



life03nat/it/000113

Acipenser naccarii

Life - Nature Project



Conservation of *Acipenser naccarii* in the Ticino River and in the middle reach of the Po River

2003 - 2006

Beneficiary and executor of the project:



PARCO DEL TICINO
www.parcoticino.it

Contributors:



LIFE-NATURE
ec.europa.eu/environment/life/home.htm



REGIONE LOMBARDIA
Qualità dell'Ambiente
www.ambiente.regione.lombardia.it

Partners:



PARCO OGLIO SUD
parco.ogliosud.it

Project budget: 891.000 €
EU Contribution: 535.000 €



Adriatic Sturgeon (*Acipenser naccarii*) represents one of the rarest freshwater fish species of the Italian and even European ichthyofauna as a whole.

Fascinating and ancient animal, with the typical "shark" shape, ventral mouth and five rows of scutes that cross the body, it's the only sturgeon native in Italy that still lives in our water courses.

The two other species native in Italy, common Sturgeon (*Acipenser sturio*) and the Beluga (*Huso huso*), have been unfortunately locally extinct in the second half of the

last century. Above all, the environmental impacts, such as the impoundments, and the fishery activities have caused their decline.

Also the Adriatic Sturgeon, strongly affected by the deterioration of our water courses and by fishing, especially in its illegal forms, is threatened of not only local but also global extinction, as the same threats addressed in Italian rivers are reported also in the remaining distribution area of the species, in which cases of local extinction have been already recorded.

The presence of the dam of Isola Serafini at Piacenza, constructed in the 60's, has caused the end of the migrations of the Adriatic Sturgeon in the middle reach of Po River and in its left affluent, like Ticino River. Then an extraordinary, but not so rare, event happened: a nucleus of Adriatic Sturgeon, remained "landlocked", isolated from the sea, exceptionally adapted itself to complete its entire life-cycle in freshwater, in the middle reach of Po R. and in the middle-low reach of Ticino River.

OBJECTIVE OF THE PROJECT.

The conservation of this population, isolated from the sea and from possible contacts with other populations, but also really important for the global rarity of the species and so for its conservation, was the objective of the Life project.



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THE THREATS

which affect the survival of the species

Loss and degradation of the available habitat.

As the population of Adriatic sturgeon of the Ticino River is confined in an area much more narrow than that once occupied for the entire life cycle, it's much more threatened by the loss and degradation of the available habitat. The risk would be particularly heavy if the reproduction sites and nurseries were threatened.

The habitat fragmentation is still an active threat to the Adriatic Sturgeon population, because, even though next to the realization, the fish pass at Isola Serafini Dam on Po River is still a project. The isolation of this Adriatic Sturgeon population represents a strong threatening factor because, avoiding the reproduction with other sturgeons free to migrate, it reduces the genetic flux among different populations, strongly limiting the viability of the species.

Genetic drift. Considering the probable little size of the population, the risk of inbreeding is high. Genetic drift can result in dramatic changes in allele frequency, determining moreover the selection of hereditary characters, no more through natural selection but through casuality, causing the loss of "evolutionary success" of the population and local extinction.

Spread of the sheat-fish. The increasing spread of the sheat-fish (*Silurus glanis*) in Po Basin and in the middle-low reach of Ticino R. represents a strong threat to the survival of all autochthonous species. The surveys and samplings carried out by GRAIA srl in Ticino River in 1998-1999 spotted out reaches of the river in which the sheat-fish was dominant, in term both of density and biomass. The ecology study on the Ticino sheat-fish population, realized by GRAIA within the Life-Nature project of "Conservation of *Rutilus pigus* e *Salmo marmoratus* in the Ticino River", carried out by Ticino Park, showed that the sheat-fish is able to occupy all the available habitats, from the low-depth areas to the big pools, from slow flow reaches to the cascades, from the main reach of the river to the small lateral ones.

The well-known predation on Gammarids by the sheat-fish represents a case of alimentary overlap with the Adriatic Sturgeon, particularly greedy of these invertebrates. The abundance of the species, with the alimentary competition, represents an other evidence in favour of the hypothesis that the sheat-fish is a real and directed obstacle to the recovery of Adriatic Sturgeon in the Ticino River; moreover, since 2-3 years old, the sheat fish can exercise direct predation on the young Sturgeon.

Fishing pressure. At the moment, even though angling activity can not be considered the first cause of the Adriatic Sturgeon reduction in the Po basin, catching even few specimens can bring a strong damage for the population. Although angling activity is forbidden since many years, poaching is still frequent.



