

## Slider turtles *Trachemys scripta elegans* released in France: a case of integrated research and conservation program

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**Abstract:** The importation, the sale and the frequent release of new pets raise more and more questions to the managers and users of natural sites and to the local authorities. The adequate solution to this established fact seems to be the public education on the potential impact caused by the release of exotic species. This education must be based on concrete results. It is within this framework that the scientists have a role to play, while making it possible to find concrete answers to the questions of conservation. The slider turtle (*Trachemys scripta elegans*) is a symbolic species of this situation: well-known and popular with the public, it is present today in all the French departments. A project of management of this species around Paris was initiated by the laboratory "Ecologie, Systématique and Evolution" (CNRS - University Paris-Sud). It is focused on 3 points: 1) Study of the impact on the ecosystems of the slider turtle as an introduced species, and characterization of its invasion capacities; 2) Education of general public to the problems arising because of this species and more generally from the pets; and 3) Installation of concrete protocols of management of the slider turtle. This program began in 2002 for 5 years (2002-2006) and gathers a growing number of partners (the General Councils and the Regional Council of Ile-de-France, Regional Agency for environment, Forestry and Fisheries Agency.). Beyond the answers to the questions of the potentialities of invasion of the slider turtle, this project wishes to provide to the French Ministry "Ecologie et Développement Durable" the necessary elements for the installation of a clear policy, including the recovery in the areas where the reproduction is proven.

**Key words:** conservation strategy, dispersal, home range, *Trachemys scripta elegans*, translocation, telemetry.

**Resumen: Introducción de la tortuga de Florida (*Trachemys scripta elegans*) en Francia: un caso de investigación integrada con un programa de conservación.** – La importación, venta y frecuente liberación de nuevas mascotas genera crecientes incógnitas tanto a gestores y usuarios del medio natural, como a las autoridades locales. La correcta solución a este problema parece ser la educación ciudadana acerca del impacto potencial generado por la liberación de especies exóticas. Dicha educación debe fundamentarse en resultados concretos, teniendo los investigadores un papel en este contexto: encontrar respuestas concretas a los problemas de conservación.

La tortuga de Florida (*Trachemys scripta elegans*) representa un paradigma de esta situación: bien conocida y popular entre el público, está actualmente presente en todos los departamentos de Francia. El laboratorio *Ecología, Sistemática y Evolución* (CNRS, Universidad París-Sur) inició un proyecto de gestión de la especie en los alrededores de París con los tres objetivos siguientes: 1) Estudio de su impacto sobre los ecosistemas y caracterización de su capacidad invasora, 2) Educación pública sobre la problemática generada por esta especie en particular y las mascotas en general y 3) Aplicación de protocolos específicos de gestión de la tortuga de Florida. El programa quinquenal se inició en 2002 (2002-2006) con un número creciente de participantes (Concejos Generales y Concejo Regional de Ile-de-France). Más allá

de responder a las incógnitas respecto de la invasión potencial de la tortuga de Florida, el proyecto pretende proporcionar al ministerio francés de Ecología y Desarrollo Sostenible las herramientas necesarias para la puesta en práctica de una política clara, incluyendo la restauración de áreas en que se haya comprobado su reproducción.

**Palabras clave:** dispersión, espacio vital, estrategias de conservación, *Trachemys scripta elegans*, telemetría, traslocación.

## INTRODUCTION

In a world where a growing part of the population lives in cities, owning an exotic pet may represent a sort of nature appropriation by urban public. Exotic pets are all the more attractive that they are rare, they come from a more distant country and they are original, differing from more "usual pets". In this context, an intensive pet trade has been developed from turtle farms in the United States (LUTZ, 2000; TELECKY, 2001), selling young slider turtles in developed countries. In France, slider turtles became very popular because of their small size, their owning easiness and their very cheap price.

