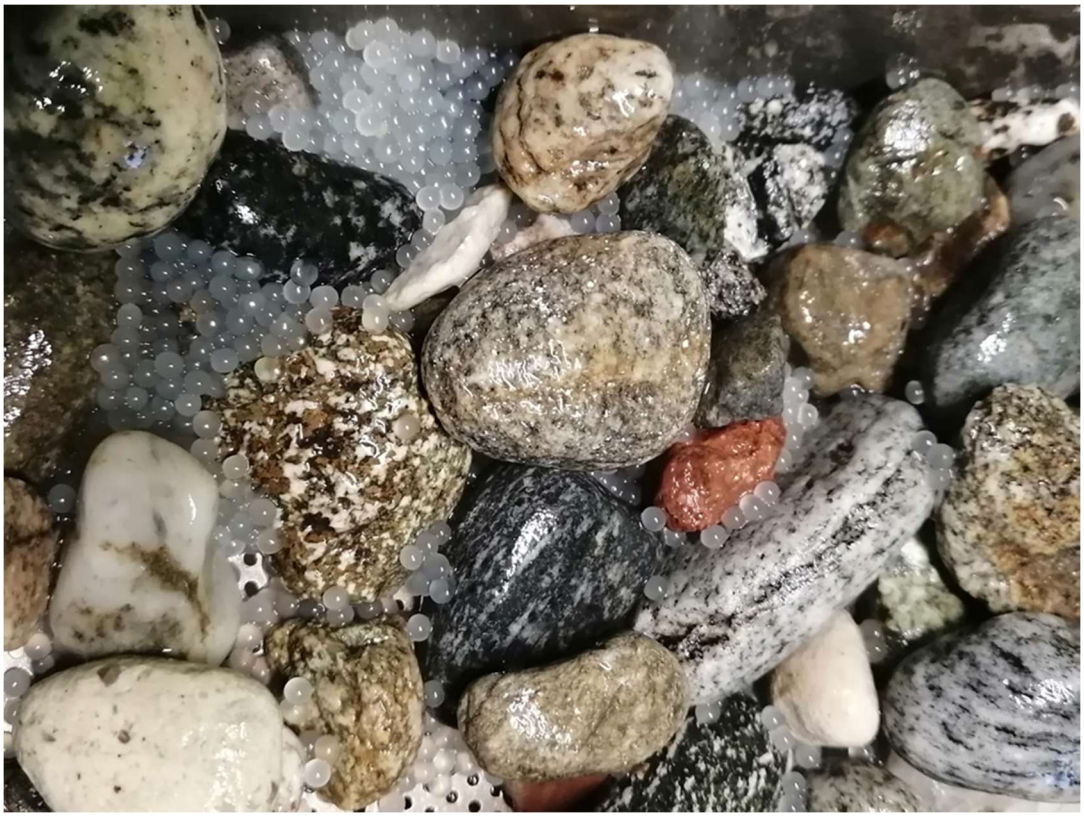


## 2.2 Spawning phase

The Lasca, in the Ticino Park, reproduces in late spring, around the second half of May. During this period gravel boxes are made available in the tanks, which must be checked daily in search of deposition. If this happens, the boxes with the eggs, must be removed from the reproducers tank and placed in a tank specially prepared for the hatching. The eggs

are also usually laid at the point of greatest turbulence. If the boxes are removed, they must be replaced with new ones until new depositions are noticed for at least 15 days.

*Figure 0-4. Lasca eggs in the gravel of a spawning box*



## 2.3 Incubation and hatching phase

The boxes with eggs are placed in “Californian” tanks, at the water entrance point (

Figure 0-5). Usually, several tanks are placed in sequence and in communication. When the hatching takes place, the larvae will be pushed by the current into the downstream tanks (Figure 0-6) thus separating them from the deposition substratum.
Once reabsorbed the yolk sac, the fry will be placed inside artificial ponds for the successive phase of weaning and first growth, as indicated in the next chapter.