Fiume Ticino



Diga di Isola Serafini sul Fiume Po



Storioncini di pochi mesi di vita



Pescatori sul Fiume Ticino



Silurus glanis

LE AZIONI DEL PROGETTO.

The project has been structured in many "Actions", aimed at contrasting the limiting factors that threaten the species survival.

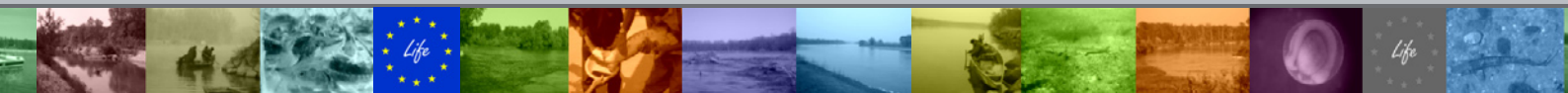
To contrast the habitat reduction, many activities have been carried on, among which:

- characterization of the area in which the Adriatic Sturgeon lives,
- assessment of size and status of the population settled in the project area,
- definition of the relationships with other species of the river and its distribution.





Acipenser naccarii



All these actions aimed at realizing a management plan of the species and the environment, that would define the best conservation strategies for the species, important for both a natural and cultural point of view. This plan, called **"Action plan of the *A. naccarii* management"**, has been drawn up and published in September 2006 in a monography distributed by

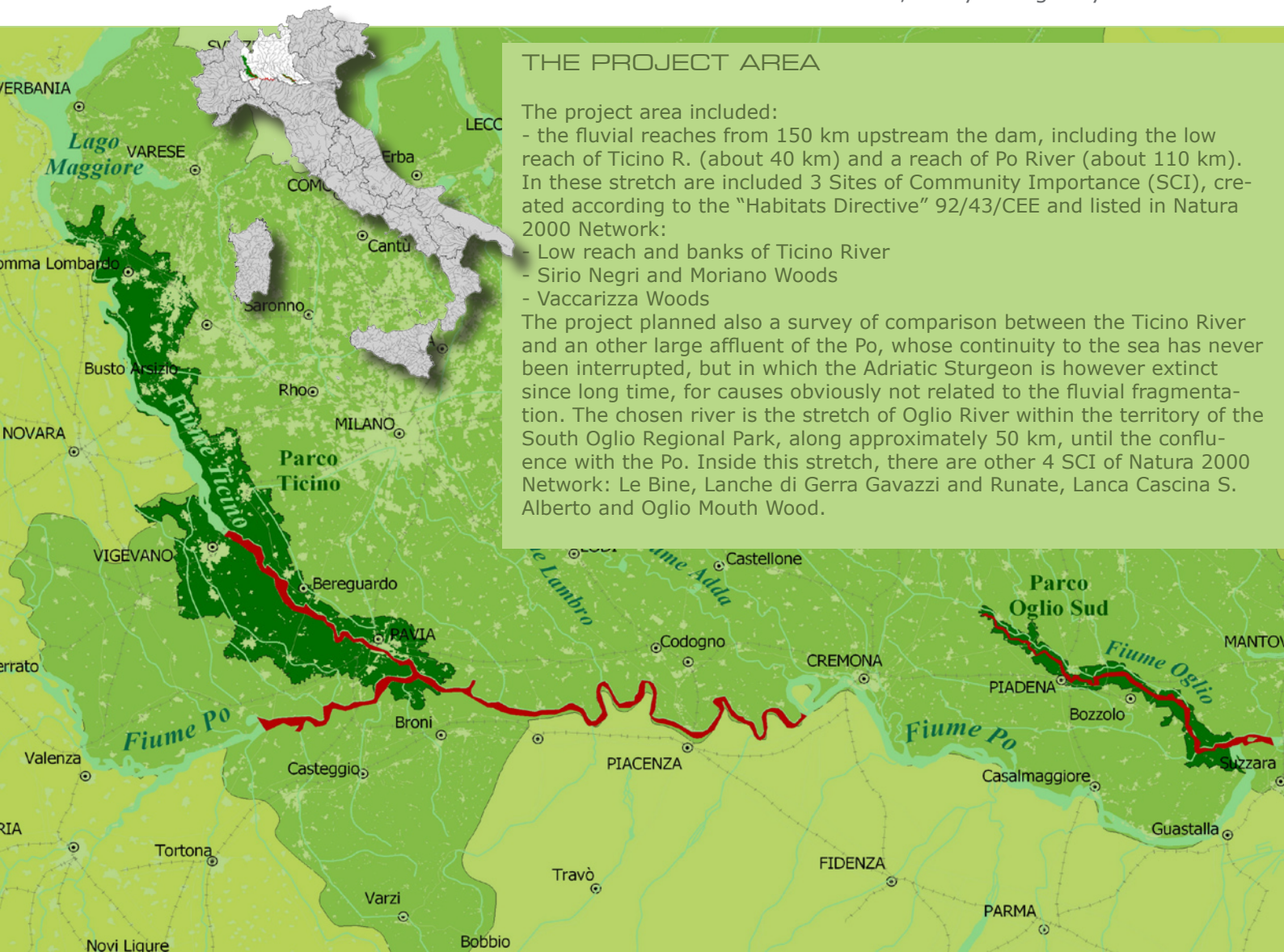
Ticino Park.

