Red-eared slider turtle

(Trachemys scripta elegans)

Test on trapping red-eared slider turtles in three waste-stabilisation ponds in La Foa (New Caledonia)

New Caledonian Nature Conservatory (CEN-NC)

■ The CEN-NC was founded in 2011 and is based in Koné. It works to encourage cooperation, facilitate negotiations and to assist in implementing the environmental strategies set by local governments in New Caledonia and the French State.

■ Its mission is to study, protect and valorise the terrestrial and marine natural areas of New Caledonia in order to ensure their integrated and sustainable management. It is particularly active in conserving dry forests, coordinating management of areas on the World Heritage List, managing the Ifrecor (coral reefs) and Dugong plans for New Caledonia and coordinating efforts against invasive alien species (IAS).

■ The IAS department of the CEN-NC develops the regulatory and monitoring tools used to implement the strategy against IASs.

■ Contact: Patrick Barrière, head of the IAS department, coordpee@cen.nc

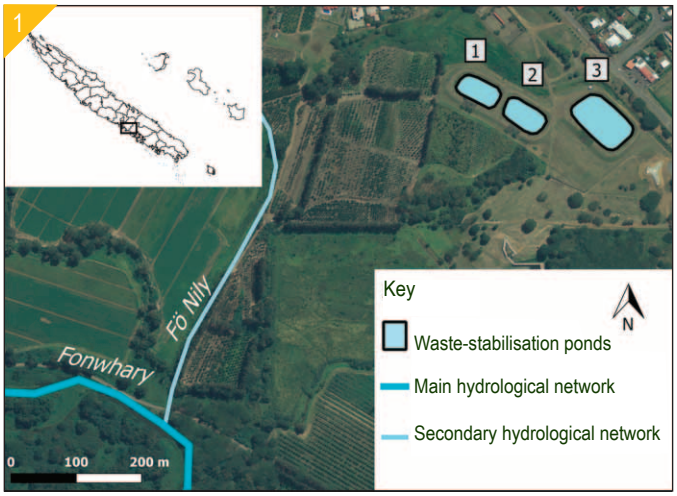
Intervention site

■ A situation conducive to a test on trapping the turtles existed in three waste-stabilisation ponds in the Nily sector of the town of La Foa (South province). The three ponds, numbered 1 to 3, covered surface areas of 2 390, 2 560 and 5 420 square metres respectively, i.e. a total surface area of 1.037 hectares. Between ponds 1 and 2, the distance is 16 metres, between ponds 2 and 3, the distance is 44 metres. The first known report of red-eared slider turtles on the site was in 2014.

■ The site is managed by the personnel of the La Foa technical department. It is located near a main river (Fonwhary) and a secondary river (Fö Nily) that are respectively 722 and 319 metres distant from the closest pond (pond no. 1). This proximity represents a risk of dissemination of the IAS to the rivers.

Disturbances and issues involved

■ Red-eared slider turtles are listed by the IUCN as one of the 100 most invasive species worldwide when introduced into a new environment.



1 - Location of the three waste-stabilisation ponds in the Nily sector of the town of La Foa. (Source: CEN-NC).

■ In New Caledonia, red-eared slider turtles were sold as pets starting in the 1970s. The animals released by people or that escaped constituted populations in natural environments. The turtles are currently present on the island of Grande Terre, but not on the six main peripheral islands.

■ The species has been listed as invasive and alien in the Environmental Codes of all three provinces (South, North and Loyauté Islands) and its import has been prohibited since 1984.

■ The zoological and forest park in the town of Nouméa set up a programme to collect red-eared slider turtles found by people, particularly in the Nouméa urban area. Over the years 2008 to 2020, almost 750 turtles were received, i.e. 57 turtles per year on average.

■ The turtles have been listed as a level-3 priority in the strategy against IASs in New Caledonia.

■ The species has been regularly observed on the La Foa site since 2014 and would appear to have established a population there. Juvenile turtles have also been observed, indicating reproduction on the site and a risk of dissemination to the nearby rivers.

■ Given that the species is omnivorous and its voracity, it represents a threat to the native fauna, though its precise impact on fish and freshwater invertebrates in New Caledonia has not yet been fully studied.

■ The species also constitutes a vector for salmonellosis.

