Acting in favour of marine turtles in French Guiana

The essence of the National Action Plan 2014-2023

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RÉPUBLIQUE FRANÇAISE

Ministère de l'Écologie, du Développement durable et de l'Énergie

Ministry of Ecology, Sustainable Development and Energy (France)

www.developpement-durable.gouv.fr

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This document should be cited as follows:

Entraygues M., 2014. Marine Turtle National Action Plan for French Guiana. L'essentiel. ONCFS. 55 p.

Contents

A. ANALYSIS OF THE CONSERVATION STATUS OF MARINE TURTLES IN FRENCH GUIANA

The analysis of the conservation status is based on 2 primary and 3 secondary criteria:

1. **The species' status and population trend**
2. **The species' mortality factors**
3. The species' habitat
4. The species' distribution
5. Perspectives for the future

•LEATHERBACK

STATUS:

Level of analysis	Status	Source
Global	Vulnerable (VU)	*UICN, 2014*
West Atlantic Ocean	Least Concern (LC)	*UICN, 2014*

POPULATION TREND:

Summary of population trends (cf. I/C.2 for more details):

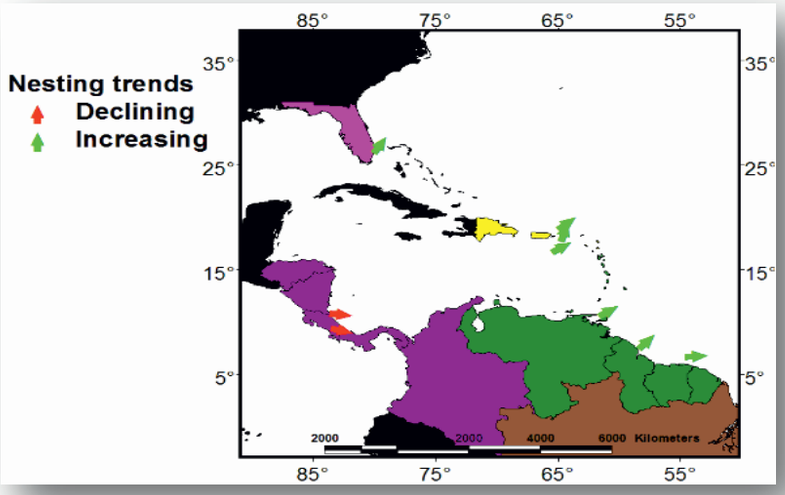
Level of analysis	Population trends	Source
Global	Declining	*IUCN*
West Atlantic Ocean	Increasing	*IUCN/NOAA*
Regional	Western sub-population: declining since the 1990s	*PRTM data (raw data not weigthed for monitoring efforts)*
	Eastern sub-population: increasing between2000 and2013	

Regional trends are only given as an indication, since all the data have not been adjusted to take into account variations in monitoring efforts.

The status of the leatherback (*Dermochelys coriacea*) depends on the scale at which the analysis is conducted. According to IUCN, the world population is still declining but the status of the species has been reviewed and shifted two levels up from 'critically endangered' (CR) to 'vulnerable' (VU) due to an increase of the number of nests at several known rookeries.

However, the situation of the species is extremely variable. It is strongly declining in some regions, especially in those of the Pacific Ocean. The Western Atlantic sub-population is numerous and increasing at several rookeries (Figure 1), and its status is considered of 'least concern' (LC).

Figure 1: Trends in the number of nests per country (NOAA 2007)[1]



✓ However, at the regional scale and according to the separate analysis of eastern and western data, the Western French Guiana 'sub-population' (Awala-Yalimapo beaches) has been decreasing since at least the 1990s. This local trend contrasts with that observed and described for the Western Atlantic population.

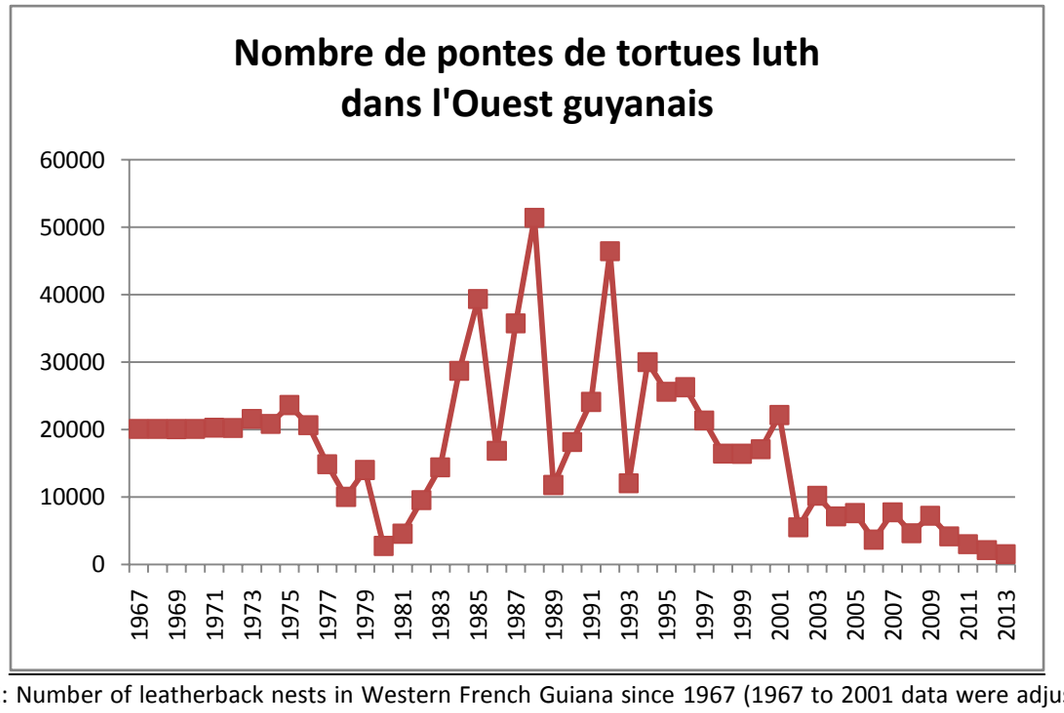


Figure 2: Number of leatherback nests in Western French Guiana since 1967 (1967 to 2001 data were adjusted to take into account variable monitoring efforts, according to the method developed by Girondot. Regarding the isolated western sites, data are available for 1970, 1971, 1972, 1987, 1988 (partial data) and 2002. It was considered that after 1970-1972 the number of nests on western beaches averaged 1000 nests per year and per available beach. In case of a gap in beach availability data, a linear regression between the two known flanking data points was used.)

[1] Thompson et al. 2001. Stock assessment of leatherback sea turtles of the western north Atlantic. Pages 68-104 in S.F.S.C. National Marine Fisheries Service. *Stock assessment of loggerhead and leatherback sea turtles and an assessment of the impact the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North atlantic. NOAA Technical memorandum NMFS-SEFSC-455.* National Marine Fisheries Service, Southeast Fisheries Science Center, Miami, United-States.

The Western French Guiana population (pooled with the Eastern Suriname population) represented until recently a large part of the global population. The nesting beaches of the sector of the Maroni estuary, on either side of the border between French Guiana and Suriname, was but a few years ago used by 40 % to 50 % of the world population of female leatherbacks (Spotila et al.1996; Rivalan 2006).

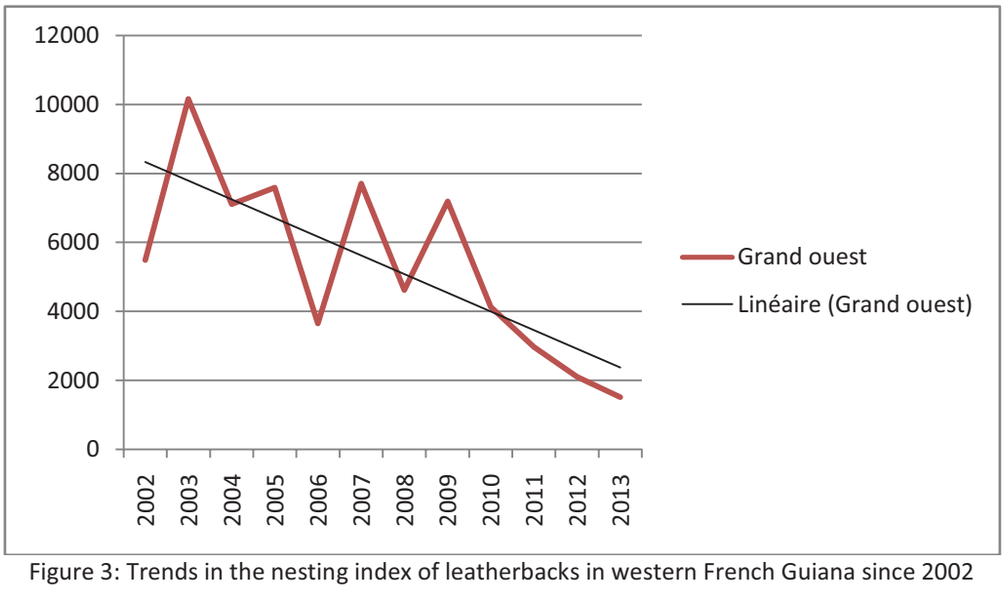


Figure 3: Trends in the nesting index of leatherbacks in western French Guiana since 2002 (data not adjusted to take into account variations in monitoring efforts)

✓ The population of Eastern French Guiana, on the other hand, followed an almost continuous uptrend from the beginning of the 2000s until 2009, dropped between 2009 and 2012, and increased again in 2013. The trend observed is therefore generally positive (Figure 4).

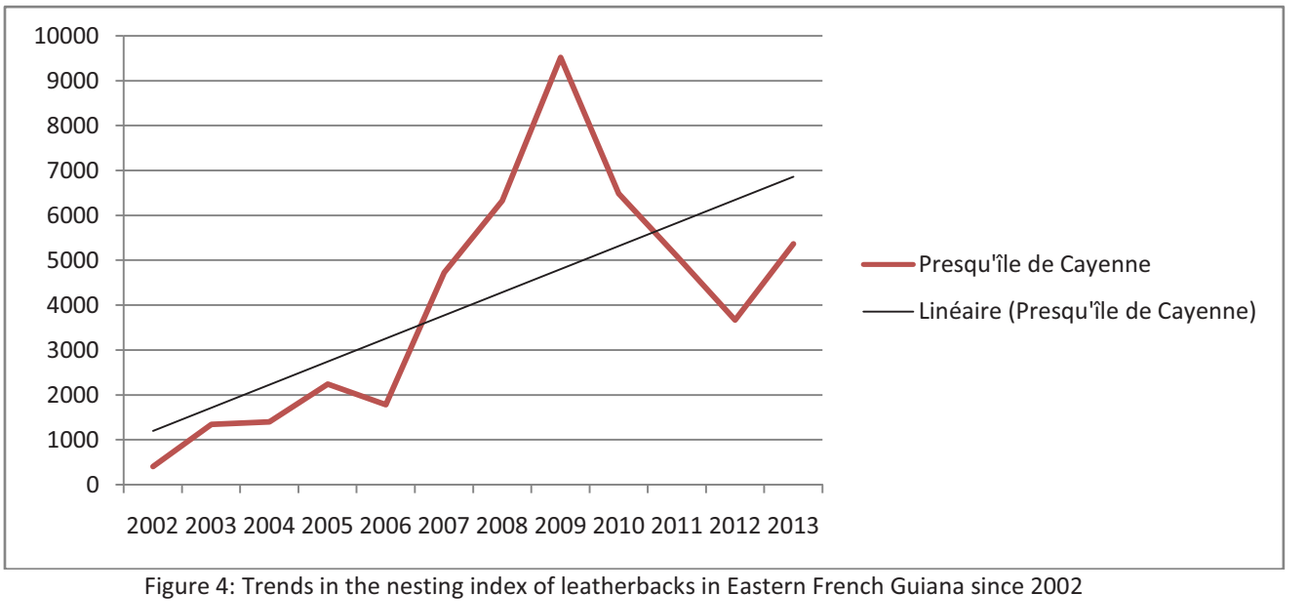


Figure 4: Trends in the nesting index of leatherbacks in Eastern French Guiana since 2002 (data not adjusted to take into account variations in monitoring efforts)

The strong reduction in the number of nests in Western French Guiana raises questions as to this population and the causes of its decline.