The study of the Sturgeon ecology took advantage also from the use of a precious instrument of surveying, today still little used: the **biotelemetry**.

An ultrasounds transmitter has been inserted surgically in the abdomen of a few number of bred sturgeon; then they have been let free in the river and followed by the investigators

with the reception systems, in order to record the localization, the movements and the relationships with the environment of each specimen, and then elaborate the environmental preferences.

The important aspect of the relationship between the Adriatic Sturgeon and its environment has been analysed through the comparison between the Ticino River, today biologically isolated



THE PROJECT AREA

The project area included:

- the fluvial reaches from 150 km upstream the dam, including the low reach of Ticino R. (about 40 km) and a reach of Po River (about 110 km). In these stretch are included 3 Sites of Community Importance (SCI), created according to the "Habitats Directive" 92/43/CEE and listed in Natura 2000 Network:
- Low reach and banks of Ticino River
- Sirio Negri and Moriano Woods
- Vaccarizza Woods

The project planned also a survey of comparison between the Ticino River and an other large affluent of the Po, whose continuity to the sea has never been interrupted, but in which the Adriatic Sturgeon is however extinct since long time, for causes obviously not related to the fluvial fragmentation. The chosen river is the stretch of Oglio River within the territory of the South Oglio Regional Park, along approximately 50 km, until the confluence with the Po. Inside this stretch, there are other 4 SCI of Natura 2000 Network: Le Bine, Lanche di Gerra Gavazzi and Runate, Lanca Cascina S. Alberto and Oglio Mouth Wood.



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BIOTELEMETRY

Biotelemetric monitoring sturgeon released in the river

Biotelemetry. In order to improve the knowledge on the Adriatic Sturgeon behaviour, it has been used a monitoring method, common in the United States but not so used in Italy for freshwater fish studies: the biotelemetry. This technique consists in applying to the animals a transmitter, of few centimeters, with a battery that converts electric power in waves with defined characteristics, that creates signals received by a receiver. The use of a receiver to pick up the signals emitted by the transmitter allows following the movements of the animal. This type of marking techniques has many advantages, first of all the possibility to control the activity and movements of the animals, without

of ultrasounds biotelemetry. The transmitter produces acoustic waves of frequency comprised between 20 and 300 kHz, not audible by men, transformed into mechanical vibrations with ultrasounds frequencies. These run in the water and can be picked up by a receiver dipped in water, called hydrophone, that contains a transducer which absorbs the mechanical vibrations and converts them into impulses, then translated in sounds.

The monitoring activity. The transmitters have been inserted in the abdominal cavity of the 30 Sturgeons monitored, through a laparotomy operation, that allowed moreover assessing the maturation level of the gonads. After one month, during which the Sturgeons have been kept under observation in the breeding tanks, verified their good health state, they have been let free in the river, at different points of Ticino R. between Vigevano and Pavia. Since the moment of release, the Sturgeons have been monitored in their movements, at first daily, then weekly, through biotelemetry monitoring with hydrophone from boat. In addition, at Pavia, a fixed hydrophone has been set, in order to pick up and record the signals of the possible passings of the Sturgeons towards the sea.

The Sturgeon behaviour. The collected data showed the behaviour of the released Sturgeons and their environmental preferences, confirmed by the observations made for the wild specimens. These data clearly show the tendency of some Sturgeons to occupy precise zones of the river, in which they have found the ideal conditions for living, and from which it resulted they don't go away; such zones are mostly big pools, deep even many meters, in which the Sturgeons stay near the bottom in the deepest points, or downstream the deepest point where there is a laminar flow. Many times, specimens have been recorded in reaches where the flow is quite high, probably in order to satisfy their food requirements. The biotelemetric monitoring regarded adult, sub-adult and young individuals, allowing studying the environmental preferences of the different age classes, leading to the result that they are similar. The preference for the great pools, as places of long stay, is shown both by young and adults, meanwhile most of young specimens tend to go downstream quite immediately, perhaps to satisfy the instinct of attraction towards the sea.



causing them an excessive stress.

