**Trachemys scripta elegans** (Red-eared Slider)

Management Information

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1.0 Introduction

In the context of threatened and endangered species the introduction of alien turtle species should always be strongly discouraged and governments should prevent the importation of freshwater turtles (Cadi and Joly 2003). Aquatic pest animals are difficult to detect; red-eared sliders require labour-intensive methods of detection. Control of this pest requires research into novel methods of detection, such as the use of sniffer dogs (DNRW 2006c, in Wilson Wilke & Saraç 2009).

Based on the results of several studies that demonstrated the deleterious impact of exotic species on local biodiversity throughout the world (eg: Jones *et al.* 2008), urban managers are encouraged to remove these species as soon as they are detected. However, the decision to remove exotic species may face opposition from the public which haves social and cultural perceptions of animals, plants and nature that may be different from scientific views (Minteer & Collins, 2005b, in Teillac-Deschamps *et al.* 2009). For a discussion of these issues please see Teillac-Deschamps and colleagues (2009); the authors have created a process-based model for the management of feral exotic pets in urban green spaces that incorporates ecological considerations, human behaviours and stakeholders and their relationships.

2.0 Preventative Measures

With effect from 22 December 1997 the EU banned the import of the subspecies *T. scripta elegans* via the Protection of Species of Wild Fauna and Flora by Regulating Trade (Bringsøe 1998 2001b, in Bringsøe 2006). For four states (Poland, Estonia, Latvia and Lithuania) this ban only came into force with effect from 2004 as they entered the EU (Bringsøe 2006). While it is no longer allowed to import Red-eared terrapin with the EU it is still legal to keep and distribute them within many EU countries.

After this legislation was passed the red-eared slider was replaced in the market by other North American turtles, such as the other subspecies of *T. scipta*: *T. scripta scripta* and *T. scripta troostii* (Adrados *et al.* 2002, in Bringsøe 2006) and other similar species such as the Eastern River Cooter (*Pseudemys concinna*), the Mississippi Map Turtle (*Graptemys kohnii-pseudogeographica* group) and snapping turtles (*Chelydra serpentine*)
As *T. scripta scripta* fetches prices three to four times higher than the red eared slider fewer individuals are being imported and sold; due to higher prices and lower quantities imported, the new species and subspecies of turtles have so far not become any real replacement (Adrados *et al.* 2002, in Bringsøe 2006). However this may change if American turtle farmers manage to improve breeding success in farms.

According to Peter Paul van Dijk (Deputy Chair, IUCN/SSC Tortoise & Freshwater Turtle Specialist Group / Director, CI/CABS Tortoise and Freshwater Turtle Conservation Program Pers. Comm. 2006) legislation was a precautionary principle without firm ecological evidence and was a single-species solution tackling a multi-species problem. It also had the effect of affecting North American native wild stocks of turtles, such as snapping turtle (*Chelydra serpentina*) in order to meet demand for turtles for export to European pet owners (P.P. van Dijk Pers. Comm. 2006).

Un fortunately snapping turtle and Chinese softshells, which are some of the species replacing the red-eared slider in the market, are substantially better adapted to cold climates (such as Nova Scotia and Siberia, respectively) and probably represent a higher ecological risk; they are very cryptic species and significantly more carnivorous than the red-eared slider (P.P. van Dijk Pers. Comm. 2006). Positive records of Chinese Softshell now exist from the UK, and of snapping turtles from the UK and Netherlands, records may be “just the tip of the iceberg” (P.P. van Dijk Pers. Comm. 2006). As some of turtle species are more resistant to cold winter conditions than *T. scripta elegans*, such as *Chrysemys picta* (especially juveniles) an import ban of *C. picta* was also implemented by the EU (Bringsøe 2001b, in Bringsøe 2006).

In January 2004 two free-ranging adult red-eared sliders were found at Mango Hill just north of Brisbane, Queensland. Two wild populations of red-eared slider turtles were identified in southeast Queensland in 2005. A preliminary risk assessment of the species rated the species as an extreme risk to biodiversity, and cautioned that, based on climate tolerance; sliders could potentially become established over more than half of the Australian continent (O’Keeffe 2009). A response group representing interested government agencies and affected local governments was established to deal with the issue; because the species is rated as a serious risk to biodiversity, but is not yet widespread or abundant in Australia; a decision was made to attempt eradication (O’Keeffe 2009). The eradication program is a cooperative effort involving three state government agencies, local governments, landholders and some community groups. The budget for this project is small, and cooperation has been essential for success (O’Keeffe 2009). The program uses a combination of techniques to achieve its objectives; the treatment strategy will depend upon the characteristics of the water body, aquatic vegetation, and tenure of the property (O’Keeffe 2009; more information on this case study is outlined under Physical Control and Education and Awareness).

The largest population, which occupied six small water bodies, has been successfully eradicated. This requires continuing monitoring to verify. A second small population has been reduced, but additional effort is required to complete eradication. Reliable detection of these animals is currently the greatest obstacle to successful eradication, but the
development of novel DNA detection technology shows promise as a solution to this problem. The reptile trade is a potential source of animals that may be abandoned or deliberately released to the environment. An increasing illegal trade in reptiles could threaten the long-term success of this work.

3.0 Physical Control
Sliders can be captured by hand or through various trapping devices. Please visit Fyke Net for Turtles for information about turtle nets. Floating boards used by sliders as basking sites seem very effective when equipped with baited cages on top (Scalera 2006) but may not be appropriate in all cases (O’Keeffe 2009). From practices learnt in the Queensland eradication (O’Keeffe 2009) the best method appears to be surveying for turtle populations by hand-trawling water bodies with a seine net. Where obstructions or obstacles prevent seine netting, cathedral traps can be used to survey water bodies. The objective of initial surveys is to establish whether a significant breeding population is present in a water body.