MORTALITY FACTORS

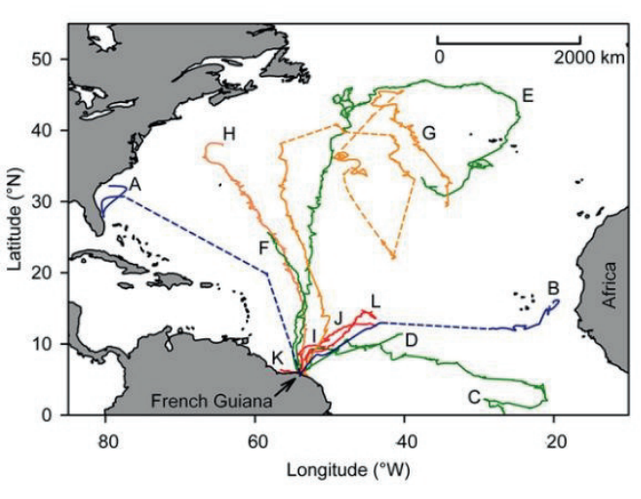
- Background information:

What could explain the strong decline observed in the Western French Guiana sub-population since 25 years?

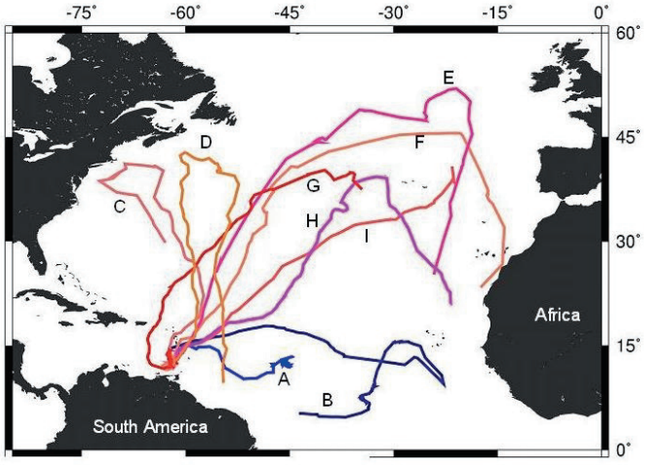
The Western Atlantic populations are increasing (Thompson *et al*. 2001; NOAA 2007). The decrease observed has not been reported from other rookeries monitored in the Caribbean, Virgin Islands and southern Florida. The Western French Guiana sub-population is part of the Western Atlantic population but exhibits a reverse trend. However, according to Molfetti et al. (2013), if one considers the 'island model' principle rather than the metapopulation theory, the situation does not seem so paradoxical, given that sub-populations can exhibit distinct histories and behaviours while at the same time being part of a greater encompassing unit.

Telemetry monitoring data show that these different populations disseminate widely in the ocean and use the same or adjacent feeding areas.

The causes of the Western French Guiana (and Suriname?) population's decline should not be sought in the oceanic province where all leatherbacks from the Caribbean breeding groups disseminate (including those of the Virgin Islands, Florida and French Guiana/Suriname) (Eckert 2001, Ferraroli *et al.* 2004, Hays *et al.,* 2004) (Figure 5), but rather in the neretic province, or even in those coastal waters used by the Western French Guiana/Suriname population. In keeping with this hypothesis, we note that the high seas fisheries of the North Atlantic are much smaller than those of the Pacific (Laurent *et al*. 1999); for example, no Asian country has fisheries using drift nets (a severely impacting type of net) in the Atlantic (ICCAT 1998), and moreover the number of captures and level of mortality produced at the scale of this ocean appear moderate (Laurent *et al*. 1999).



Yalimapo beach (Ferraroli et al. 2004)



Caribbean (Hays et al. 2004)

Figure 5: Telemetry monitoring of leatherbacks equipped in French Guiana and in the Caribbean.

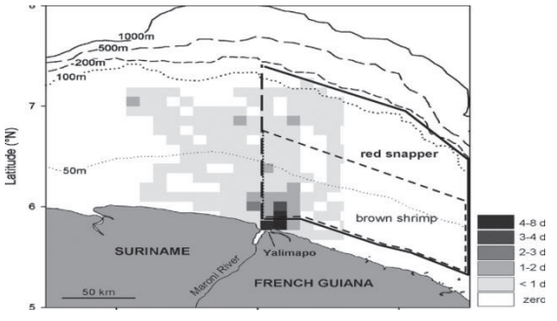
- Possible factors of decline:

At the regional level, at least two elements may play a role in the observed population decline: a high rate of breeding females mortality and/or a drop in the quality of the nesting site leading to poor hatch success. In other terms, the important indicator is the ratio of breeding females mortality rate to recruitment rate. A third hypothesis would involve a geographical shift of the population towards other nesting sites.

First hypothesis: a high mortality rate of breeding females

Between a season's successive clutches, breeding females stay in the vicinity of the rookery. They spend 80 % of their time within 20 km of the Maroni estuary (Figure 6), with frequent cross-border movements (Ferraroli *et al.* 2004).

Figure 6: Topographic representation of space use by 10 Argos-tracked leatherback turtles during their inter-nesting movements off French Guiana in relation to bathymetry and local fisheries targeting red snapper (*Lutjanus purpureus)* (bold continuous line) and brown shrimp (*Penaeus subtilis)* (fine dashed line). The hue of grey reflects total time (in days) spent by the turtles in each 0.1° x 0.1° square (Ferraroli et al. 2003, updated by Georges et al. 2007).



The introduction of TTED (trash and turtle excluding device) in 2011 resolved the issue of accidental captures caused by interactions with shrimp fishing (which has a low impact on leatherbacks). All the trawlers currently in activity are now equipped.

Longline fishing (used for red snapper) may occasionally result in accidental captures or lethal wounds. Although the capture rate (estimated between 0 and 2.4 per 1000 hooks[2]) is not the highest reported for turtles (in comparison with the 0-14 captures per 1000 hooks reported for loggerheads), it is estimated that between 50,000 and 60,000 leatherbacks have been caught worldwide by longlines in 2002. Even though the use of longlines is fairly limited, the level of interaction in French Guiana should be assessed and mitigations measures implemented (it is possible to reduce capture rate by 65 % to 90 % by changing the type of hook used – opting for e.g. circle hooks – as well as the type of bait; NOAA 2004).

The leatherback is overall the most sensitive species to coastal fishing nets. A study based on interviews of fishermen estimated that leatherbacks account for 70 % to 85 % of sea turtles caught by coastal gillnetters (Delamare 2005[3]).

A 2007 survey of coastal fishing pressure in the Maroni estuary (Nalovic 2008) revealed the presence of a surprising 93 active vessels, including 28 around Awala-Yalimapo. It appears that the number of vessels at Awala-Yalimapo has dropped considerably since (Chevalier, pers. com.).

[2] Lewison *et al.,* 2004

[3] Delamare, A. 2005. Estimation des captures accidentelles de tortues marines par les fileyeurs de la pêche côtière en Guyane. Mémoire de fin d'études pour l'obtention du Diplôme d'Agronomie Approfondie, Spécialisation Halieutique. Agrocampus de Rennes – WWF, 45p.

A single fisherman is currently engaged in a declaration procedure at Awala-Yalimapo, to which can be added a few small-sized traditional boats.
Moreover, the nets used are seldom very long (less than 100 m) and have a small mesh-size, which limits the risk of accidental captures. What is more, the few turtles that are caught are, in most cases, freed alive.

On the other hand, the trespassing of illegal fishing boats in French Guiana waters is well documented since the 1990s and the impact of drifting gillnets has been denounced repeatedly. These nets, several kilometers long (up to 5 km long and 4 m high[4]) have a great impact, although still difficult to quantify precisely.

Illegal tapouilles boats[5], apparently more numerous in eastern than in western French Guiana waters, can nonetheless be observed (Figure 7). The regional préfet of French Guiana, representing the Government for State Action at Sea (Action de l'Etat en Mer; AEM) and assisted by the Commandant of the maritime zone, directs all the administrations that are competent at sea in order to control illicit fishing practices, both in the western and eastern waters. The operational, legal and international framework within which this control is exercised is constantly changing (adaptation of illegal fishermen, evolution of statutory law and common law precedents, different views of neighbouring States). Consequently, it is necessary to support all the means deployed to combat illicit fishing, in eastern and western French Guiana waters alike. The State's efforts have mostly targeted the east and therefore Brazilian illegal fishing vessels, but the west is currently under increasing scrutiny. Although tapouilles boats seem less numerous in the west, their impact on sea turtles appears to be much greater due to the location of nesting sites. The importance of the area therefore justifies specific attention.

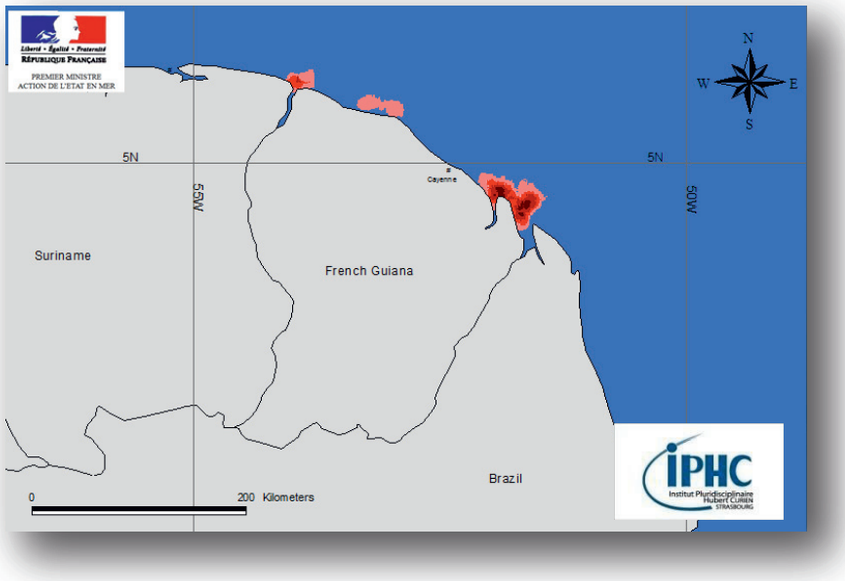


Figure 7: Density of illegal fishing activities in 2012 (the darker the hue, the greater the density).
Source: Action de l'Etat en Mer (AEM) – Data processing and mapping: CNRS IPHC (Damien Chevallier).

[4] Chevalier et al, 1998. Apports scientifiques à la stratégie de conservation des tortues luths en Guyane française

5 Name given, in French Guiana and Brazil, to the wooden boats with inbord engine that are used for fishing with nets in shallow areas.

A study showed in 2012[6] that 46 % of the leatherbacks coming to lay on Yalimapo beach exhibited wound scars, 48 % attributable to fishing nets, 44 % to sharks and 7 % to boat propellers. An average of 1.9 tapouilles boat, presumably engaged in illegal fishing activities, is currently observed at each visit to the beaches of the Amana Reserve.

The presence of Surinamese vessels, which have been observed for several years fishing on both side of the Maroni estuary, could have a substantial effect on the mortality rate of leatherbacks in the area, liable to induce a diminution of the breeding population, insufficiently balanced by the recruitment of young females reaching maturity. The alleviation of this ongoing threat should more than ever be considered an utmost priority.

Second hypothesis: poor hatch success due to decreasing quality of nesting sites

Hatch success on Yalimapo beach was estimated in three studies. All three calculated hatch success rates of 33 % to 38 %, which is fairly low for leatherbacks (usually estimated at around 60 %[7]). Hatch success estimates ranged from 33.27 % (SE= 3.37) to 38.95 % (SE= 3.51) on 48 clutches in 2001 by Torres (2002), while Maros et al. (2003) found 35.9 % (SE= 7.1) on 10 clutches over 2001 and 2002 and Caut et al. (2006) 35.5 % (SE= 1.9) on 99 clutches in 2002.

Another study examined the percentage of nests that produced at least one hatchling on Yalimapo beach in 1998 (Girondot & Tucker 1998). This percentage was found to be low, under 11 %. It is unfortunate that no comparison can be made with the Ilets Bâches site (the main rookery in the 1960s and 1970s), as this might have provided elements shedding some light on the current population decline at Yalimapo beach. Over a period of about twenty years, a very large number of leatherbacks visited and nested on Yalimapo beach. The high density of nests could have resulted in the development of microorganisms detrimental to egg development.
Moreover, a high diversity of organochlorine pesticides was found in the sand of Yalimapo beach. Even though the effects of exposition to these compounds are still little known, they would be worth exploring as a potential factor of the apparent poor hatch success on the site[8]. Other pollutants, such as mercury, have not yet been searched for but may also be present.

6 Damien Chevallier, CNRS IPHC

7 Rafferty A.R., Santidrián Tomillo P., Spotila J.R., Paladino F.V. and Reina R.D. (2011) Embryonic death is linked to maternal identity in the leatherback turtle (*Dermochelys coriacea*). Plos One, 6(6), e21038.