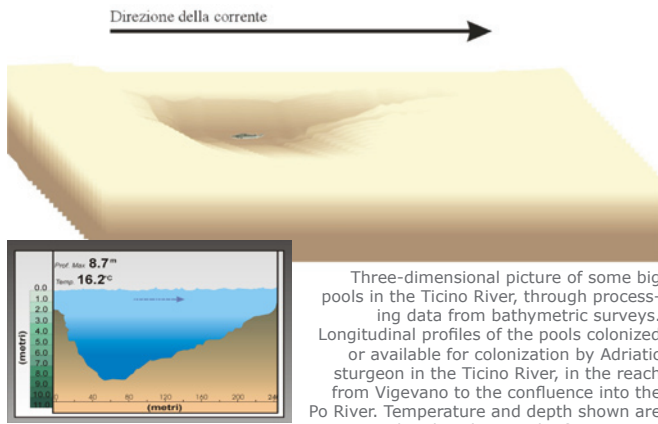
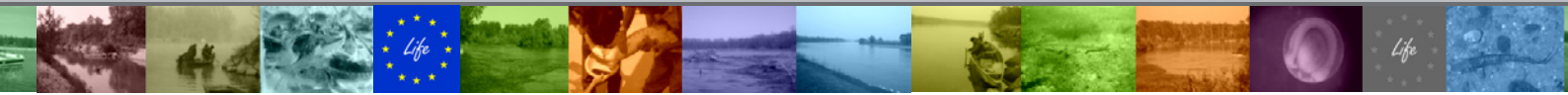
The technique of biotelemetry monitoring. In the present project it has been adopted the technique

Biotelemetry in the Ticino River





Acipenser naccarii



from the sea, and the Oglio River, within of the South Oglio Park, still in connection with the sea but since long time no more visited by the species; the results of the study underlined the importance of the maintenance of the water course natural shape for the species colonization.

To contrast the fragmentation of the distribution area of the species, **a survey has been carried on along the stretch of Po River between Isola Serafini and its mouth**, in order to characterize other possible impoundments, that prevent the migration of Sturgeon, and to plan the best mitigation actions. At the dam of Isola Serafini, that interrupts the biological connection of the middle reach of the Po and its affluents with the sea,

the project of an artificial fish pass has been already discussed and approved.

To contrast the threat of the genetic drift, it has been realized the

repopulation of the river with bred sturgeons, coming from the same river basin and, as it resulted from the genetic surveys, with levels of genetic variability compatible with those showed by other natural populations. **All the specimens introduced into the river have been marked** with microchip, in order to recognize each individual in

case of re-capture.

The groups of sturgeons released in the river, before their release, have been submitted to a period of preadapting to the life in the natural environment,

PITtag and scanner for marking sturgeons.

Marking and weighing of sturgeons.

Marking of yearlings with PanJet.





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transferred in the semi-natural breeding tanks at Cassolnovo in which they have been gradually accustomed to feed themselves with the macrobenthic fauna that naturally lives in the bottom of the ponds.

As a group of adult sturgeons, mature for reproduction, was available, it has been possible



Semi-natural breeding tank for the pre-adaptation of sturgeons to the life in nature.



Specimen of Adriatic sturgeon in the semi-natural tank.

for two years to make experiments of artificial reproduction of the species, thanks to which the Park gained the experience and the necessary technical knowledge to start a species

breeding using its structures and only aimed to the restocking of the river.

In order to contrast the threat deriving from the spread of the sheat-fish, the action of **control of the invasive species** has been carried on, with campaigns of diurnal and nocturnal electro-fishing, started by the Park during the previous Life-Nature plan of conservation. In addition, even the **study of the sheat-fish biology** in the Ticino River, started during the previous

project, has been carried on.