The preferred method for eradication is to drain a water body, recover and relocate native fauna, remove all sliders, and finally, fill and compact the site (O’Keeffe 2009). When a water body is drained rapidly, up to 75% of sliders will emigrate (Cash & Holberton 2005, in O’Keeffe 2009). Before draining water bodies, sites are secured with barrier fences and pitfall traps to prevent emigration. To capture native Australian turtles, a seine net is run through the water while driving turtles away from banks or aquatic vegetation by splashing and beating the water (O’Keeffe 2009). This technique is unsuitable for sliders, which tend to drop to the bottom of the water body and burrow into the mud. Sliders enter cathedral traps readily; however, persistent intensive trapping is required to capture sliders when small numbers are present. Successfully removing sliders from water bodies will still leave the problem of re-infestation by hatchlings that emerge from terrestrial nests; a detection dog can be used to locate turtle nests and eggs in order to allow breeding to be controlled (O’Keeffe 2009). Eggs can also be found and removed by following females at nesting areas (Scalera 2006).

The current best practice for euthanasia of reptiles in New Zealand involves overdosage with either an inhalation anaesthetic agent (e.g., halothane) or appropriately diluted sodium pentobarbitone solution. Particular care is needed to ensure that a “euthanised” reptile actually is dead. For a discussion on this issue please see Gartrell & Kirk. 2005. Euthanasia of Reptiles in New Zealand: Current Issues and Methods.

4.0 Education and Awareness
The importation, sale and frequent release of pets create problems for which the adequate solution seems to be the public education. An information campaign aimed at raising public awareness of the risk posed by dumping pets is a priority in the EU (Scalera 2006). In some countries (e.g: Italy, Spain and France) live specimens abandoned by pet owners are disposed of in rescue centers and zoological gardens (Scalera 2006). Information campaigns via the media should encourage people to better care for their pets/turtles and refrain from releasing them into the wild (Bringsøe 2006). All pet shops in the EU should be compelled to provide proper care sheets about turtles and other animals to buyers
These animals pose a potential risk to human health and this demands sanitary control and increased information to the public (de Sa & Solari 2002).

In the western part of north Europe and the Baltic region invasive species public awareness campaigns have been carried out; these campaigns have been aimed at encouraging pet owners to obtain information about the animals they want to purchase in advance and never to release them into the wild (Bringsøe 2006). In Denmark a brochure discouraging releasing pets in the wild has been produced by the Danish Forest and Nature Agency (Skov og Naturstyrelsen 1998) and a beginners’ booklet on the acquisition of reptiles and amphibians for captive husbandry focuses on proper preparation and awareness of the juvenile turtles attaining larger sizes (Bringsøe 2006). Please see Bekæmpelse af Rødøret terrapin. Skov- og Naturstyrelsen for more information on this issue (in Danish).

In Australia native reptiles such as *Elusor macrurus* are kept as pets (Burgin 2006). Keeping native reptiles instead of exotics should be encouraged in Australia and elsewhere (Burgin 2006). In Queensland a telephone ‘hotline’ was established, and persons having seen or captured sliders were encouraged to contact the project team (O’Keeffe 2009; see Preventative Measures for more information on this project).

Another form of cultural control and education could be applicable in Asia. In parts of Asia animals are released into the wild as a part of traditional Buddhist mercy ceremony to increase good karma, honour Buddha and repent for ones sins. Severinghaus and Chi (1999, in Ramsay et al. 2007) commented that in Taiwan prayer released birds are usually wild caught, while the turtles and fishes tend to be captive-bred non-indigenous species, such as *T. scripta* and carp. The Ministry of the Environment (Republic of Korea) advised that people should consider taking care of injured birds and animals and then set them free for a more environmentally-friendly symbolic act.

5.0 Knowledge and Research

Although the red-eared slider is now found on every continent except Antarctica (Salzberg 2000, in Ramsay et al. 2007), the ecological effects of introductions of *T. scripta elegans* have been poorly documented (Platt & Fontenot 1992, in Ramsay et al. 2007). For example, there is a complete lack of published information on this species in the Australian region (Bomford 2003, in O’Keeffe 2009). Clearly there is scope for much research in this area.

Competition of *T. scripta elegans* with the indigenous European pond turtle *Emys orbicularis* has been studied in France (see Cadi & Joly 2003) and a management project for the red-eared slider was initiated by the laboratory “Ecologie, Systématique and Evolution” (CNRS-University Paris-Sud) in collaboration with managers and local communities (Cadi et al. 2008; Teillac-Deschamps et al. 2008). Begun in 2002, the project focused on research and education to study and manage *T. scripta elegans* populations in the Paris region (Teillac-Deschamps et al. 2008). This project had three goals: (i) to acquire knowledge on the invasive status of slider turtles and on the social representations of this species; (ii) to educate the public; and (iii) to provide suggestions
for management strategies (Teillac-Deschamps et al. 2008). It is within the framework of education and awareness that scientists have a role to play, making it possible to find concrete answers to the questions of conservation (Cadi et al. 2008).

6.0 Integrated Management
To mitigate the impacts of *T. scripta elegans* on *E. orbicularis* and avoid the extinction of further turtle populations, special protection zones and a captive breeding and reintroduction programme for native species are suggested (Tiziano 2004).

7.0 References
For references please see the GISD Species Profile for *Trachemys scripta elegans* (References Section).