8 Un certain nombre de publications aborde déjà ce sujet :
Guirlet E. (2005) Ecotoxicologie et écologie de la réussite d'incubation chez la tortue luth, *Dermochelys coriacea*, en Guyane française [Ecotoxicology and Ecology of Hatching Success in the Leatherback Turtle, *Dermochelys coriacea*, in French Guiana]. Master Ecologie, Biodiversité et Evolution, Université Paris Sud, Orsay, France.
Guirlet E. (2008) Etude des facteurs écologiques et écotoxicologiques impliqués dans la réussite d'incubation chez la tortue luth, *Dermochelys coriacea*, de Guyane Française PhD thesis, Université Paris Sud, Orsay, France.
Guirlet E., Das K. and Girondot M. (2008) Maternal transfer of trace elements in leatherback turtles (*Dermochelys coriacea*) of French Guiana. Aquatic Toxicology, 88(4), 267-276.
Guirlet E., Das K., Thomé J.-P. and Girondot M. (2010) Maternal transfer of chlorinated contaminants in the leatherback turtles, *Dermochelys coriacea*, nesting in French Guiana. Chemosphere, 79(7), 720-726.

Coastline erosion may also have a negative impact on hatch success through nest destruction. In 2012, according to CNRS IPHC findings, between 10 % and 15 % of the nests were destroyed by erosion (erosion > 50 cm), with an additional 40 % of nests located in areas that suffered an erosion of 1 to 50 cm[9] and therefore exposed to destruction.

The very poor hatch success documented over several consecutive years may have affected recruitment figures observed ten years later and thereby contribute to the decline of the breeding population.

Third hypothesis: decreasing beach availability

Beach availability may have been affected by erosion-related factors (reduction of beach mileage, creation of steep erosion sand 'cliffs' limiting accessibility, decrease of beach width) leading to a drop in the number of clutches recorded from year to year and to probable re-locations to other sites, as described by Kelle et al. (2007).

HABITATS

In French Guiana, nesting sites can change very rapidly when exposed to factors related to coastline dynamics or erosion.

Beaches favourable to nesting may become unfavourable, and vice-versa. Given the sand deficit noted worldwide and the global trend of increasing coastline erosion, a drop in the availability of appropriate nesting sites is likely in the coming decades, but we are still without robust prediction tools that would enable us to set up a sound conservation strategy.

Leatherbacks are distributed in the oceanic province and migrate over large distances. They are therefore confronted to human-related threats and to the deep changes of the marine environment that result from human activities. Oceans are currently suffering from the overexploitation of their resources[10], rising pollution levels and the effects of global change.

GEOGRAPHICAL DISTRIBUTION

The leatherback is the most widely distributed marine turtle species. This proves its outstanding adaptive capacity, which is an asset in these times of global change.

[9] Perron C., *Dynamique littorale et comportement de ponte des tortues marines en Guyane française, 225pp.*

[10] The large communities of predatory fish species collapsed by 90 % over the last 50 to 100 years due to overfishing (Extinction, survival or recovery of large predatory fishes. Myers & Worm 2005)

PERSPECTIVES

Non selective fisheries, overexploitation of resources, coastal erosion, global warming[11] and pollution leave but little room for improvements in the conditions for marine turtle population growth. Local and regional actions are an absolute necessity, but they must be backed by ambitious political decisions at the international level.

CONCLUSION

Regarding western French Guiana, the analysis of the current negative trend and persisting mortality factors (concerning juveniles and adults in particular) leads us to conclude to a very unfavourable conservation status (if no natural cause is identified).

Regarding eastern French Guiana, the population trend appears positive since 2002 (in spite of persisting mortality factors, especially accidental captures). The conservation status is therefore considered favourable. It is however important to note that the current status could change very quickly. Sudden collapses of breeding populations have already been reported, especially in the Pacific Ocean[12]. Conservation efforts, in particular the control of mortality factors, thus need to be carefully targeted and reinforced with the objective to maintain the conservation status for the years to come.

The contrasting conservation status of two populations 250 km apart and monitored over several years raises a number of important scientific questions. The challenge for the coming years is not only to alleviate extant threats, but also to understand the natural and/or human-related factors at the root of this worrying situation.

Conservation status of the leatherback marine turtle in French Guiana in 2014:

WESTERN POPULATION: VERY UNFAVOURABLE

EASTERN POPULATION: FAVOURABLE

[11] It is impossible to foretell all the effects of global climate change. Given that the diet of leatherbacks is largely based on jellyfish and that global warming stimulates jellyfish proliferation, it is possible that climate change will have a positive effect on the resource and therefore on the breeding capacity of leatherbacks. Besides, global warming could affect reproduction by unbalancing the sex ratio of hatchlings in favour of females.

[12] Spotila J.R., Reina R.D., Steyermark A.C., Plotkin P.T. and Paladino F.V. (2000) Pacific leatherback turtles faces extinction. Nature, 405, 529-530.

- **GREEN TURTLE:**

STATUS & POPULATION TREND

Level of analysis	Status	Trend	Source
Global	IUCN: Endangered (EN)	Declining	*IUCN 2008*
Suriname	?	Increasing (since the 1970s)	*Reichart &Fretey 1993, Bryan Pinas, pers. com.*
French Guiana	?	Increasing (since the 2000s)	*PRTM data (raw data not weigthed for monitoring efforts)*
For the countries of the Guiana Shield, assessing the regional status is complex and requires exploitable data sets, which do not always exist.			

The **green turtle** (*Chelonia mydas*) is considered as « endangered » (EN) by IUCN and has been so since 1986. Analysis of historic and recent published accounts indicates extensive sub-population declines in all major ocean basins over the last three generations. According to IUCN, it is therefore the most threatened of the species present in French Guiana.

In French Guiana and Suriname, however, it appears that nesting is on the increase. This trend even seemed to accelerate in Suriname in 2012 and 2013, but the data needs to be verified.

The same trend is observed at the scale of the Western Atlantic Ocean, where 75 % of the populations appear to be on the rise[13].

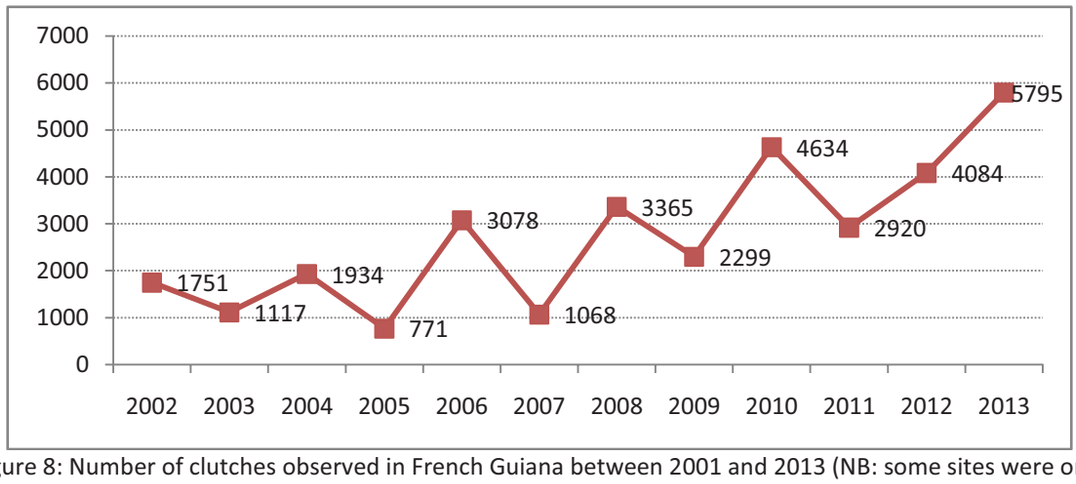


Figure 8: Number of clutches observed in French Guiana between 2001 and 2013 (NB: some sites were only monitored as from 2010)

[13] Taquet C., 2007 - Diversité et différenciation génétiques des populations de tortues vertes (*Chelonia mydas*) dans les sites de ponte et d'alimentation du Sud-Ouest de l'océan Indien : Application aux stratégies de conservation de l'espèce. Thèse de Doctorat de l'Université de la Réunion, Biologie Marine, 226p.

MORTALITY FACTORS

- Accidental captures:
  Green turtles are subject to accidental captures related to fishery activity during the nesting, feeding and migration periods. Out of a total of 16 individuals tagged in French Guiana, 2 have very probably fallen victims of fishing nets off northern Brazil during migration. In French Guiana, interactions with legal and illegal coastal fishing activities remain a serious concern that should be assessed with rigour. Collaborative projects are also needed with countries in whose waters green turtles are known to migrate and/or feed (in particular Brazil).

  The increasing demand for authorizations for offshore mining exploration activities is a potential threat that is difficult to assess.

- Other threats:
  Green turtles are highly sensitive to disturbance when they are laying. It follows that the increasing number of people who come to watch turtles landing on beaches to nest may be a real problem for this species (disturbance can prompt the turtle to leave its nesting spot – often only temporarily – and return to the sea).
  Fibropapillomatosis is a disease that affects all marine turtles, but it appears that the symptoms tend to develop more readily in the green turtle (Baboulin 2008). In certain areas of Florida and Hawaii, over half the green turtle population is affected[14][15]. High prevalence seems to coincide with shallow coastal waters affected by pollution[16].

- Lower impact threats: mostly poaching, and predation by roaming dogs. These threats have a more limited impact due to the measures implemented.

HABITATS

In French Guiana, the long-term existence of beaches is made uncertain by coastline dynamics and processes of local coastal erosion.

The marine habitat used by the green turtle (mostly the neritic province) is affected by coastal pollution (both physical and chemical), maritime traffic and non-selective fishing activities.

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[14] Balazs G.H, Pooley S.G (1991) Current status of fibropapillomas in the hawaiian green turtle, *Chelonia mydas*, In: Research Plan For Marine Turtle Fibropapilloma, NOAA Technical Memorandum NMFS SWFSC-156, 47-57.

[15] Ehrhart L.M (1991), Fibropapillomas in green turtles of the Indian River Lagoon, Florida: Distribution over time and area, In: Research Plan For Marine Turtle Fibropapilloma, NOAA Technical Memorandum SWFSC-156, 59-61.

[16] Foley A.M, *et al.* (2005), Fibropapillomatosis in stranded green turtle (*Chelonia mydas*) from the eastern United States (1980-1998): trends and associations with environmental cofactors, Journal of Wildlife Diseases, 41(1), 29-41.

GEOGRAPHICAL DISTRIBUTION

The green turtle is found in all the tropical and sub-tropical regions of the planet (Hirth 1997). It is reported from the territorial waters of a total of 140 countries, but only nests in 80 of these countries (Seminoff 2004).

Highest population densities are found in the neritic zone, along the continental coastlines and around ocean islands, where human activities are concentrated. This situation increases the risk of interaction.

PERSPECTIVES

At the global scale, non-selective fisheries, resource overexploitation, coastal erosion, global warming[17] and pollution are still serious threats to marine turtles.

Local and regional actions are indispensable but must be backed by ambitious international policies.

CONCLUSION

The number of green turtle clutches monitored since 2001 follows a positive trend in spite of identified mortality factors – in particular accidental captures. The conservation status is therefore considered favourable.

However, given the persisting threats still insufficiently assessed in French Guiana (accidental capture linked to legal and illegal fishing activities), the potential and/or observed threats along migratory routes and the development of offshore mining exploration activities in French Guiana and northern Brazil, efforts must be continued and increased with a special focus on threat alleviation in order to preserve the status of conservation in the years to come.

Conservation status of the green turtle in French Guiana in 2014: FAVOURABLE

[17] The effects of climate change are impossible to predict. Warming could in particular affect reproduction through unbalancing the sex-ratio in favour of females.

- **OLIVE RIDLEY**

STATUS & POPULATION TREND

Level of analysis	Status	Trend	Source
Global	IUCN: Vulnerable (VU)	Declining	*UICN 2008*
Suriname	?	Declining (since the 1970s)	*Reichart &Fretey 1993, Mohadin 1999, Marcovaldi 2001*
French Guiana	?	Increasing (since 2000)	*Kelle et al. 2009, Plot et al. 2011*
Brazil	?	Increasing (since 1990)	*Da silva et al. 2007*
For the countries of the Guiana Shield, the evaluation of the regional status is complex and requires exploitable data sets, which do not always exist.			

IUCN considers the status of the olive ridley (*Lepidochelys olivacea*) as « Vulnerable » because the number of breeding females is decreasing in sites that have been monitored over 2 to 3 generations.
The species is not abundant in the Atlantic Ocean. The main rookeries in the Western Atlantic are in Brazil and French Guiana, where populations are currently rising. The decline in clutch number observed in Suriname since the 1970s and the apparent increase of nesting activity in French Guiana have been interpreted as breeding females shifting their laying sites from Suriname to French Guiana rather than as a recruitment of new breeding adults (Kelle, Gratiot & De Thoisy 2009).