Interventions

Context

- Given the known difficulties in trapping red-eared slider turtles around the world and the good results achieved in the Bassin de l'Or using the Fesquet cage traps[1], the technical committee of the IAS department decided in 2014 to take advantage of the conducive situation to develop and test a new model based on the Fesquet trap, but adapted to the local context.
- Given low water levels in mangroves and in many rivers in New Caledonia, the lack of indigenous freshwater turtles, no regulations prohibiting lethal trapping or the use of fully submerged traps, and the objective of developing a multicapture (i.e. several turtles without having to lift the trap after each) trapping method requiring only one visit per month, the size of the new model was set at 50 centimetres in all three dimensions.
- In addition, several baits were tested to select the most effective and capable of remaining effective in fresh water over a period of at least one month.
- Approximately 20 cage traps based on the Fesquet model were constructed and the test was launched on 2 December 2014 with four traps placed in the three waste-stabilisation ponds. It was the first pilot test for trapping in New Caledonia using a Fesquet-type cage trap requiring only one visit per month.
- A total of 4 animals were captured during the first two weeks of the test.
- Subsequently, a test protocol and monitoring sheets were prepared in view of expanding the trapping test to include various partners. Starting in January 2015, in addition to the pilot test run in La Foa, the CEN-NC carried out three training sessions for ten nature surveillance personnel in each of the North and South provinces, and for three contact persons in environmental-protection groups. During each session, approximately 20 of the new cage traps were supplied to local governments and environmental groups in order to expand the trap assessment.

2 - Training session on trapping for partners of the CEN-NC.
3 - Cage trap designed and tested (square mesh 2.5 cm, dimensions 50 x 50 x 50 cm).

Method

Traps and baits

- The main trap tested was a multicapture cage trap derived from the Fesquet trap. The traps were built using wire mesh (2 mm diameter wire) with a square grid pattern (2.5 x 2.5 cm). The traps were cubic (50 x 50 x 50 cm) and the entryway dimensions were 30 x 25 x 20 cm.
- Two hoop nets (5 cm mesh) of two different sizes were also placed in pond no. 3 on 24 April 2015. The smaller measured 60 x 45 x 20 cm and the larger 83 x 60 x 25 cm.
- Bait. At the beginning of the test on 2 December 2014, pieces of fish, cuttlefish and pork rind were placed in the traps. Pork rind resisted submersion for a month far better than the other baits and starting on 14 April 2015 was the only bait used. Pork rind may be obtained free of cost or for very little from butchers. The bait was placed in a glass jar with a punctured cover so that the smell could diffuse, but the bait could not be eaten by turtles or other predators.
- Once the bait had been set, bailer twine was tied to the cages and they were placed in the pond two to three metres from the bank using a forked branch. Cages were positioned upright on a flat bottom, completely submerged with the entryway facing the pond.
- A pair of thick, waterproof gloves were used in handling the captured turtles to avoid bites and the risk of salmonellosis.

1 - http://www.especes-exotiques-envahissantes.fr/wp-content/uploads/2017/05/Trachemyde_a_tempes_rouges_R2.pdf

Trapping effort and visits

■ The test took place from 2 December 2014 to 19 February 2020, i.e. a bit more than five years (63 months). One to four cages were placed in each of the three ponds, representing a total trapping effort of 2 628 trap-days (Table 1). One small and one large hoop net were also placed in pond no. 3 in 2015, 2017, 2018 and 2019, representing a total trapping effort of 1 664 trap-days.

Table 1. Visits and trapping effort using cage traps and hoop nets.

	2014	2015	2016	2017	2018	2019	2020	TOTAL
Number of visits to the site	3	17	7	6	4	6	1	**44**
Cage traps (trap-days)	116	1 213	443	348	346	62	100	**2 628**
Hoop nets (trap-days)		136		452	408	668		**1 664**

■ In general, the traps were inspected once every month or two months. However, due to available resources and the seasons, three-month intervals occurred three times (February to May 2016, December 2016 to March 2017, December 2018 to March 2019) and there was one six-month interval (February to August 2018). It should be noted that the activity of turtles (and consequently the possibility of capturing them) is reduced during the cool season (June to August). Visits were made as much as possible on sunny days during the warmest hours (12 to 3) in order to count any turtles at the surface of the water or on the sunning sites (rocks along some sections of the pond banks).

