Signal crayfish

(*Pacifastacus leniusculus*)

Experiments on managing signal crayfish in ponds in the Vosges department

Onema, the French national agency for water and aquatic environments, NE regional office

■ Onema is a public agency under the supervision of the Ecology ministry and was created by the Law on water and aquatic environments (30 December 2006) in response to the requirements of the Water framework directive (23 October 2000) which set quality objectives for water and aquatic environments with a deadline in 2015.

Onema is the principle technical organisation in France in charge of developing knowledge on the ecology of aquatic environments and managing aquatic ecosystems. Its mission is to contribute to comprehensive and sustainable management of water resources and aquatic environments.

■ Five main missions:

- provide technical support for water polices (local governments, Water agencies, State services, etc.);
- stimulate research on the major challenges facing water and aquatic environments (climate change, new forms of pollution, etc.);
- improve knowledge on the status and uses of water and aquatic environments and make the information available to the public;
- play an essential role in the police for water and aquatic environments, in support of State services;
- fund specific water policies, such as solidarity funding between river basins and the Ecophyto plan.

■ The agency is organised around three hierarchical and geographical organisational levels:

- the general management develops science-advice capabilities in support of public water policies, manages the agency and coordinates the Water information system (WIS-FR);
- the nine regional offices corresponding to one or more administrative regions in France. They represent the agency in its dealings with local authorities and they manage the local offices in their region;
- the local offices are the basic building blocks of Onema. Their mission is to inspect and monitor water uses and to provide technical support to the water police. They also collect data on the status and uses of water and aquatic environments, as well as on species.

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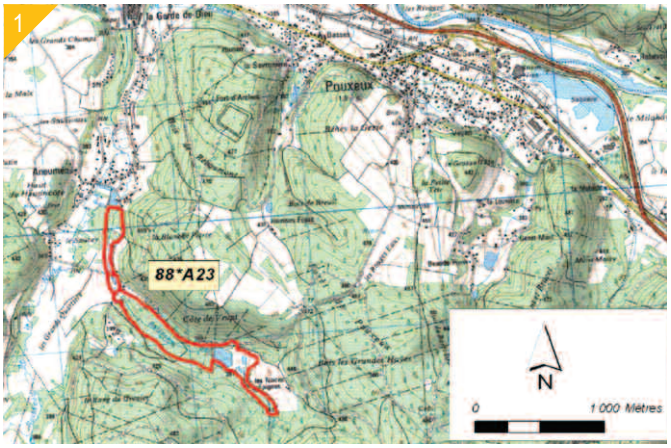

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1. Map showing the intervention site.

Intervention site

■ The site is listed among the sensitive natural areas in the Vosges department and covers a total of 30 hectares. This report deals essentially with the management of the ponds and of the signal crayfish (*Pacifastacus leniusculus*).

■ The two ponds lie on private land. Following the discovery of signal crayfish during an inspection carried out by Onema in September 2009 and given the illegal nature of the ponds, legal proceedings were initiated at the end of 2009 by the departmental territorial agency against the owners, in order to regularise the situation.

■ The injunction (signed in March 2010) stipulated that:

- the ponds be drained to eradicate the population of signal crayfish;
- a wetland and ecological continuity be restored by setting up a bypass. The towns of Arches and Pouxeux volunteered to provide the technical oversight. The policy of the Vosges departmental council concerning sensitive natural areas applied and was implemented by the Lorraine nature conservatory.