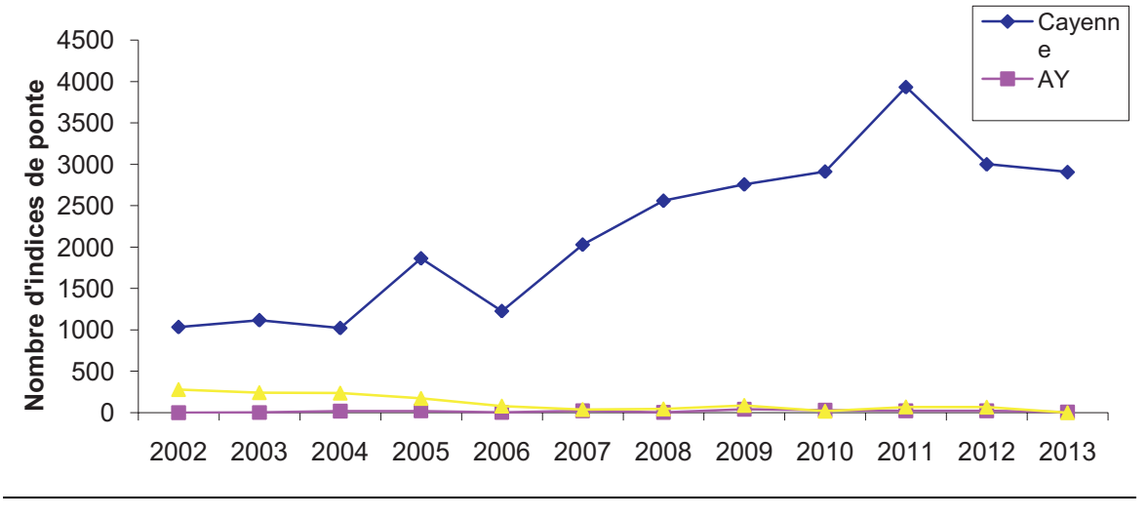

Figure 9: Number of clutches recorded (nesting index) between 2002 and 2013 on the beaches of French Guiana (raw data not weigthed for variable monitoring efforts)

MORTALITY FACTORS

- Accidental captures: Olive ridleys are heavily impacted by accidental captures and are especially vulnerable to shrimp trawling. All the fisheries of the Guiana Shield now use selective trawling gear (TTEDs in French Guiana since 2011 and TEDs in Suriname since 1992, Mohadin 2000). In theory, therefore, the main threat is eliminated (although it is certain that TTEDs are used in French Guiana, information is more difficult to come by concerning their use in Suriname, for example).

  Interactions with legal and illegal coastal fishing activities remain a serious concern, which needs to be assessed with rigour over the coming months and years, in particular due to the nesting behaviour of this population, in which the breeding females concentrate (arribadas) in areas where fishing activity is high.

  The increasing demand for authorizations for offshore mining exploration activities is a potential threat that is difficult to assess.

- Lower impact threats: mostly poaching and predation by roaming dogs. These threats are currently decreasing due to the measures implemented.

HABITATS:

As for other species of marine turtles, coastline dynamics and erosion processes can affect nesting sites very quickly. Some highly favourable nesting beaches, in particular isolated sites, are at risk of disappearing entirely. However, new sites may also be created, but in a way that is unpredictable for the time being.

As in the case of the green turtle, the marine habitats used by the olive ridley (mainly the neritic province) are exposed to coastal pollution (both physical and chemical), maritime traffic and non-selective fishing activities.

GEOGRAPHICAL DISTRIBUTION

The olive ridley has a widespread distribution and is found in all the tropical and subtropical basins. However, it appears to be the least abundant species in the Western Atlantic Ocean, where only two main breeding sites are known, including one in French Guiana.

Besides, it is mainly found in the neritic zone, which is also where the most heavily impacting human activities are concentrated.

PERSPECTIVES

Non selective fisheries, overexploitation of resources, coastal erosion and climate warming[18] leave but little room for improvements in the conditions for marine turtle population growth. Local and regional actions are an absolute necessity, but they must be supported by ambitious political decisions at the international level.

CONCLUSION

Since 2002, the breeding population of French Guiana follows a positive trend in spite of existing factors of mortality, in particular accidental captures. The conservation status is therefore considered to be favourable.

However, given the very low population numbers so far, persisting threats still insufficiently evaluated in French Guiana[19] (legal and illegal fishing by-catch), the potential threats to migratory corridors, the importance of the breeding site at the scale of the Western Atlantic Ocean and the development of offshore mining exploration activities in French Guiana and northern Brazil, current efforts must be continued and increased with a special focus on threat alleviation in order to preserve the status of conservation over the coming years.

Conservation status of the olive ridley in French Guiana in 2014 : FAVOURABLE

[18] The effects of climate change are impossible to predict. Warming could in particular affect reproduction through unbalancing the sex-ratio in favour of females.

[19] In spite of the increasing number of olive ridley clutches recorded in Brazil (de Castilhos & Tiwari 2006), the species is still facing interactions with non selective trawling gear in the Western Atlantic Ocean, especially in Brazil (Da Silva *et al.* 2007). Consequently, the olive ridley is still under threat in the Western Atlantic Ocean, in spite of the upgrading of its IUCN status from Endangered to Vulnerable in 2008. The discrepancy between the global and regional situations stresses the need for regional assessments for these widely distributed species (Seminoff 2004, Mast et al. 2006).

B. INTERVENTION STRATEGY

The National Action Plan (NAP) proposes a realistic intervention strategy based on the prioritization of identified conservation issues. The strategic intervention framework is organised around three main axes, of which the principal is **threat alleviation (Specific Objective 1: SO1)**, backed by two other axes, namely, research on breeding populations and research on threats (Specific Objective 2: SO2).

These three axes are directly connected with transboundary cooperative actions (Specific Objective 3: SO3). The 'environmental education' (Specific Objective 4: SO4) and 'promotion as socio-economic asset' (Specific Objective 5: SO5) additional axes are at the interface between the three main axes and contribute to the overall objective.

Actions concerned with the networking of the actors (SO6) and with governance (SO7) are peripheral and participate to the general operation of the NAP (Figure 10).

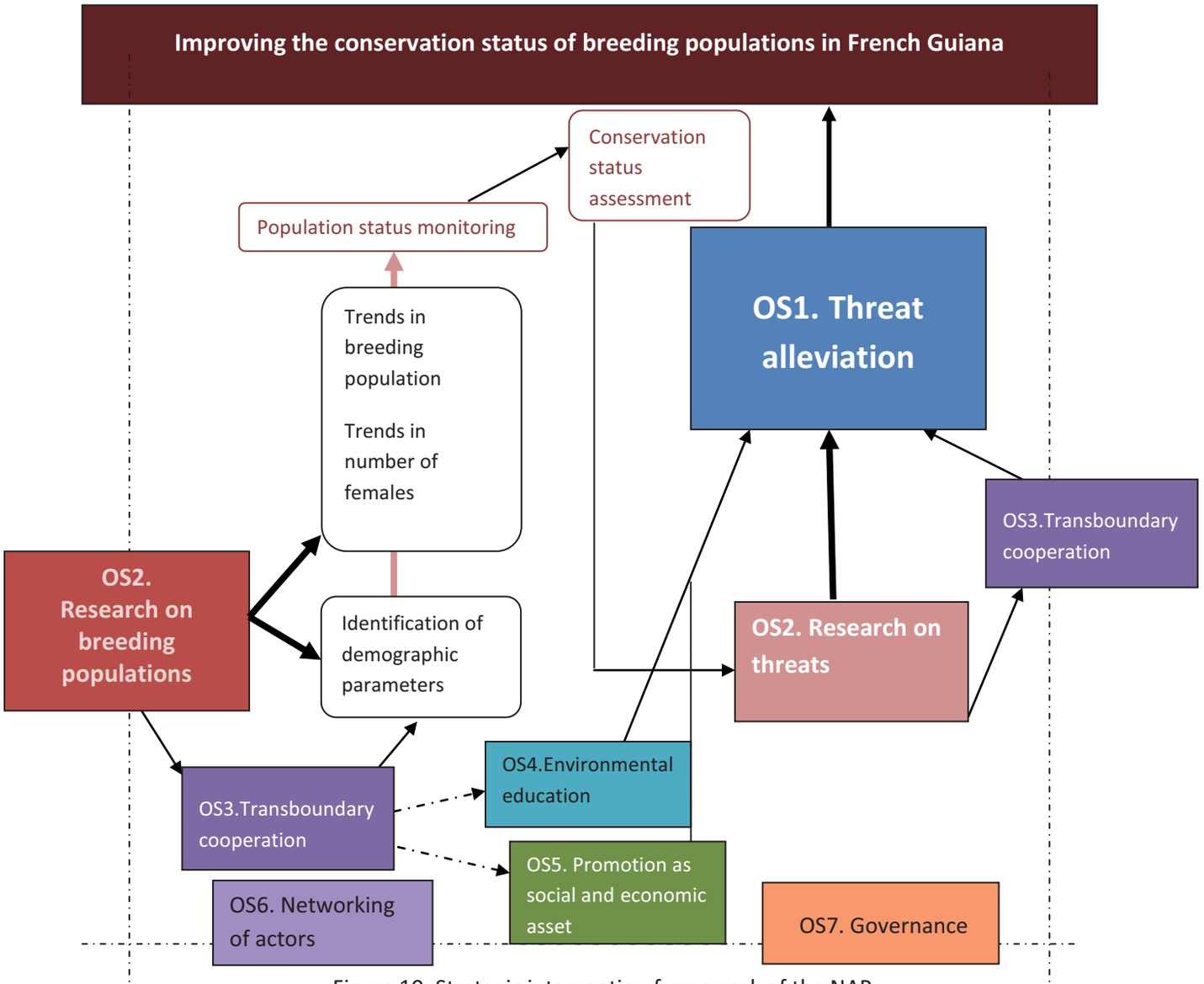

Figure 10: Strategic intervention framework of the NAP

C. LOGICAL FRAMEWORK

Objective of the National Action Plan

Improving the conservation status of marine turtles in French Guiana

Five specific objectives to meet the overall objective, in order of decreasing importance, plus two cross-cutting objectives

1. Alleviating threats: top priority.

A conservation plan is expected to implement practical measures to improve the conservation status of the target species. This improvement depends on the application of measures to reduce the impact of identified and/or anticipated threats intervening during the duration of the plan. In this Plan, each threat is identified and prioritized according to predetermined criteria.

2. Research for conservation:

Above all, advancement in knowledge should be tailored so as to meet conservation objectives and address issues directly linked to conservation actions. Population monitoring (number of nests, number of breeding females) and the estimation of demographic parameters are elements used for the evaluation of the threat-alleviating measures. Furthering knowledge can also concern the threats themselves (assessment and quantification). A number of sub-objectives in this section can therefore be used directly as inputs to threat alleviation sub-objectives.

The monitoring of isolated sites: a scientific, technical and financial challenge

In French Guiana, many potentially important nesting areas are in remote locations. Coastline dynamics makes rapid changes to the shoreline, leading to the wearing away or disappearance of beaches in some places, and to the expansion or generation of new ones elsewhere. This dynamic situation calls for quick reaction on the part of monitoring teams (availability of technical and financial resources) and for flexible protocols adaptable to local conditions. The implementation of appropriate measures on new breeding sites, difficult to plan in advance, will require the active involvement of all the actors.

Conservation actions in favour of marine turtles, which are migratory species, obviously cannot be limited to nesting and feeding sites. Cooperation with countries directly concerned by the target species (Suriname, Guyana, Brazil) should be developed and, more generally, international cooperative actions need to be reinforced.

4. Environmental education.

Environmental education aims to disseminate knowledge and values, promote appropriate behaviours and develop the necessary skills to take part efficiently and responsibly in preventing and solving problems related to the cohabitation of human beings and the environment and to the maintenance or restoration of environment quality.

Environmental education applied to marine turtles directly fosters a feeling of ownership of turtle conservation issues. The actions that will be developed as part of this specific objective will need to address target issues with respect to disseminating and sharing knowledge and to improving behaviours and skills.

5. Promotion as social and economic asset

For marine turtle conservation to be successful in French Guiana, a collective sense of ownership of conservation issues needs to be elicited. Value-adding constitutes the economic aspect of conservation actions and, when it is allowed to develop in a well-defined and integrated framework, contributes to the success of conservation schemes because social and professional stakeholders feel they have some ownership of the project. As a source of jobs and development, the protected species, instead of symbolizing regulations and restrictions, becomes a valuable asset for sustainable economic development that obviously needs to be managed carefully.

In French Guiana, marine turtles are iconic species, which have been only recently put to the fore in tourist information media. They provide a unique sight every year and their attraction potential is still underused. The National Action Plan, building on existing surveys and diagnoses, could help to identify key actions likely to foster the emergence of eco-touristic activities focusing on sea turtles.