■ During each visit, the number of turtles observed in each pond was recorded to assess any changes in abundance (calculations were based exclusively on data collected during the summer). The traps were pulled from the water, cleaned and/or repaired if needed, and new bait was set. Data on each captured turtle included its condition (living, recent death, decomposition), sex and the length of its top shell to determine its age (juvenile, sub-adult, adult). The collected data were recorded on "trapping" and "capture" monitoring sheets.

■ Living turtles were sent to the CEN-NC and euthanized.

Unforeseen events

■ Over the five-year test period, six cage traps disappeared (suspected theft) and two were destroyed (one by a rotary cutter and one during a flood). In that the precise date of the disappearance or destruction was not known, the trapping effort was calculated by assuming that the incident occurred at the midpoint between the visits before and after the incident. Where possible, some or all of the missing traps were replaced.

Results and costs

■ Results

■ Between 2 December 2014 and 19 February 2020, a total of 47 red-eared slider turtles were captured, including 32 in the cage traps derived from the Fesquet model (a success rate of 1.22 turtles per 100 trap-days) and 15 in the larger of the hoop nets (success rate of 0.9 turtles per 100 trap-days) (Table 2 and graph next page).

Table 2. Results of monitoring and captures (numbers and trapping success).

	2014	2015	2016	2017	2018	2019	2020	TOTAL
Max. number of turtles seen per visit	20	16	13	10	11	31	3	**104**
Number of turtles captured in cages	6	12	5	5	3		1	**32**
Cage success rate (per 100 trap-days)	5.17	0.99	1.13	1.44	0.87		1	**1.22**
Number of turtles captured in hoop nets				5	3	7		**15**
Net success rate (per 100 trap-days)				1.1	0.7	1.0		**0.9**

The reduction in the number of captures and in the success rate for the cage traps between 2015 (6 captures; 5.17 turtles per 100 trap-days) and 2020 (1 capture; 1 turtle per 100 trap-days) would appear to correspond to the reduction in the estimated abundance based on the average number of turtles observed over the four months of the summer season (December to March), in spite of interannual variations, due notably to the differences in the trapping effort caused by the disappearance of six traps and the destruction of two others (see the graph on the next page).

Trapping success rate and the relative abundance for all ponds combined.

Among the 32 turtles captured in the cage traps, only two were found alive (Table 3). The 32 included 16 females, one male and 15 turtles whose sex could not be determined given the degree of decomposition. The age group could be estimated for 29 turtles, including 15 female adults (of the 16 identified) and 14 among those of indeterminate sex (8 adults, 1 sub-adult, 5 juveniles).

Table 3. Characteristics of turtles captured in cage traps.

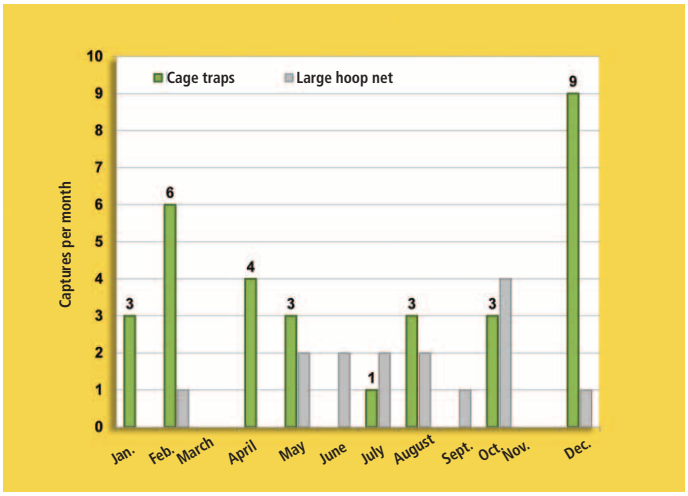
	2014	2015	2016	2017	2018	2019	2020	TOTAL
Living	2							**2**
Recently dead	2	1						**3**
Decomposed	2	11	5	5	3		1	**27**
Females	5 (4 Ad, 1 Ind)	7 Ad	2 Ad	2 Ad				**16 (15 Ad, 1 Ind)**
Males								**1 (Ind)**
Sex not determined		5 (2 Juv, 1 Sub, 1 Ad et 1 Ind)	3 Ad	3 Ad	3 Juv		1 Ad	**15 (5 Juv, 1 Sub, 8 Ad et 1 Ind)**

Age groups of turtles captured: Juv (juvenile), Sub (sub-adult), Ad (adult), Ind (indeterminate).