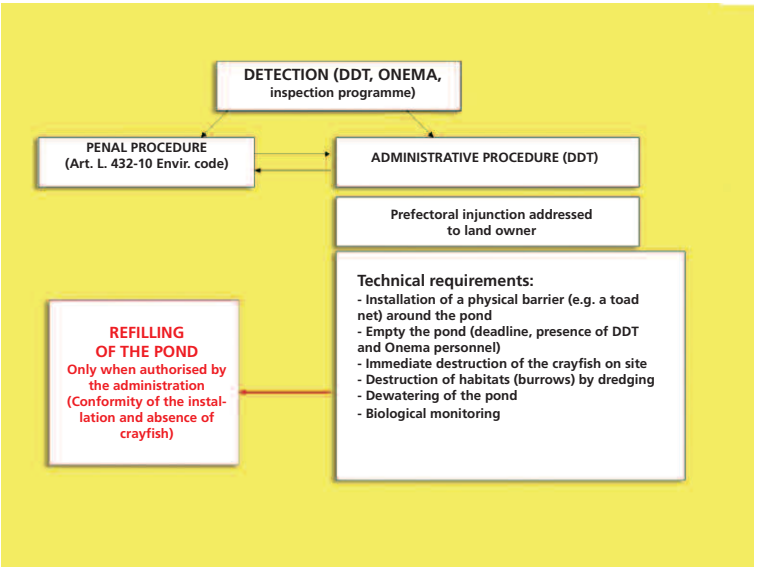
■ The site consists of two ponds/reservoirs on a tributary to the Noires Feignes stream (Rhin-Meuse basin).

The ponds, with a respective surface area of 21 ares and 1.5 hectares are also supplied by springs.

■ The two ponds are each equipped with a draining system and can be drained.

■ The inspections on site noted, however, that the signal crayfish had already colonised the Noires Feignes stream downstream of the ponds.

Diagram of the administrative and penal system in the Vosges department.



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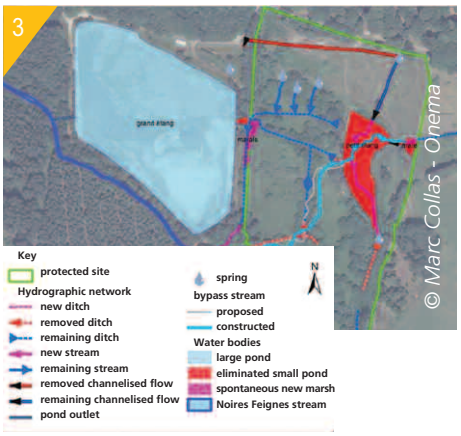


2. Pacifastacus leniusculus *(signal crayfish).*
3. Map showing the hydrographic network and the restoration work.

Disturbances and issues involved

■ The presence of the signal crayfish entails a number of consequences for the local environment, including:

- a risk that certain native species (native crayfish, molluscs, invertebrates, fish, amphibians) may regress or simply disappear;
- the crayfish may be healthy carriers of “crayfish plague” (aphanomycosis), a disease that kills native crayfish. The infection rate for crayfish plague of the observed population was high.

■ On the local level, the objective of the intervention was to eliminate the “source population”, introduced to the ponds by the owners via living animals transported from Lake Geneva, and to limit the spread of the population both upstream and downstream in the stream.

Interventions

■ The two ponds were drained and the signal crayfish were eliminated.

■ The smaller pond was purchased by the public authorities and eliminated:

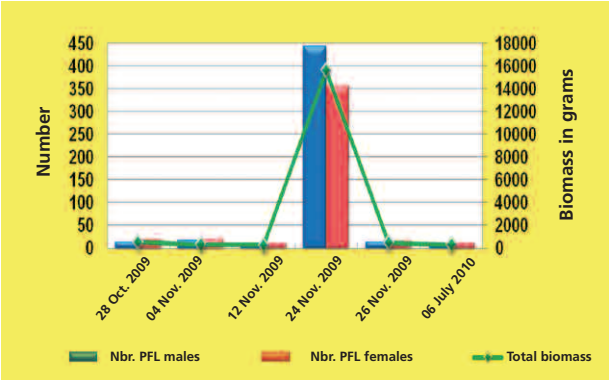
- ecological continuity was restored by destroying the draining systems and reinstating the normal flow toward the Noires Feignes stream;
- functioning of the wetland was restored by recreating the riverbed in the tributary. Previously, the small pond drained directly into the larger pond. Restoration of ecological continuity required that the water from the small pond flow directly to the Noires Feignes stream. The selected technical solution consisted of recreating a riverbed to enable the movement of fish;
- the landscape was restored by partially lowering the dike and reprofiling the former banks.