As well as two cross-cutting specific objectives:

6. Networking actors

In French Guiana, numerous actors are concerned by the issue of marine turtles, whether research organisms setting up scientific programmes, non-governmental organizations and associations involved in population monitoring, conservation and awareness-raising, local authorities that increasingly take into consideration conservation issues in their development policies, or social/professional actors

interacting with sea turtles (such as fishermen), stakeholders of the tourism sector wishing to make the most of these species, or civil security enforcement agents actively participating in their conservation.

In this context, the networking of these actors appears essential at various levels:

- to encourage the sharing and dissemination of information;
- to foster mutual knowledge and contribute to identifying each networker's roles and particular skills;
- to promote the notion of network of actors, much more easily grasped and clearly visualized by the general public than the proliferation of independent actors and actions.

7. Governance

One of the conclusions of the evaluation of the first Restoration Plan (PRTM 2007-2012) insisted on the need to give back some decision-making power to the Steering Committee. The ambition of this 7th Specific Objective should be to review the definition of the Steering Committee's roles and to provide practical and innovative elements regarding the governance of the NAP, encouraging a widening of the panel of actors, especially in direction of the local authorities.

D. DURATION OF THE PLAN

The first Restoration Plan (PRTM 2007-2012) was to be implemented over a period of 5 years. Given the results and the recommendations of the evaluation of the first Plan, the national authorities decided to pursue their conservation policy regarding these species with a second Plan to be implemented **over a period of 10 years**. In order to meet the conservation challenges posed by long-lived species such as sea turtles, it is important to match the duration of the plan with the biology of the species concerned and the nature of the expected findings (in the case of marine turtles, due to the long generation interval, population trends have a certain inertia and react with some time-lag to measures taken for improving their conservation status).

E. SUMMARY OF ACTION CARDS

- SYNTHETIC PRESENTATION OF SPECIFIC AND OPERATIONAL OBJECTIVES

OP3	Train and share
OS5	**PROMOTING AS SOCIAL AND ECONOMICAL ASSET**
OP1	Develop eco-tourism products around marine turtles on the short term
OP2	Create favourable conditions for reinforcing the development of eco-touristic activities focusing on marine turtles on the medium term
OS6	**NETWORKING ACTORS**
OP1	Promote the notion of network of actors
OS7	**GOVERNANCE**
OP1	Review decision-making and monitoring procedures in the NAP
OP2	Guarantee transparency of information
OP3	Ensure access to information
OP4	Ensure opportunity for each partner to express opinion

1ST SPECIFIC OBJECTIVE: ALLEVIATING THREATS

(Priority objective)

OS1	Groups of objectives	Operational objectives	Sub-objectives	Card n°	Threat level* (1 to 5)	Threat trend	Schedule and degree of priority									
							2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ALLEVIATING THREATS	Alleviating threats at sea	Limit the impact of offshore mining activities	Limit oil survey disturbances	1		↗	3	3	3	3	3	3	3	3	3	3
			Limit the impact of exploration and production drillings and wells	2		↗	5	5	5	5	5	5	5	5	5	5
			Limit the impact of potential major accident	3		→	2	2	2							
		Reduce fishing by-catch in French Guiana	Reduce illegal drift gillnet fishing	4		→	1	1	1	1	1	1	1	1	1	1
			Limit by-catch in legal coastal fishing	5		→	2	2	2	2						
			Monitor appropriate implementation of TTEDs	6		↘	4	4	4	4	4	4	4	4	4	4
			Reduce number of coastal fishing nets (recreational fishing) during the nesting season	7		→	3	3	3	3	3	4	4	4	4	4
			Limit potential impacts of longline fishing	8		→				4	4					
	Alleviating threats on land	Reduce the disturbance of hatchlings and adults	Prevention and control of incivilities	9		→	3	3	3	3	3	3	3	3	3	3
		Reduce disorientation of hatchlings and adults	Reduce sources of light pollution	10		↗	3	3	3	3	3	3	3	3	3	3
		Reduce predation by dogs	Reduce predation on nests, hatchlings and adults	11		↘	3	3	3	3	3	3	3	3	3	3
		Reduce egg poaching	Pursue and adapt patrolling activities in the field	12		↘	3	3	3	3	3	3	3	3	3	3
		Reduce man-related causes of nesting site degradation	Limit man-made degradation of nesting sites	13		↗	4	4	4	4	4	4	4	4	4	4
			Limit interventions enhancing erosion impacts	14		↗	4	4	4	4	4	4	4	4	4	4

*Table 1: Summary of Specific Objective 1 "Alleviating threats", **including schedule***

OS1	Groups of objectives	Operational objectives	Card n°	Sub-objectives	Threat level (1 to 5)	Threat trend (1 to 5)	Means/actions	Priority
REDUCTION DES MENACES	Alleviating threats at sea	Limit the impact of offshore mining activities	1	Limit oil survey disturbances		↗	Produce a document summarizing direct threats (disturbance/frightening offof turtles) and indirect threats (impact on resources and resource availability)	3
			2	Limit the impact of exploration and production drillings and wells		↗	Obtain from oil industry and DEAL objective information on the characterization of potentially impacting diffuse pollutions	5
			3	Limit the impact of potential major accident (hatching=potential threats)		→	Prepare an emergency response plan specifically designed for marine turtles in case of oil spill or major accident Prepare an environmental sensitivity map of the coastline prioritizing areas for intervention with respect to turtles	2
		Reduce fishing by-catch in French Guiana	4	Reduce illegal drift gillnet fishing		→	Strengthen means for illegal fishing control in the west (operations in the coastal zone, purchase of a light vessel by the Amana Nature Reserve) Gather data on IUU fishing in the west(develop network of volunteers, experiment with light aircraft) Encourage legal and administrative response in the west (obtain site for deviating and neutralizing tapouilleboats) - Lobby at the European Commission Optimize interventions of State action at sea (AEM) in the west (seasonal timing, cooperation with Suriname, supportive action from National Hunting and Wild Fauna Office (ONCFS) and Amana Nature Reserve, monitoring network) Encourage and monitorthe delimitation of the French Guiana-Suriname boundary Schedule additional interventions ofthe National Hunting and Wild Fauna Office (ONCFS) with the Amana Nature Reserve Develop cooperation with fishermen from neighbouring countries and the promotion of environmentally-responsiblefishing practices	1
			5	Limit by-catch in legal coastal fishing		→	Pursue interaction assessments through on-board observation campaigns Experiment with alternative fishing gear and practices	2
			6	Monitor appropriate implementation of TTEDs		↘	Encourage adoption and ownership of TTEDs by professionals Assess problems experienced and extent of use of TTEDs through surveys	4
			7	Reduce number of coastal fishing nets (recreational fishing) during the nesting season		→	Information campaign by the National Hunting and Wild Fauna Office (ONCFS) Illegal fishing nets retrieval campaign by the environmental police (SMPE) during the nesting season Salvage turtles ensnared in fishing nets: intervention by the fire and rescue service (SDIS), withholding of the fishing nets by the environmental police (SMPE);seasonal timing	3
			8	Limit potential impacts of longline fishing		→	Assess the impact of longline fishing through observation campaigns Experiment if needed with alternative techniques (e.g. circle hooks)	4
	Alleviating threats on land	Reduce the disturbance of hatchlings and adults on beaches	9	Prevention and control of incivilities		→	Make sure animators are present at nesting sites Integrate Action Card n°.... of the Environmental Education element Extend information materialson each nesting site	3
		Reduce disorientation of hatchlings and adults	10	Reduce sources of light pollution		↗	Propose financial support to adaptprivate outdoor lighting equipment of concern Identify and adaptpublic outdoor lighting equipment of concern Ensure this objective is taken into account in public events and development schemes	3
		Reduce predation by dogs	11	Reduce predation on nests, hatchlings and adults		↘	1. Capture all feral dogs; 2. Regulate numbers of free-roaming dogs; 3. Raise public awareness (health risks for the population (diseases, parasites, bites), predation risks for turtles, health of dogs, etc.)	3
		Reduce egg poaching	12	Pursue and adapt patrolling activities in the field		↘	Maintain an adequate effort of control through an intervention strategy Improve knowledge of the sector and its connections, identify high-sensitivity areas, characterize poaching actions, identify best practices for control, develop partnership with Suriname	3
		Reduce man-related causes of nesting site degradation	13	Limit man-made degradation of nesting sites		↗	Regulate impacting human activities (compaction, rock armour, development, events) Maintain and improve vegetation cover of the upper beach and adjoining inland area	4
			14	Limit interventions enhancing erosion impacts		↗	Alert and mobilize on the impacts of hydroelectric dams with respect to sediment trapping (specific impact study) and on development schemes likely to enhance erosion effects (paddy fields)	4

*Table 2: Summary of Specific Objective 1 "Alleviating threats", **including description of actions***

2nd SPECIFIC OBJECTIVE:

RESEARCH FOR CONSERVATION

The following table gives an overview of the planned actions and priorities for each sub-objective and each of the three species.

OS 2	Groups of objectives	Operational objectives	Sub-objectives	Card n°	Schedule and degree of priority										Species
					2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
RESEARCH FOR CONSERVATION	Define breeding sub-populations and spatio-temporal trend of these populations	Understand the distribution of the different populations/sub-populations and their level of interaction	Find whether there are sub-populations (time scale of analysis: 50 years) at the scale of the Guiana Shield	17-1		4	4	4							Dc
				18-1		5	5	5							Cm
				19-1		2	2	2							Lo
			Assess the trend in exchanges between sub-populations	17-2		2		2							Dc
				18-2				2			2			2	Cm
				19-2		3		3							Lo
	Document population trends for each population/sub-population and each species	Document population trend for each population/sub-population	Document trend in number of clutchesevery year	17-3	1	1	1	1	1	1	1	1	1	1	Dc
				18-3	1	1	1	1	1	1	1	1	1	1	Cm
				19-3	1	1	1	1	1	1	1	1	1	1	Lo
			Document trend in number of breeding females every year	17-4	1	1	1							1	Dc
				18-4	1	1	1	5	5	5	5	5	5	1	Cm
				19-4	1	1	1							1	Lo
			Manage database	17-5	2	2	2	2	2	2	2	2	2	2	Dc
				18-5	2	2	2	2	2	2	2	2	2	2	Cm
				18-5	2	2	2	2	2	2	2	2	2	2	Lo
	Understand the dynamics of the populations of each species	Understand factors affecting demographic parametersat nesting sites	Estimate key demographic parameters atnesting sites (survival rate of hatchlings and influencing factors, sex-ratio)	17-6	2	2	2	2	2	2	2	2	2	2	Dc
				18-6		2			2			2			Cm
				19-6		3									Lo
		Understand factors affecting demographic parameters at sea	Estimate key demographic parameters in offshore habitats (survival rate, recruitment rate, emigration rate)	17-7	2	2	2	2							Dc
				18-7						2			2		Cm
				19-7	3			3			3			3	Lo
			Measure influence of bioclimatic factors on demographic parameters (return rate, number of clutches)	17-8	3	3	3	3							Dc
				18-8					3			3			Cm
				19-8	3			3			3			3	Lo
		Investigate poorly documented segments of population	Improve knowledge ofmales (movements, behaviour during breeding season, interaction with fisheries, ecology)	17-9		4	4	4	4	4	4	4	4	4	Dc
				18-9		3	3	3	3	3	3	3	3	3	Cm
				19-9		3	3	3	3	3	3	3	3	3	Lo
			Improve knowledge offoragingjuvenile green turtles												Dc
				18-10	3	3	3	3							Cm
															Lo
	Investigate and quantify threats	Identify and quantify threats toadults during the breeding period	Identify area concerned by movements of adult females during the breeding period	17-10	1	1	1								Dc
				18-11	3	3	3								Cm
				19-10	5	5									Lo
			Identify and quantify threats tothis area from mining exploration activities	17-11	2	2	2	2		2		2		2	Dc
				18-12	2	2	2	2		2		2		2	Cm
				19-11	2	2	2	2		2		2		2	Lo
			Assess interactions between turtles and illegal fishing activities	17-12	1	1	1	1		1		1		1	Dc
				18-13	1	1	1	1		1		1		1	Cm
				19-12	1	1	1	1		1		1		1	Lo
			Assess interactions between turtles and legal fishing activities	17-13	1	1	1	1	1						Dc
				18-14	1	1	1	1	1						Cm
				19-13	1	1	1	1	1						Lo
		Identify and quantify threats toadults between breeding periods	Identify areas concerned by movements of adult females between nesting periods	17-14		3	3	3							Dc
				18-15	5	5	5								Cm
				19-14	4	4	4								Lo
			Identify and quantify threats tothese areas	17-15		4	4	4							Dc
				18-16	2	2	2	2	2		2		2		Cm
				19-15		2	2	2	2	2	2	2	2	2	Lo
		Monitor health status of turtles	Identify and characterize pollutants and diseases affecting marine turtles (joint Action for the 3 species)	17-16	5	5	5	5	5	5	5	5	5	5	Dc
				18-17	4	4	4	4	4	4	4	4	4	4	Cm
				19-16	4	4	4	4	4	4	4	4	4	4	Lo
		Take into account possible effects of climate change in the conservation strategy	Take into account the potential effects of climate change and coastline dynamics	17-17	3	3	3	3	3	3	3	3	3	3	Dc
				18-18	3	3	3	3	3	3	3	3	3	3	Cm
				19-17	3	3	3	3	3	3	3	3	3	3	Lo