In addition to the turtles, five eels were captured in the cage traps, including three live eels that were released and two that were found dead.

Differences between ponds. In spite of the proximity between the three ponds and the addition of two hoop nets in the third, the success rate using the cage traps varied from 0.7 turtles per 10 trap days in pond 1 (3 captures for 419 trap days) to 0.9 in pond 3 (13 captures for 1 369 trap days) and 1.9 for pond 2 (16 captures for 840 trap days).

Differences between seasons. A total of 18 turtles among the 32 captured using the cage traps were captured during the hot season from December to March (56.2%, i.e. 1.7 turtles per 100 trap days), compared to only 4 during the cool season from June to August (12.5%, i.e. 0.7 turtles per 100 trap days, see the graph below).



Cumulative monthly captures. Hot season (December to March). Cool season (June to August).

4 - Poster to raise awareness concerning red-eared slider turtles (produced by the former GEE group).
5 - Poster listing the 68 priority IASs in New Caledonia (the turtles are a level-3 priority).

Costs

The cost of the materials for the tested cage traps was 1 300 FCFP (approximately 11 euros) and each trap took about 3.5 hours to build.

The test took place over a period of 63 months, from December 2014 to February 2022, i.e. a bit longer than five years.

A total of 44 visits were made to the ponds, i.e. generally one visit per month. Given the distance between CEN headquarters (in the town of Koné) and the village of La Foa, and in spite of the fact that visits were generally combined with other trips to the area, each visit took approximately five hours including the travel time. Consequently, the 44 visits over 63 months represented a total of 220 hours or 27.5 work days.

Information on the project

The poster to raise awareness on the impact of the turtles and inform on its management was produced and distributed in 2010 by the former Invasive Species Group (GEE).

The poster listing the 68 priority invasive alien species for the IAS strategy, with the Red-eared slider turtle as one of the level-3 priorities, was widely disseminated among CEN partners and other stakeholders, notably in the town of La Foa.

■ An information notice edited by the CEN was regularly distributed on the island of Grande Terre on sites where red-eared slider turtles were reported, notably by the environmental authorities, as well as during information campaigns by the CEN and via the internet.

Outlook

■ Following the test, a new cage trap was built using plasticized wire mesh (wire 2 mm in diameter) with a larger grid pattern (5 x 7.5 cm) in order to reduce the cost (725 FCFP, i.e. 6 euros per trap), the time required to build it (only two hours), the weight (2 kg) and to capture more selectively by allowing mid-sized eels and fish to escape.

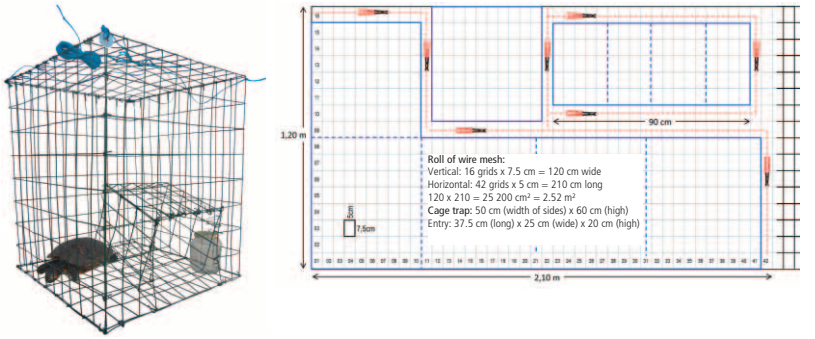


Illustration and cut-out drawing of the new cage trap (mesh 5 x 7.5 cm, trap size 50 x 50 x 60 cm).

■ New cage traps will soon be made available to the technical personnel of the town of La Foa, to compensate the traps stolen and to pursue the trapping effort and monitoring in the three waste-stabilisation ponds.

■ New cage traps will also be available for any persons wishing to participate in the test and to trap red-eared slider turtles near their homes.

■ Efforts to raise awareness and to communicate with the public on the problem caused by red-eared slider turtles in the natural environment have been continued.