■ Small and large pond

■ Fall 2009:

- November 2009, slow emptying of the ponds by the owner in the presence of the State services, DDT and Onema, following the prefectoral injunction;
- netting to collect a maximum number of crayfish, plus manual collection of any visible crayfish and searches in the various habitats. Over 800 crayfish were captured during the draining of the ponds;
- use of quicklime in pools remaining in the pond;
- total dewatering with filtration systems in the pond fish trap to avoid the escape of any remaining crayfish to the stream.

Numbers and total biomass of crayfish removed during the interventions in 2009 and 2010.



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■ Large pond

■ 2010, the pond was dewatered in the winter and summer, with monitoring of the filtering system and collection of the crayfish in the pond fish trap.

■ 2011:

- mechanical means were used to dredge and restructure the bed. The burrows in the banks and other habitats of the signal crayfish were destroyed;
- biological monitoring was organised on the site.

■ 2012, the pond was refilled.

■ Small pond

■ 2010, the small pond was eliminated and restoration work was undertaken for the wetland and stream.

Results and costs

■ Results

■ The measures implemented in this particular case succeeded in eliminating the population of signal crayfish found in the two ponds. Concerning the colonised stream, no work was undertaken against the crayfish population in the absence of effective techniques.

■ Costs

■ For the large pond, the costs were not calculated and fell entirely on the pond owner who had introduced the crayfish.

4. Work to eliminate the small pond.
5. Dredging in the large pond.
6. Captured signal crayfish.
7. View of the large pond following the work.
8. Restoration of the stream on the site of the small pond.

■ The elimination of the small pond and the accompanying measures cost 25 761,84 euros including VAT and were carried out in November 2011. The work required the use of a 20-ton excavator on special “marsh tracks” and equipped with a support system to improve stability and reduce the impact on the soil.

Outlook

■ Total emptying of the colonised ponds and control over the water levels were indispensable elements in the success of the management work on the invasive crayfish.

■ This case showed that in efforts against an invasive species of crayfish, the work must be adapted to each situation and each site. It also showed that an intervention may last a fairly long time (two years in this case).

Information on the project

■ The Lorraine nature conservatory conducted a number of informational sessions on site for the owners prior to the work.

■ Several articles were published in the local press on the method and work.

Note on applicable regulations

■ The introduction of a “species likely to provoke biological imbalances”, as per articles R432-5 and L432-10 in the Environmental code, is subject to a fine of 9 000 euros.

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For more information

■ http://www.onema.fr/Les-rencontresde-l-Onema

■ http://www.onema.fr/collection-lesrencontres-syntheses

■ http://www.set-revue.fr/la-gestion-des-ecrevisses-exotiques-envahissantes-dans-le-departement-des-vosges/texte

■ Collas M., Julien C. et Monnier D. 2007. Note technique : La situation des écrevisses en France. Résultats des enquêtes nationales réalisées entre 1977 et 2006 par le Conseil Supérieur de la Pêche. Bulletin Français de la Pêche et de la Pisciculture (386) :1-39. http://www.kmae-journal.org

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■ Holdich D.M., Reynolds J.D., Souty-Grosset C., Sibley P.J. 2010. A review of the ever increasing threat to European crayfish from non-indigenous crayfish species - Knowledge and Management of Aquatic Ecosystems (2009) 394-395, 11. http://www.kmae-journal.org

■ Souty-Grosset C., Holdich D.M., Noël P.Y., Reynolds J.D. et Haffner P. (eds) 2006. *Atlas of Crayfish in Europe*. Muséum national d’Histoire naturelle, Paris, Patrimoines naturels, (64), 187 pp.

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