Table 3: Summary of Specific Objective 2 "Research for conservation" for the three species, ***including schedule***

3RD SPECIFIC OBJECTIVE:

GIVING IMPETUS TO TRANSBOUNDARY COOPERATION

OS 3	Target	Groups of objectives	Operational objectives	Sub-objectives	Card n°	Means/Action	Schedule and degree of priority									
							2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
TRANSBOUNDARY COOPERATION	MARINE TURTLES	Improve cooperation through cross-cutting actions	Develop greater knowledge of the various actors involved on the Guiana Shield and in Brazil	Know the actors involved in clutch monitoring, associated research programmes, police actions, etc.	20	Compile a detailed list of all the actors involved directly or indirectly in marine turtle conservation projects throughoutthe Guiana Shield and Brazil, updated yearly	3	3	3	3	3	3	3	3	3	3
			Develop sharing of experience between actors	Organize sharing of experiences between countries	21	Organize yearly meetings between French Guianan and Surinamese actors (with rotation of hosting country) on the following topics: population monitoring and scientific projects, threat assessment and control, development of cooperation tools. Build on the existing river councils (Oyapock, Maroni) as tools for structuring cooperation	2	2	2	2	2	2	2	2	2	2
				Identify skills and training needs	22	Inventorize the skills of field actors ("skills bank") and identify skills needed (tagging, placing satellite transmitters, data analysis, database management, etc.) Implement actions to meet the needs identified	5	5	5	5	5	5	5	5	5	5
			Allow dissemination and sharing of information between neighbouring countries	Translate documents and reports useful for sharing of knowledge	23	Translate NAP or parts of it in English and Portuguese to enable broad dissemination (Guiana Shield, Brazil) Translate the study reports and teaching support material that may be useful in neighbouring countries Translate documents in English and Brazilian reports that may be useful to French Guianan actors	2	2	2	2	2	2	2	2	2	2
		Improve cooperation on population monitoring	Obtain population trends of the three turtle species at the scale of the Guiana Shield and Brazil and investigate the mechanisms of population dynamics and exchanges	Share clutch monitoring data of each species	24	Prepare and circulate yearly summary reports from the 4 countries of the eco-region, indicating clutch numbers (detailing total mileage of beaches monitored and protocol applied) and fact sheets on leatherback, green turtle and olive ridley tagging activities Analyse these data to identify the mechanisms underlying each population's dynamics	2	2	2	2	2	2	2	2	2	2
			Encourage data exploitation at the eco-regional scale	Encourage collaboration on specific scientific studies	25	Act as facilitator between the scientific partners of the eco-region and neighbouring countries Encourage collaborations between French Guianan scientists and scientists from neighbouring countries	5	5	5	5	5	5	5	5	5	5
		Improve knowledge of cross-borderthreats	Share on a yearly basis synthetic data on threats and actions implemented	Encourage the yearly sharing of data on identified threats and on measures implemented	26	Identify resource people in each country Prepare a report reviewing information collated on all identified threats: number of strandings, impact level of free-ranging dogs, egg and adult poaching, fisheries by-catch, and control measures implemented	3	3	3	3	3	3	3	3	3	3
		Improve control of transboundary threats	Improve control of threats through cooperative actions	Consolidate the decrease in poaching activities through cooperative actions	27	Encourage contact between resource people fromFrench Guiana and Suriname Enable continuity of legal processes between French Guiana and Suriname Share information between forces engaged in control actions	3	3	3	3	3	3	3	3	3	3
				Reduce illegal fishing through cooperative actions	28	Encourage cooperation in the interventions of State action at sea (AEM) in the west Encourage and monitordelimitation of the French-Surinamese boundary Encourage cooperative actions with Bresil Encourage cooperative actions with neighbouring countries Encourage lobbying at the European Commission for the possible blacklisting of certain flags	1	1	1	1	1	1	1	1	1	1
				Identify and quantify threats along migratory corridors (olive ridley and green turtle) and contribute to the reduction of these threats	29	Inventorize threats along greenturtle and olive ridley migratory routes Assess the impact of these threats Encourage cooperation with fishermen from neighbouring countries and the promotion of responsible fishing practices	2	2	2	2	2	2	2	2	2	2
		Promote the development of cross-border tourism	Support the development of eco-tourism	Support the development of eco-tourism in the estuarine zone of the Maroni	30	Present feasibility studies to local partners Find solutions for the entry of foreign tourists on the territory Make the most of these visits economically through the development of tourism products at Awala-Yalimapo ("tapping" of the "visitors" resource) Set up a best practices charter for turtle watching activities with professionals of Galibi	3	3	3	3	3	3	3	3	3	3
		Encourage communication between transboundary actors	Encourage interactions and economic development in the Maroni estuary area	Investigate the possibility to establish a free-movement zone in the estuary area	31	Launch a legal feasibility study for the establishment of a free-movement zone for registered people Creation of the free-movement zone if legally possible	4	4	4	4	4	4	4	4	4	4

Table 4: Summary of the Specific Objective 3 "Giving impetus to transboundary cooperation", ***including schedule***

4TH SPECIFIC OBJECTIVE:

ENVIRONNEMENTAL EDUCATION

O.S. 4	Operational objectives	Sub-objectives	Description of implemented actions	Card n°	Targets				Current situation (from 1: completed to 5: not completed)	Action feasibility (from 1: easy; to 5: difficult)	Conservation gain (de 1 > 5)	Lead organismes considered	Potential implementation partners	Proposed level of priority (for the entire duration of the Plan)
					Youth (in school and out of school)	Civil society	Social and professional partners*	Elected representatives						
ENVIRONMENTAL EDUCATION	Promote environmentally-friendly behaviours via project-based learning	Set up, promote and implement educationalprogrammes for young people	Inventorize existing awareness-raising activities and set up ad hoceducational activities and programmes of activities as part of an educational activities programme in partnership with the local education authority (identify needs) Promote these activities in a catalogue Deliver these educational activities	32	X				3	2	3	Kwata & RNA, with GRAINE	Kwata, RNA, Luth & Nature, Tourists guides, Compagnie des Guides	2
		Develop appropriate education tools	Improve museography inthe Amana Nature Reserve, considering it as a possible eco-touristic attraction Enrich existing educational media/materialsand integrate them in an educational project; develop the tools for a mobile museography	33	X	X			3	2	4	RNA et Kwata	Graine, Sepanguy, WWF, ONCFS, DEAL	3
		Involve local communities	Set up citizen's networks adapted to local conditions in the east Develop new approaches in the west	34		X		X	5	5	2	?	Kwata, Associations, RNA	3
	Promote knowledge	Add value to the actions of the NAP through communication actions	Prepare a short film on the turtles NAP Prepare spot radio and TV announcements on turtle-watching best practices Make regular appearances on local radio stations Ensure visibility in events connected with the environment or the tourism sector Update regularly the news section of the website Propose scientific outreach actions (conferences for the general public, etc.) Disseminate knowledge through the new media (social networks) Set up partnerships (Air France, Air Caraïbes, transport businesses, etc.) for the distributionof articles/films	35		X			4	3	3	ONCFS	Kwata, RNA, Luth & Nature, CNRS, Canopée des sciences, WWF, CTG, Guyane 1re, ATG, Guyaweb, Blada, Air France, Air Caraïbes, le Kotidien, France Guyane, ...	2
		Ensure agent present on beaches during nesting season	Pursue awareness-raising activities on beaches Organize turtle watching excursions	36		X			2	1	3	Kwata & RNA	Graine, Luth & Nature, DEAL	1
	Train and share	Develop and implement training programmes and activities	Approach and brief professionals of the sea (awareness-raising) Approach and brief law-enforcing agents (awareness-raising and training) Approach and brief professionals of the accommodation and tourism sectors Approach and brief public safety agents Organize occupational training for information agents and educators (French Guianan Tourism Committee (CTG), volunteers, local authorities'workers, coast guards, recreation centres, teachers, etc.) Approach and brief elected representatives	37			X	X	3	2	5	Kwata et RNA, soutenus par le GRAINE	Kwata, RNA, CNFPT, ONCFS, WWF, Compagnie des Guides	3
		Encourage sharing of knowledge and practices between actors	Create conditions conducive tothe sharing of cultural and scientific knowledge (tale-telling evenings, training of environmental educators by local communities, etc.) Plan meetings between environmental educators from the east and west for sharing experiences	38		X	X		5	3	4	Kwata, RNA, WWF, ONCFS, soutenus par le GRAINE	Autorités coutumières, RNA, Kwata, CNRS, Luth et Nature, Guides touristiques	4

* Pêcheurs, Force de l'ordre, sécurité civile, animateurs, CTG, gardes, agents mairie, guides touristiques, professeurs...

Table 5: Summary of Specific Objective 4 "Environmental Education"

5TH SPECIFIC OBJECTIVE

PROMOTING AS SOCIAL AND ECONOMICAL ASSET

This Specific Objective includes two Action Cards only. There is therefore no summarizing table.

Specific Objective	V. PROMOTING AS SOCIAL AND ECONOMICAL ASSET
Operational Objective	1. DEVELOP ECO-TOURISM PRODUCTS FOCUSING ON MARINE TURTLES ON THE SHORT TERM

CARD 35 ACTION 5.1.1	Identify practical levers to boostand/or launch one or more 'turtle' products in French Guiana	Priority				
		1	**2**	3	4	5

Background & objectives	Marine turtles make a fascinating attraction when they come to lay on beaches. This sight can and should be used to enhance economic development based on eco-tourism products. Several studies carried out by WWF elicited the creation of a 'turtle' product in the west, implemented by a travel agent. After the agency changed hands, however, the product was abandoned by the new owner. The positive and negative aspects of this experiment should now be evaluated and practical suggestions submitted in order to rejuvenate this product and/or develop one or more alternative products better designed for the long term and meeting the expectations of professionals of the sector. Once these products are designed and implemented by operators, efforts should be prolonged by developing their promotion both in French Guiana and abroad.
Target	Local population, tourists

Evaluation	Current situation (completed: 1/not completed: 5)					Feasibility of action (more feasible >less feasible)					Conservation gain (1>5)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Implementation details	Re-boost or create one or more 'turtle' products: - Organize a meeting to reflect back on the studies carried out in 2011 and 2012, the findings of which have not been widely circulated, and propose a workshop to review the diagnostic, the actions already carried out and the problems experienced, in order to identify levers that could be activated to rejuvenate or create 'turtle' products - Identify implementing agencies and promote the products Develop support materials for tourist guides: - Prepare, in collaboration with the guides, a document to serve as support for guided excursions, integrating a cross-cutting approach (turtle ecology + beach ecology; cultural and historical aspects) - Develop communication on professionally-guided excursions

Schedule	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	X	X	X	X						

Potential implementation partners	Social and professional actors of the tourism sector, local destination management companies (Jal Voyage, Couleur Amazone, TopGF), French Guiana Tourism Committee, Region, city councils of Rémire-Montjoly, Cayenne, Awala-Yalimapo, Kourou, Département council, Tourist Offices, WWF

Budget	Yet to be worked out
Possible financial resources	Not yet identified
Monitoring and evaluation indicators	Number of perennial 'turtle'products Number of users of this or these products Number of jobs created 'Turtle' tourist products made visible both in French Guiana and mainland France
Expected results	Creation of jobs directly or indirectly connected with marine turtle eco-tourism activities
Considered leading organisms	'Turtle' products: local destination management companies, travel agencies Promotion and communication: French Guiana Tourism Committee (CTG)

Specific Objective	V. PROMOTING AS SOCIAL AND ECONOMICAL ASSET
Operational Objective	1. CREATE FAVOURABLE CONDITIONS FOR REINFORCING THE DEVELOPMENT OF ECO-TOURISTIC ACTIVITIES FOCUSING ON MARINE TURTLES ON THE MEDIUM TERM

CARD 35 ACTION 5.1.1	Develop management of beaches and adjoining areas to enhance eco-tourism activities	Priority				
		1	**2**	3	4	5

Background & objectives	As mentioned in the Regional scheme for the development of tourism and recreation in French Guiana, beaches are the most visited sites for tourism and recreation. However, they lack adequate management. In order to develop eco-touristic activities centered on marine turtles, these natural sites (beaches and adjoining areas) urgently need to be properly managed and made safer for visitors (risks of aggression) In the framework of this Regional scheme for tourism, a 'Beach Plan' is proposed in order to contribute to some development (lay out planning, car parks, toilets, refuse bins, picnic tables, shopping facilities on the most popular sites, patrols in the hight of the season, etc.). This 'Beach Plan' will also be implemented at the scale of the commune. Objectives to enhance the social and economical value of marine turtles will need to be integrated into these management programmes.
Target	Local population, tourists

Evaluation	Current situation (completed: 1/not completed: 5)					Feasibility of action (more feasible >less feasible)					Conservation gain (1>5)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Implementation details	- Ensure that the 'Beach Plan' of the Regional master plan for tourism takes into account the value of marine turtles as an eco-tourism asset and gives priority to appropriately thought-out layout and management of beach areas - Support local authorities for input in to their 'Beach Plan' at the scale of the communes

Schedule	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
		X	X	X	x	x				

Potential implementation partners	Region, citycouncils (communes of Rémire-Montjoly, Cayenne, Awala-Yalimapo, Kourou), Département council, French Guiana Tourism Committee, social and professional actors of the tourism sector, Atout France
Budget	Yet to be worked out

Possible financial resources	Not yet identified
Monitoring and evaluation indicators	Integration of turtle issues in the regional 'Beach Plan' Elaboration of local 'Beach Plans' Implementation of the planned developments
Expected results	Improvement of visitor facilities on beaches and in adjoining areas Development of eco-tourism activities focused on marine turtles
Considered leading organisms	Communes of Rémire-Monjoly, Cayenne and Awala-Yalimapo

The last two Specific Objectives are cross-cutting elements, which will be implemented in parallel with the other actions. Since they contain only one Action Card each, there is no summarizing table.