However, unsuspecting turtle owners were rarely prepared to continue maintaining in captivity large adults (up to 30 cm long) so long (up to 50 years old). Larger turtles have often been released in the wild by their owners, these owners being still involved in the future of their animal. Because of these introduction events, red-eared slider turtles are now present in freshwater ecosystems in many developed countries (e.g. DE ROA & ROIG, 1997; LUISELLI *et al.*, 1997; ARVY & SERVAN, 1998; CHEN & LUE, 1998; CADI & JOLY, 2003, 2004; MARTINEZ-SILVESTRE, 2003), with increasing densities in urban wetlands.

The impact of this introduced species on local ecosystems and communities remains unknown. However, there are some available information concerning its reproduction success: egg deposition has been observed in Spain, Southern Europe (e.g. CAPALLERAS & CARRETERO, 2000) and in France (PRÉVOT-

JULLIARD *et al.*, 2003), and the production of young of both sexes was observed in the south of France (CADI *et al.*, 2004). In this context, the slider turtle is a good example of exotic pets' situation: although well known and popular with the general public, its invasive status remains questionable.

A project of study and management of this species near Paris (France) has been initiated in 2002 by our research laboratory, in collaboration with managers and local communities, as well as with a research unit in Anthropology of nature. This program tries to achieve three different and connected goals: (i) a research aspect, (ii) an education aspect, and (iii) propositions of management strategies.

## PROJECT OF MANAGEMENT

### Research aspect

*Impact of introduced turtles on local communities.* – A study of stomach contents of captured slider turtles introduced near Paris revealed the presence of plants in most of the turtle stomachs, as it is the case for adult sliders in their origin area (PARMENTER & AVERY, 1990). A complex experimental design (12 mesocosms with two turtle density treatments) should allow a more precise understanding of the general impact of these turtles on local communities in France.

*Impact of the turtle removal from natural wetland areas.* – Local communities (plants, invertebrates and vertebrates) of some pairs of ponds with turtles are surveyed, before and after turtle removal in one pond of each pair.

Data analyses following a BACI design (STEWART-OATEN & BENICE, 2001) should provide relevant information on removal consequences on local communities.

*Conditions of successful reproduction of introduced slider turtles.* – The environmental conditions (i.e. temperature and hygrometry) of successful egg incubation and production of both sexes are studied with experimental designs and mechanistic model. These results should allow building a “map of risks” concerning reproduction of slider in France.

*Social representations of the slider turtles as a “natural” species.* – The study of social representations of slider turtles located in natural wetland areas should bring some new pieces for the decision-making process.

### Education aspect

The research axes are developed in connexion with the conception of different education tools and teaching aids, such as poster, short movie, exhibition and teaching guidelines concerning slider turtles, and exotic pets more generally. All these tools should be available for free through a special website.

### Management aspect

Finally, the results of our research axes will be used to propose some management strategies on slider turtles control in natural wetland: Does it is worth systematically removing turtles? What to do after capture? What to do to prevent the owners from releasing turtles? We will use a multi-agent system (BOUSQUET & LE PAGE, 2004) to integrate biological data (on impact and reproduction of slider in different geographical contexts) with social data (on representations of slider by the general public or more concerned people), as well as with economical data (e.g. removal costs). This system simulates different scenarios, which will be used as a concrete basis for discussions. At the same time,

we develop a large collaboration with zoo and aquarium to enhance direct recuperation.

### Conclusion

The “Slider Turtle Program” is a concrete experience that integrates interdisciplinary research (in biology and human sciences), education and management to try to solve a complex question concerning urban wetland conservation. As noted by ALBERTI *et al.* (2003), urban ecology would be correctly studied only if human and biological sciences are studied in close relationship. Moreover, we think, as BERKES (2004), that biological conservation will be able to reach ambitious objectives only by having a systemic approach and by integrating human society in several (all) levels of the process. This program, supervised by a research laboratory and funded by local communities, is an example trying to achieve these goals.

Concerning public information, a special web site is available on:  
<http://tortue.floride.u-psud.fr/index.htm>.

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