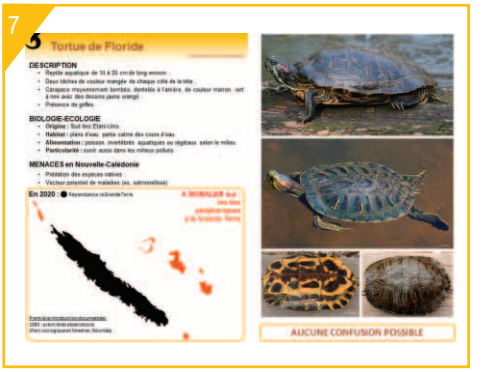
■ In the framework of the territorial strategy to manage IASs in New Caledonia, seven new guides and seven posters specific to the seven main islands of the archipelago were disseminated in the beginning of 2021. The "STOP the INVADERS. If you see them, REPORT THEM" guides are designed for the entire Caledonian population to enable people to monitor and report any new IAS that may represent a threat. That is why red-eared slider turtles are listed in the documents for the six secondary islands (not Grande Terre) where they have not yet been observed.

Regulations

■ In the South province, the Environmental code prohibits "the introduction in the natural environment, whether through negligence or imprudence, the production, ownership, transport, use, trade, transfer at cost or free of cost, offer for sale, sale or the purchase of a live specimen" of the Red-eared slider turtle. Infractions are liable for two years of imprisonment, for a fine of 17 850 000 FCFP (148 750 €) and for the fine foreseen for class-4 offences in the Penal code.

6

7



6 - Information notice on red-eared slider turtles published by the CEN-NC.
7 - Identification sheet for red-eared slider turtles in the "STOP the INVADERS. If you see them, REPORT THEM" guide.

■ In the North province, the Environmental code prohibits "the breeding, raising or the multiplication by any means, the transport, trade, use, offer for sale, sale or purchase, introduction, whether intentional or non-intentional through negligence or imprudence, in the natural environment of a live specimen" of the Red-eared slider turtle. Infractions are liable for a fine of one million FCFP (8 333 €) and for the fine foreseen for class-4 offences in the Penal code.

■ Environmental codes of the three provinces in New Caledonia:

- Environmental code of the South province, 2020. Book II. Protection of the natural heritage, Title IV. Efforts against invasive alien species, Art. 261-1 to 262-3; 28 May 2020, p. 108 - 165;
- Environmental code of the North province, 2020. Book II. Protection and valorisation of the natural heritage, Title VI. Invasive alien species, Art. 250-1 to 250-9 ; 13 March 2020, p. 74 - 76 ;
- Environmental code of the Loyauté Islands province, 2020. Book II. Protection and valorisation of the natural heritage and of the associated cultural interests, Title V. Efforts against invasive alien species, Art. 251-1 to 253-4 ; 04 August 2020, p. 26 - 31.

Authors and contributors: Laure-Line Lafille (CEN-NC), Ken Cadin (CEN-NC), Julie Mattei (CEN-NC), Patrick Barrière (CEN-NC) and Clara Singh (IUCN French committee).

2022 edition

For more information...

■ https://www.cen.nc/documents/espece-senvahissantes/

■ CEN 2017. Strategy against invasive alien species in the natural environment of New Caledonia; framework document, 107 p. (In French)

■ CEN 2015. Trapping protocol, Monitoring sheet for trapping and capture of red-eared slider turtles, 3 p. (In French)

■ CEN 2019. Strategy against invasive alien species in the natural environment of New Caledonia; Summary and poster of the 68 priority IASs in New Caledonia, second edition, 12 p. (In French)

■ Fillon A., Gendre T. & Couronne M., 2013. The Fesquet trap, at last an effective trap for red-eared slider turtles! Record capture rates in the Or Pond using a new trap. Board for the Bassin de l'Or, CEN Languedoc-Rousillon, 9 p. (In French)

■ Hytec & Mary N., 2010. Study on the invasive nature of certain plant and animal species introduced in freshwater environments in New Caledonia. Part 4. *Trachemys scripta elegans* (red-eared slider turtle). Study report for the North province, Economic-development and environment department, Environmental service, and for the South province, Environmental department, Terrestrial-environments service, 428 p. (In French)

■ Pascal M., Barre N., De Garine-Wichatitsky M., Lorvelec O., Fretey T., Brescia F. & Jourdan H., 2006. Vertebrate communities in New Caledonia. Invasions and disappearances. IRD, Invasive species in the New Caledonian archipelago, p. 111-162. (In French)