6TH SPECIFIC OBJECTIVE:

NETWORKING ACTORS

Specific Objective	VI. NETWORKING ACTORS
Operational Objective	4.1 PROMOTE THE NOTION OF NETWORK OF ACTORS

CARD 41 ACTION 5.1.1	Create a French Guiana marine turtles network ("Réseau Tortues Marines Guyane")	Priority				
		1	2	3	4	5

Background & objectives	In French Guiana, many actors are concerned by the issue of marine turtles: research organisms developing scientific programmes, non-governmental organisations that carry out population monitoring and awareness-raising actions, local authorities, which increasingly take turtle conservation into consideration in their development policies, professionals who interact with turtles (such as fishermen and tourist guides), actors of the tourism sector who wish to develop this asset, public safety agents who are actively involved in turtle conservation, etc. In this situation, networking stakeholders appears essential at different levels: to help circulating information among actors, to help actors to learn more about each other (identify each one's roles and special skills, etc.), and to give body to the notion of network of actors, much more easily grasped and clearly visualized by the general public than the proliferation of independent actors and actions. *Since this is the only Action Card for this Specific Objective, it is given a priority of 1.*

Evaluation	Current situation (completed: 1/not completed: 5)					Feasibility of action (more feasible >less feasible)					Conservation gain (1>5)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Implementation details	- Improve mutual knowledge of the actors by drawing the network's organisation chart with each member's position - For each agency, ascertain the type of information it is interested in and identify a contact person - Collect information from each member on a monthly basis and circulate in the network - Develop tools for the internal dissemination of information (mailing list, participative forum, AGORA-type tool) - Communicate on behalf of the network to promote the actions of all the partners - Develop communication materials to enhance visibility of the network - Make the network known outside French Guiana and share information and experience with other networks elsewhere (Antilles, La Réunion, etc.)

Schedule	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	X	X	X	X	X	X	X	X	X	X

Potential implementation partners	All the partners included in the network (approximately thirty)

Budget	Internalized
Possible financial resources	-
Monitoring and evaluation indicators	Percent of the French Guiana population who is aware of the Marine Turtles Network as a group of actors involved in the protection and socio-economical enhancement of turtles Percent of institutional partners who know the Marine Turtles Network
Expected results	Better visibility of actions implemented in connection with marine turtles in French Guiana Development of real interconnections between the various actors
Considered leading organism	ONCFS

7TH SPECIFIC OBJECTIVE :

GOVERNANCE

Specific Objective	VII. GOVERNANCE
Operational Objective	7.1 REVIEW DECISION-MAKING AND MONITORING PROCEDURES IN THE NATIONAL ACTION PLAN

CARD 42 ACTION 7.1.1	Achieving effective transversal governance	Priority 1 2 3 4 5

Background & objectives	One of the conclusions of the evaluation of the First Restoration Plan (PRTM 2007-2012) stressed the importance of returning some decision-making authority to the Steering Committee. The ambition of this 7th Specific Objective should be to redefine the roles of the Steering Committee and to provide practical and innovating elements for NAP governance, encouraging the inclusion of a wider set of actors, in particular from local authorities. *Since this is the only Action Card for this Specific Objective, it is given a priority of 1.*

Evaluation	Current situation (completed: 1/not completed: 5)					Feasibility of action (more feasible >less feasible)					Conservation gain (1>5)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Implementation details	- Re-examine steering mechanisms by returning some decision-making power to the Steering Committee (to a coordination cell, for example) - Ensure transparency of information by allowing free access to all documents concerning the NAP - Ensure access to information through use of appropriate materials/media that centralize the information and improve its readability - Make sure each partner has the possibility to express himself or herself by setting up a platform enabling their free expression

Schedule	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	X	X	X	X	X	X	X	X	X	X

Potential implementation partners	All the partners of the network (approximately thirty)
Budget	Internalized
Possible financial resources	-

Monitoring and evaluation indicators	Number of decisions taken within the Steering Committee Participation of local authorities to strategic meetings Partners feel they are part of the decision-taking process (survey)
Expected results	More horizontal decision-taking processes Greater representation of local authorities
Considered leading organism	ONCFS

F. STRATEGIC SCENARIOS

Four different scenarios were distinguished depending on the financing possibilities and the level of priority given to the actions.

Level 1: funding possibilities [--], priority [++++]

Level 2: funding possibilities [-], priority [+++]

Level 3: funding possibilities [+], priority [++]

Level 4: funding possibilities [++], priority [+]

This makes it possible to highlight the key high-priority actions of the Action Plan. Cross-cutting actions are not taken into account here since they do not need any additional funding and will be implemented regardless of the scenario selected.

Level I includes the high-priority axes of the Action Plan.

Strategic scenarios					
Level	Sub-objectives	Action card n°			
Level 1					
	Reduce illegal drift gillnet fishing	4	28		
	Assess and limit by-catch in legal coastal fishing	5	17-13	18-14	19-13
	Estimate the number of clutches per year laid by each of the three species along French Guianan shores	17-3	18-3	19-3	
	Ensure presence of agent on beaches during the breeding season	9	36		
Level 2					
	Assess interactions of illegal fisheries with marine turtles	17-12	18-13	19-12	
	Contribute to the reduction of these threats	29	18-16	19-15	
	Identify and quantity threats related to mining exploration activities	17-11	18-12	19-11	
	Limit the impact of a potential major oil well accident	3			
	Pursue and adapt patrolling activities in the field (poaching)	12	27		
	Reduce predation on nests, hatchlings and adults	11			
	Reduce the number of coastal fishing nets during the breeding period	7			
	Limit oil survey disturbances	1			
	Reduce sources of light pollution	10			
	Determine the number of breeding females every year	17-4	18-4	19-4	
	Identify area concerned by movements of adult females during the breeding period	17-10			
	Estimate key demographic parameters at nesting sites	17-6	18-6	19-6	
	Estimate key demographic parameters in offshore habitats	17-7	18-7	19-7	
	Add value to the actions of the NAP through communication actions	35			
	Manage database	17-5	18-5	19-5	
	Set up, promote and implement educational programmes for young people	32			
	Organize sharing of experiences between countries of the Guiana Shield	21			
	Translate documents and reports useful for sharing knowledge	23			
	Share clutch monitoring data on each species	24			
	Identify practical levers to boost and/or launch one or more 'turtle' products in French Guiana	39			
	Develop management of beaches and adjoining areas to enhance eco-tourism activities	40			

Level 3				
	Monitor appropriate implementation of TTEDs	6		
	Limit potential impacts of longline fishing	8		
	Limit man-made degradation of nesting sites	13		
	Limit interventions enhancing erosion impacts	14		
	Find whether there are sub-populations at the scale of the Guiana Shield	17-1	18-1	19-1
	Assess the trend in exchanges between sub-populations	17-2	18-2	19-2
	Measure influence of bioclimatic factors on demographic parameters	17-8	18-8	19-8
	Improve knowledge of males	17-9	18-9	19-9
	Improve knowledge of foraging juvenile green turtles	18-10		
	Identify areas concerned by movements of adult females during the breeding period	18-11		
	Identify areas concerned by movements of adult females between nesting periods	17-14	19-14	
	Identify and quantify threats to areas used between nesting periods	17-15		
	Take into account the potential effects of climate change and coastline dynamics	17-17	18-18	19-17
	Know the actors involved in clutch monitoring, associated research programmes, police actions, etc.	20		
	Encourage the yearly sharing of data on identified threats and on measures implemented	26		
	Support the development of eco-tourism in the estuarine zone of the Maroni	30		
	Develop appropriate education tools	32		
	Involve local communities	33		
	Develop and implement training programmes and activities	37		
Level 4				
	Limit the impact of exploration and production drillings and wells	2		
	Identify area concerned by movements of adult females during the breeding period (olive ridley)	19-10		
	Identify areas concerned by movements of adult females between nesting periods (green turtle)	18-15		
	Identify and characterize pollutants and diseases affecting marine turtles	17-16	18-17	19-16
	Identify skills and training needs	22		
	Encourage collaboration on specific scientific studies	25		
	Investigate the possibility to establish a free-movement zone in the estuary area	31		
	Encourage sharing of knowledge and practices between actors	38		

G. Organization of the Plan

G.1 NAP facilitation

DEAL (the Regional environment, planning and housing office) launched in January 2013 a call for tenders for the preparation and implementation of a new Action Plan for the conservation of marine turtles in French Guiana (PNATM). The National Hunting and Wild Fauna Office (ONCFS) was selected for this task in March 2013.

A facilitator was recruited by ONCFS on 1st April 2013 in order to organize the successive phases of the NAP's elaboration and coordinate its implementation over the following years.

ONCFS undertakes to implement the National Action Plan according to the requirements of DEAL. It takes responsibility for the following tasks:

- Centralization and synthesis of information provided by the technical network using in particular the collective database 'Tortues Marines de Guyane' (French Guiana marine turtles) created in 2013 at the initiative of DEAL;
- Facilitation, secretariat and engineering of the Plan;
- Facilitation of the Steering Committee 'Implementation of the Plan for the conservation of marine turtles': preparation of the yearly actions programme to be submitted to the Committee, arrange a work plan for the Committee, preparation of funding applications/arrangements to be presented before the Committee, reporting and synthesis of data, execution of the decisions of the Committee;
- Creation, facilitation and secretariat of the different working groups constituted to advise the Steering Committee and provide guidance and support to project developers and implementing agencies;
- Elaboration of a mechanism for monitoring the Plan's actions, including a scoreboard to monitor implementation and performance indicators;
- Facilitation of the French Guiana Turtles Network
- Overall annual assessment of the actions taken and data collected under the Plan in the shape of an annual performance report;
- Communication to partners, elected representatives and the general public (updating and extension of the website, etc.)

As soon as the National Action Plan is validated, the **Steering Committee will be officially constituted**. It will emanate from the Monitoring Committee and actors/stakeholders concerned by the NAP and approached during the consultation phase, as the document was being prepared. The Steering Committee will use input from a Coordination Cell, a Scientific Committee, resource people and working groups.

The **working groups** will be constituted to monitor the main Specific Objectives. Thought will be given to improve their organization and functioning.

The Steering Committee and the working groups will meet regularly, in particular before the onset of the nesting season, in December or January, in order to set a series of objectives for the season, and again at the end of the season, in September or October, to take stock of the operations and propose a strategy for the following year taking into account the results obtained. If needed, the Steering Committee, through the coordinator, will be able to consult the working groups, the Scientific Committee or resource people on specific issues. The coordinator will be responsible for the facilitation and secretariat of these groups and the Steering Committee.

The coordinator will also provide daily guidance and support to the various actors (project developers and implementing agencies) through the necessary formalities for the implementation of the turtle conservation actions set out in the NAP. He or she will prepare the annual activity reports and keep DEAL regularly informed of the progress of the actions.

Besides, the coordinator will manage and develop the French Guiana Turtle Network, using existing communication tools (website, social networks, etc.) and arranging ad hoc actions by taking on the role of head of network.

G.2 NAP governance

During the latest Monitoring Committee for the elaboration of the NAP (30th April 2014), the new proposal regarding governance was presented to all the partners and accepted.