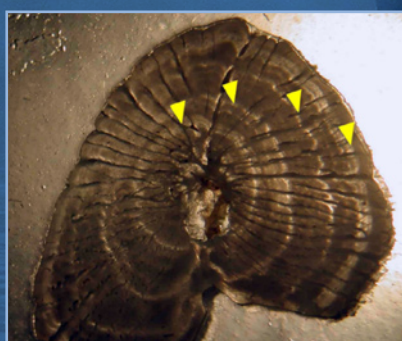
To contrast the threat deriving from fishing pressure, or better, from "poaching", considering the impossibility to hold under tight and constant surveillance an area so big and complex as that of the Ticino River, beside **the creation of a nucleus of vigilance, constituted by two patrols, charged with the surveillance of the river and the safeguard of the fish fauna**, the Park has decided to act above all in favour of the

THE FIGHT TO SHEAT-FISH

Why to contrast the spread of the sheat-fish. Since many years the Park is engaged in a fight against the sheat-fish. Since 1999, the census carried on throughout the entire course of Ticino R. by GRAIA srl for the Park, within the Research on the Fish Fauna (GRAIA srl, 1999), underlined the problem of the spread of the sheat-fish, showing worrying signs of its fast demographic increase. On the basis of the results of the previous Life Project, which improved the knowledge about the biology of the species, its behaviour and its

relationships with the environment, the reasons that make the sheat-fish a strong enemy of the native fish fauna of the Ticino River are summarized in the followings:

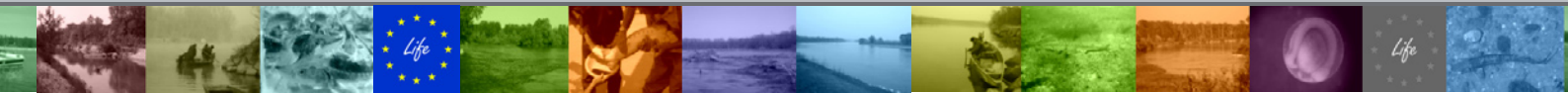
- the rapid and strong increasing rate, that allows the species reaching in only 3 years a length of 50 cm and a weight of 1 kilogram;
- its almost ichthyophagic diet since the first years of life, completely opportunist regarding the prey choice, particularly effective thanks to the big size of the animal - much bigger than the greatest part of the species present in the river- and thanks to its habits of nocturnal hunting, that allows the surprising effect on the preys;
- the capacity in occupying the best covers, chasing away the other fish, thanks to its size and its "reputation" of terrible predator;
- the long reproductive period that lasts for many months, from late spring to late summer, assuring,



This project continues the study of biology, of the behaviour and of the relationships with the environment of the *Silurus glanis* population of the Ticino River. In particular, more data on its growth rate, its diet and its reproductive biology have been collected. The graphs in the followings resume the results of the surveys carried out.



Acipenser naccarii



sensitization of the fishermen and the public.

In order to explain the purposes of the plan, the importance of the biodiversity conservation and also to ask for the collaboration of people, the Park promoted a series of initiatives, such as meetings with the Fishing Associations, distribution of informative material, creation of a web-site devoted to the project and creation of a net of local restaurants cooking Sturgeon, that will guarantee

the safeguard of the species, through an adhesive attesting the exclusive use of fish of



breeding origin.

For children education to the respect and the safeguard of the natural environment and its resources, **didactic material** for primary and secondary has been produced, to support alumnus in the study and observation of the environment and to support teachers in their activity.

Equipped with the best instruments and acquired the experience and the technical knowledge necessary for the management and the conservation of the freshwater fish species in decline, the Ticino Park, already involved for a long time in conservation projects of autochthonous fish fauna, thanks to the LIFE Projects has already started numerous new actions of faunistic conservation and management which will see it more and more involved in following the LIFE Programme and Nature 2000 objectives.

always or at least partially, the success of the reproduction, contrasting whichever events of disturbance that can negatively affect the eggs eclosion or the first increase of the larvae.

All these aspects, with the fact that in a few years the sheat-fish, demonstrating a strong capacity of colonization, spread in a long reach of Ticino, from its mouth in Po (from where it has probably come) to Vigevano, for about 40 Km, occupying not only the main reach but also its lateral environments, and that its increase in abundance was always followed by an impoverishment of the rest of the fish community, constitute good motivations that justify the deep engagement of the Park in controlling the sheat-fish and in the sensitization of the public opinion on the importance of the personal contribution for the contrast and the prevention of this menace.