*Figure 0-5. Spawning boxes laid in a Californian tank*

*Figure 0-6. Tank placed at the end of the series of spawning boxes, where the larvae will concentrate*

## 2.4 Weaning and growth of juveniles for release – fitness for survival

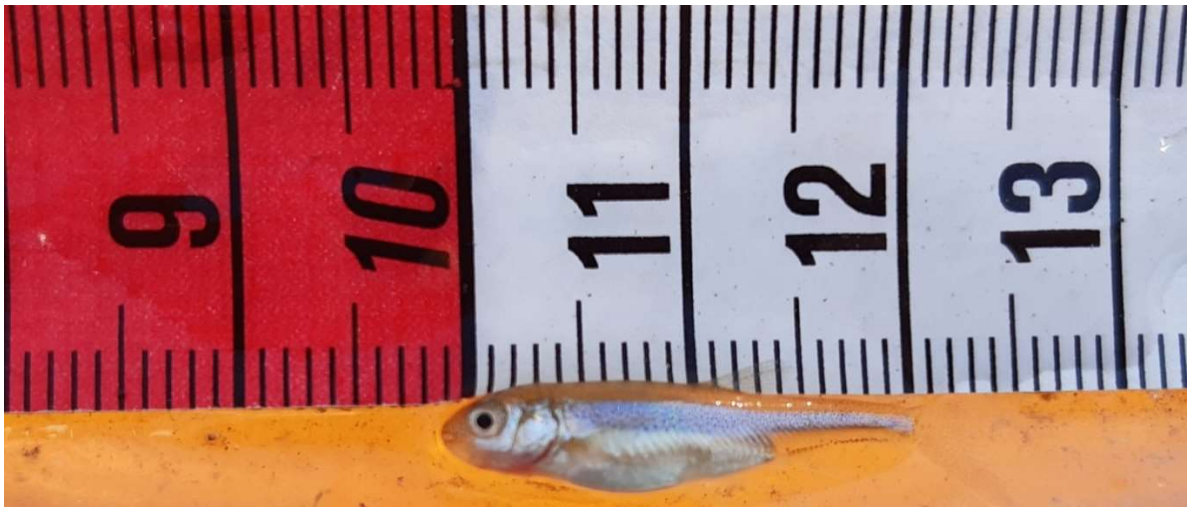
The breeding of juvenile for release program has to be programmed following the *Fitness for survival approach,* to assure specimen with the most possibilities to survive in the wild.
The Ticino Park has adopted the use of artificial ponds where the fries are transferred when have adsorbed the yolk sac.
About ten days before the transfer of the fries, the ponds are fertilized with manure; this and the the good exposure to the sun, favors the development of phytoplankton and zooplankton on which the young lasca feed in the early stages of growth.
When the fry reach 3-4 cm in length, feed should be administered to enrich their natural nourishment.

In this way the fishes are well adapted to survive in the natural environment that they will find when released.

*Figure 0-7. The artificial ponds at the hatchery of Abbiategrasso*

The young fish remain in the pond until reaching the size chosen for the stocking that can be implemented both in the early stages of development.

*Figure 0-8. Young growing in ponds almost two months after birth*




## 2.5 Release in the river

Once reached the right size – we suggest almost from 4/5 cm in order to better adapt to the site conditions - the fishes are transferred to the release sites, in an oxygenated tank possibly in days with not too high temperatures.

If the release is done using specimens of small size (4/5 cm) considering that Lasca is a sensitive fish, it is not recommended to use elastomers or pit tag to mark the animals.

It is suggested to release the specimens in the lateral branches of the rivers and the places chosen for the release must be appropriate for Lasca, with availability of food, shelters, connection to the river and areas with low turbulence, and prepared for the release with electro-fishing sessions to reduce the presence of predators.

Once reached the release site, it is important a short pre-adaptation phase to the water of the river. This must be done measuring both the initial temperature of the water of the river and of the tank; when necessary add slowly to the transport tank few quantities of river water to reach the river temperature

The release must be done as much extensive as possible, walking on the banks and releasing the fish in very small groups (5-10) every 25-50 meters, in shallow and slow running water, possibly in presence of shelters (roots, submerged macrophytes …).

*Figure 0-9. Capture of young Lasca in the artificial growth pond before the release in nature (left) and preparation of the buckets with the young Lasca before release in nature (right)*

*Figure0-10. Young Lasca specimen grown in artificial ponds and ready for stocking; on the right at the Branch Delight, environment of the Ticino River*

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