Governance of the National Action Plan will be organised around a **Steering Committee** including all the partners and drawing on two bodies:

- The **Coordination Cell of the Action Plan** (CCPA), with decision-making power;

- The **Scientific Committee**, with advisory power, which will focus with particular attention on the 'Research for conservation' Specific Objective.

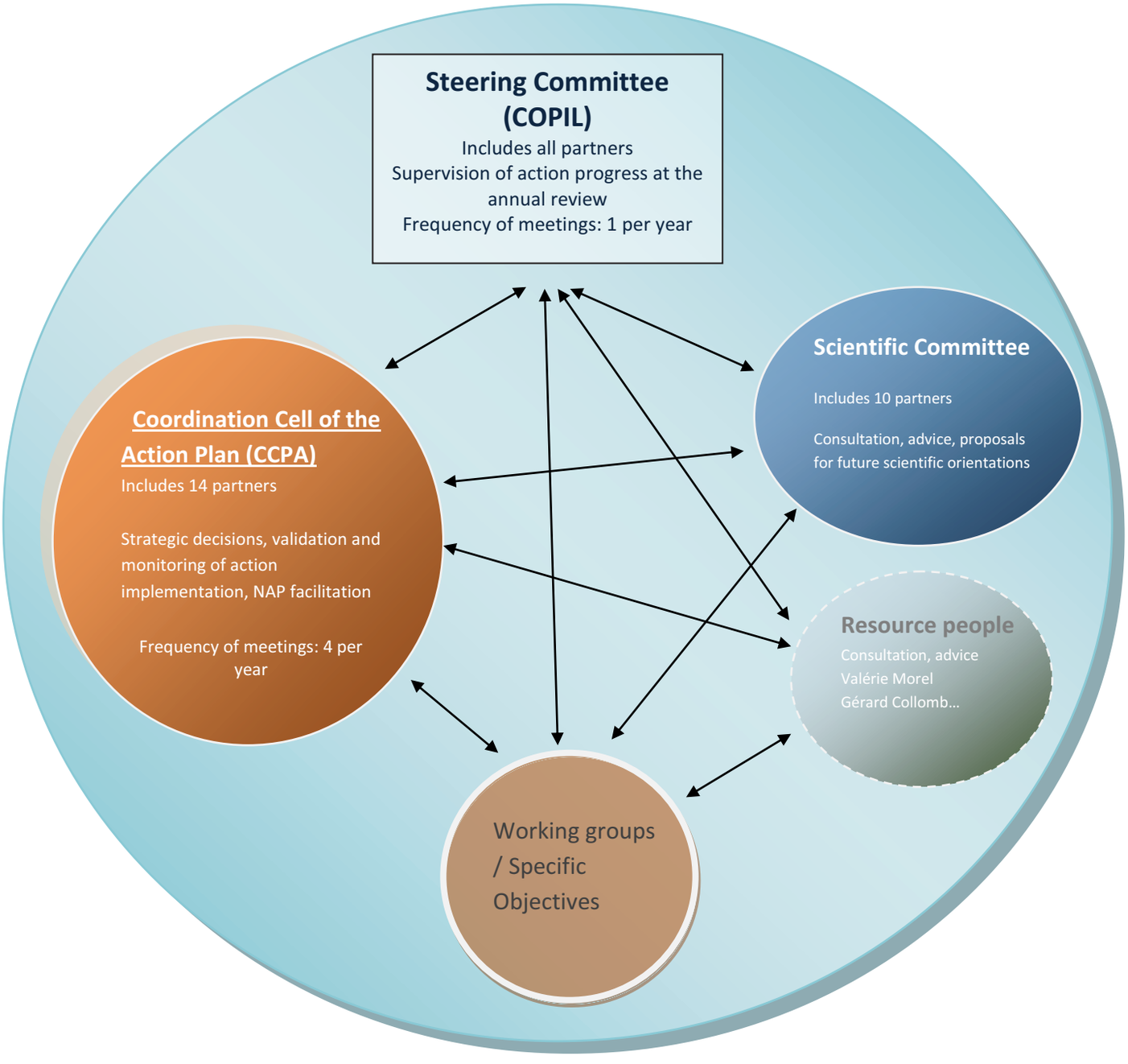

Figure 11: Organisation chart of the governance of the National Action Plan

The Steering Committee (COPIL)

The Committee includes representatives of all partner agencies (approximately thirty) and meets once a year to discuss how the various actions are progressing. The meeting also serves to exchange views and information.

The Steering Committee can at any moment submit proposals, which will then be examined by the Coordination Cell of the Action Plan.

The Coordination Cell of the Action Plan (CCPA)

The Coordination Cell of the Action Plan is a condensed committee composed of 14 partner agencies representing the totality of the actors/stakeholders. It has a decision-taking capacity concerning the orientations to be adopted**. It is the true steering body of the Plan** and takes the strategic and technical decisions necessary for the successful implementation of the Plan. It also acts as a dynamic facilitator for the entire Plan.

	Organisations	Positions	Resource people (2014)
1	DEAL	- Head of the department of natural habitats, biodiversity, sites and landscapes -Project manager on marine biodiversity	Arnaud Anselin Hélène Delvaux
2	Kwata	Scientific director	Benoit de Thoisy
3	ONCFS	-Head of technical unit -NAP coordinator -Head of SMPE	Rachel Berzins Mathieu Entraygues Jeremie Ripaud
4	WWF	Head of French Guiana WWF Office	Laurent Kelle
5	RNA	Manager	Johan Chevalier
6	Regional Council	To be decided later	To be decided later
7	Departement Council	To be decided later	To be decided later
8	Cayenne city council	To be decided later	To be decided later
9	Rémire-Montjoly city council	To be decided later	To be decided later
10	Awala-Yalimapo village council	To be decided later	To be decided later
11	AEM	Head of Office	Thomas Pailloux
12	DM	Director	Eric de Chavanes
13	CRPMEMG	Director	Patricia Triplet
14	Graine	Director	Camille Guedon

Table 8: Possible composition of the Coordination Cell of the National Action Plan

The Scientific Committee

The Scientific Committee is made up of scientists from the Region, but also from mainland France and abroad, involved in the conservation of marine turtles. The Committee is consulted as often as necessary by the coordinator, on any topic or issue connected with the scientific projects considered in the Plan. It suggests orientations and issues advice, subsequently submitted to the CCPA.

Organisations		Positions	Resource people (2014)
Regional	Kwata	Scientific Director	Benoit de Thoisy
	ONCFS	- Head of technical unit - NAP coordinator	Rachel Berzins Mathieu Entraygues
	WWF	Head of French Guiana WWF Office	Laurent Kelle
	CNRS IPHC	- Senior researcher - Research engineer - Doctor in ecology	Yvon le Maho Damien Chevallier Céline Le Bohec
	UICN	Biologist	Tony Nalovic
	RNA	Manager	Johan Chevalier
	CSRPN	Member	Benoit de Thoisy
National	Laboratoire ESE	Professor	Marc Girondot
	CEFE Montpellier	Senior researcher	Jean-Dominique Lebreton
	MNHN	- GTMF coordinator - Honorary Research Fellow	Françoise Claro Jean Lescure
	UICN/Chélonée	Expert on marine turtles	Jacques Fretey
International (about specific question, workshop)	Widecast	Director	Karen Eckert
	UICN	Marine Turtle Specialist Group	Bryan Wallace
	NOAA	Program Leader, Marine Turtle Genetics Program	P.H. Dutton
	Drexel University, Philadelphia	Professor	J.R. Spotila
	NC Widlife	Biologist	Matthew Godfrey

Table 7: Possible composition of the Scientific Committee of the National Action Plan

Resource people

Some people with special skills apparently not directly connected with the conservation programme (geographers, anthropologists, consultants, etc.) may be consulted in order to give an outsider's perspective on specific issues.

H. PLAN MONITORING, EVALUATION AND SCHEDULE

H.1 Plan monitoring

A set of indicators is given on each Action Card.

On the basis on these implementation indicators, which will need to be assessed every year for the annual review coordinated by the operator, the Steering Committee will be able to follow the progress made towards the Plan's objectives.

H.2 Plan evaluation

Two evaluations are provided for under the National Action Plan:

- A first evaluation mid-term (at 5 years), which will assess the actions undertaken and the progress made towards the planned objectives (technical, scientific, financial and moral outcomes); it will make it possible to re-orient some of the actions and re-evaluate certain priorities in the face of the progress achieved;

- A second evaluation at the end of the implementation period of the NAP.

These evaluations will be entrusted to independent agencies, not represented in the Steering Committee. These agencies will be selected by DEAL.

H.3 Schedule

Each action detailed in the Action Cards is planned. The summary tables provided give an overview of the actions scheduled year after year.

I. Financial evaluation

Cost estimates are given on each Action Card when data are available from each partner.

A number of actions have not seen their financial requirements estimated yet. This is currently being worked out and should be finalised shortly, especially for actions that can be integrated into a general funding plan led by ONCFS.

The following tables summarize the current status of each action's financial evaluation, distinguishing three stages (funding secured, costs estimated but funding not yet secured, costs not yet estimated and funding sources not yet identified) corresponding to different colours. For certain actions, funding may be only partly secured, or costs only partly estimated: in such cases, several colours are juxtaposed.

Strategic scenarios and funding		
Level	Sub-objectives	Fiches Action card N°
Level 1		
	Reduce illegal drift gillnet fishing	4, 28
	Assess and limit by-catch in legal coastal fishing	5, 17-13, 18-14, 19-13
	Estimate the number of clutches per year laid by each of the three species along French Guianan shores	17-3, 18-3, 19-3
	Ensure presence of agent on beaches during the breeding season	9, 36
Level 2		
	Assess interactions of illegal fisheries with marine turtles	17-12, 18-13, 19-12
	Contribute to the reduction of these threats	29, 18-16, 19-15
	Identify and quantity threats related to mining exploration activities	17-11, 18-12, 19-11
	Limit the impact of a potential major oil well accident	3
	Pursue and adapt patrolling activities in the field (poaching)	12, 27
	Reduce predation on nests, hatchlings and adults	11
	Reduce the number of coastal fishing nets during the breeding period	7
	Limit oil survey disturbances	1
	Reduce sources of light pollution	10
	Determine the number of breeding females every year	17-4, 18-4, 19-4
	Identify area concerned by movements of adult females during the breeding period	17-10
	Estimate key demographic parameters at nesting sites	17-6, 18-6, 19-6
	Estimate key demographic parameters in offshore habitats	17-7, 18-7, 19-7
	Add value to the actions of the NAP through communication actions	35
	Manage database	17-5, 18-5, 19-5
	Set up, promote and implement educational programmes for young people	32
	Organize sharing of experiences between countries of the Guiana Shield	21
	Translate documents and reports useful for sharing knowledge	23
	Share clutch monitoring data on each species	24
	Identify practical levers to boost and/or launch one or more 'turtle' products in French Guiana	39
	Develop management of beaches and adjoining areas to enhance eco-tourism activities	40

Level 3				
	Monitor appropriate implementation of TTEDs	6		
	Limit potential impacts of longline fishing	8		
	Limit man-made degradation of nesting sites	13		
	Limit interventions enhancing erosion impacts	14		
	Find whether there are sub-populations at the scale of the Guiana Shield	17-1	18-1	19-1
	Assess the trend in exchanges between sub-populations	17-2	18-2	19-2
	Measure influence of bioclimatic factors on demographic parameters	17-8	18-8	19-8
	Improve knowledge of males	17-9	18-9	19-9
	Improve knowledge of foraging juvenile green turtles	18-10		
	Identify areas concerned by movements of adult females during the breeding period	18-11		
	Identify areas concerned by movements of adult females between nesting periods	17-14	19-14	
	Identify and quantify threats to areas used between nesting periods	17-15		
	Take into account the potential effects of climate change and coastline dynamics	17-17	18-18	19-17
	Know the actors involved in clutch monitoring, associated research programmes, police actions, etc.	20		
	Encourage the yearly sharing of data on identified threats and on measures implemented	26		
	Support the development of eco-tourism in the estuarine zone of the Maroni	30		
	Develop appropriate education tools	33		
	Involve local communities	34		
	Develop and implement training programmes and activities	37		
Level 4				
	Limit the impact of exploration and production drillings and wells	2		
	Identify area concerned by movements of adult females during the breeding period (olive ridley)	19-10		
	Identify areas concerned by movements of adult females between nesting periods (green turtle)	18-15		
	Identify and characterize pollutants and diseases affecting marine turtles	17-16	18-17	19-16
	Identify skills and training needs	22		
	Encourage collaboration on specific scientific studies	25		
	Investigate the possibility to establish a free-movement zone in the estuary area	31		
	Encourage sharing of knowledge and practices between actors	38		

Colour coding

Funding secured (funding arranged and available or actions financed internally by the leading agency)
Costs estimated but funding not yet secured
Costs not yet estimated, funding sources not yet identified