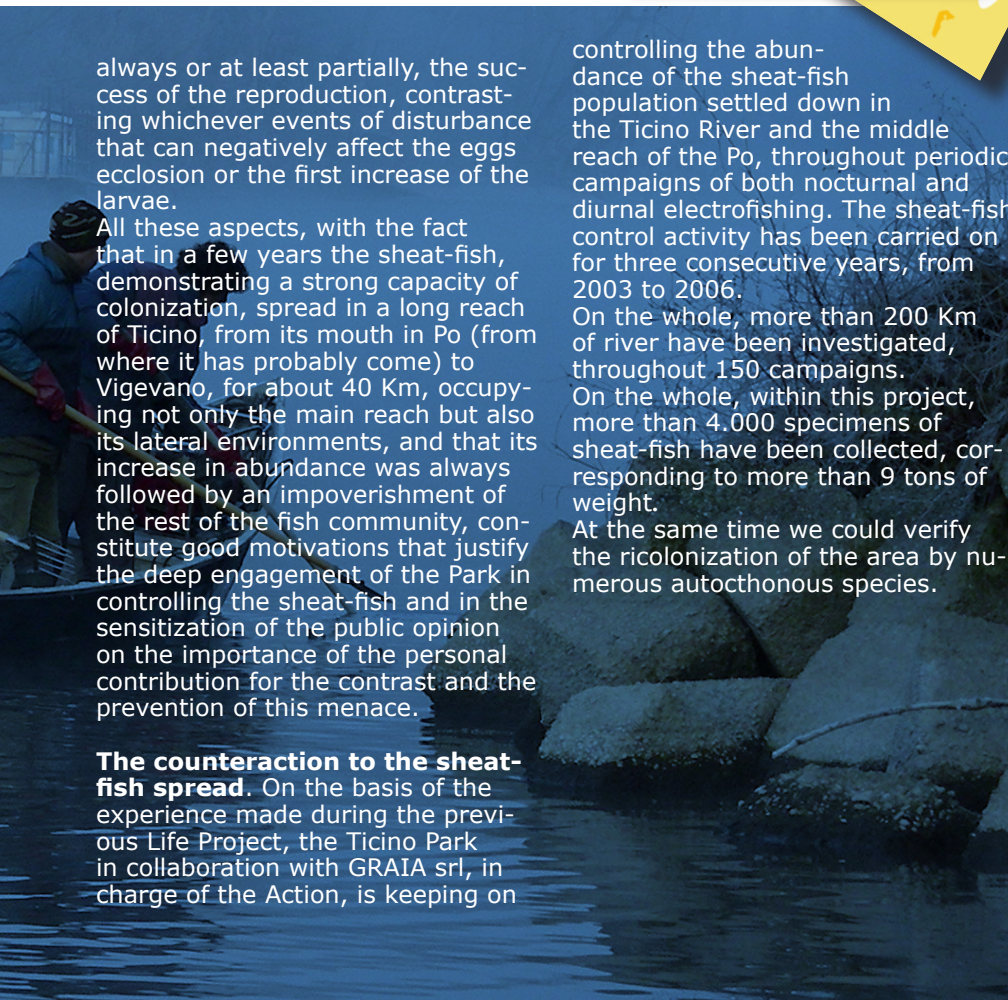
The counteraction to the sheat-fish spread. On the basis of the experience made during the previous Life Project, the Ticino Park in collaboration with GRAIA srl, in charge of the Action, is keeping on

controlling the abundance of the sheat-fish population settled down in the Ticino River and the middle reach of the Po, throughout periodic campaigns of both nocturnal and diurnal electrofishing. The sheat-fish control activity has been carried on for three consecutive years, from 2003 to 2006.

On the whole, more than 200 Km of river have been investigated, throughout 150 campaigns.

On the whole, within this project, more than 4.000 specimens of sheat-fish have been collected, corresponding to more than 9 tons of weight.

At the same time we could verify the recolonization of the area by numerous autochthonous species.





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Actions of the project.



OTHER SUBJECTS INVOLVED IN THE PROJECT:

The Ticino Park, as beneficiary of the Life contribute, and as coordinator of the project, through the work of its Faunistic Office, to realize the various actions it has involved a series of other subjects, among them there are in particular:



SEZIONE DI PAVIA

the FIPSA (Federazione Italiana Pesca Sportiva e Attività Subacquee) - Sezione di Pavia and other local Associations of anglers (Società Pescatori Dilettanti Cassolese e Gruppo Pesca Abbiategrasso), which actively collaborated to various actions;



the GRAIA srl - Gestione e Ricerca Ambientale Ittica Acque (www.graia.com) which worked with the Park as technical consultant for the realization of the activities of: fishfauna monitoring, characterization of the fluvial fragmentation, ichthyological research, control of *Silurus glanis*, biotelemetry and drawing up the divulgative and didactic material.

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