7. Wallis and Futuna : Status Report

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1 - Introduction

Wallis and Futuna Islands make up one of the three French overseas territories in the Pacific. They are located 2000 km north of New Caledonia and 3500 km northwest of Tahiti. The territory comprises two distinct archipelagoes situated 240 km apart : the Wallis Islands and the Horn Archipelago composed of Futuna and Alofi (Figure 1). The Wallis Islands are made up of the main island Uvea and 19 islets scattered throughout a lagoon which is 24 km long and 15 km wide. Futuna is high island without a lagoon and with a few areas of cliffs, surrounded by a fringing reef of varying width. Separated from Futuna by a channel of 1800 m width, Alofi is a high volcanic island surrounded by a variably developed fringing reef. The surface area of land is small (215 km^2) and coral reefs occupy about 300 km^2 ; immerged reefs are found to the north of Wallis Island. The Exclusive Economic Zone of the territory covers 300,000 km^2.

The climate is characterized by elevated mean temperatures (26 to 27°C), an average relative humidity and a typically tropical rainfall pattern. The territory has a population of 15,000, equivalent to a density of 60 inhabitants/km^2. Most of the population (74.4% of the active unemployed population) exploit marine resources for a significant part of their diet. Among reef resources, a large part is made up by fish, and shells and crustaceans to a lesser degree. The recent initiatives in favor of coral reefs both at the national as well as the international level have raised the awareness of local authorities about the importance of these environments in the future development of the territory.

Despite the low level of knowledge about coral reefs of the territory, this document aims to present the first status report of these environments. We will successively assess the state of the benthos, the state of fish and fishing, anthropogenic threats, impacts of climate changes, marine protected areas, regulations, and finally the gaps in the current capacity for management and conservation of the coral reefs of the territory.

2 - State of Coral Reef Benthos

2.1 - Before 1998

2.1.1 - Wallis

Around the central island of Uvea, the Wallis Islands have a regular and relatively wide (4 to 5 km) barrier reef dissected by four passes which are all located in the west (Fatumanini,

Fugauvea, Avatolu) or the south (Honikulu). The only pass navigable by large vessels is Honikulu in the south. The total surface area of coral reefs is about 220 km^2. The reef rim is highly asymmetric with the more exposed eastern side including all of the islets and the more sheltered western side including three passes. The lagoon is generally rather shallow and has a complex morphology, with notably deep pools resulting from the hydrodynamic regime and partitioning corresponding to basaltic ridges. The eastern lagoon is on average deeper than the western lagoon where the fringing reef is much wider. The principal biotopes found in the reef-lagoon complex of Wallis are shown in figure 2.

The fringing reef zone is generally characterized by a succession of three seagrasses on shallow (0.2 to 1 m), fairly heterogeneous sandy-muddy substrates. Moving from the shore, there is typically a Halodule seagrass bed, followed by a Halophila seagrass bed on coarser sand and frequently associated with Halimeda, and a Syringodium seagrass bed usually accompanied by Turbinaria. These formations are very important in the Wallis reef ecosystem because they cover a large part of the fringing reef zone. The flora associated with these seagrass beds is usually made up of Padina, Turbinaria and Halimeda. The associated benthic fauna is equally very rich and diversified. For all these reasons, the seagrass beds play a primary role in the reef-lagoon ecosystem of Wallis. The mangroves, located generally in the south and west of the central island, occupy a non negligible surface area and are a fundamental component of the Wallis Island coral reef ecosystem. Moving from the shore, the following mangrove zonation can be observed : Inocarpus edulis, then Barringtonia speciosa, Bruguiera eriopetala and Rhizophora mucronata.

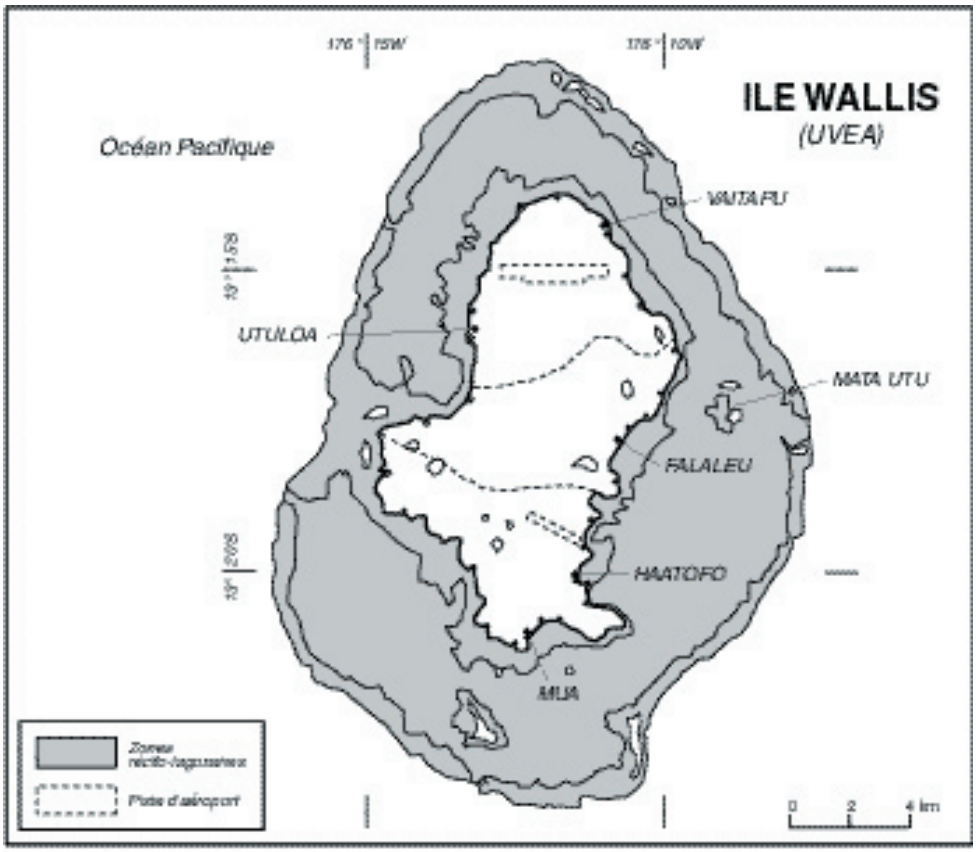
The lagoon itself is complex. There are coral alignments arising from coral growth on basaltic ridges, isolated coral patches, large pools, pavement with smaller pools, and abundant debris near the islets. Wide stretches of the lagoon floor, generally bordering seagrass beds and mainly on the western side of the island, are carpeted by blue-green algae. A few algae are also found there (Enteromorpha, Hydroclathrus, Halimeda and Padina) and the fish community of these lagoon bottoms is almost zero. Coral communities on the lagoon floor are scarce compared to the neighboring Fiji Islands. They are mainly the reef flats of scattered coral patches and a few pinnacles. The first studies show a low scleractinian coral cover in the lagoon, except in some places where coral cover of 40 to 90% has been observed. Coral construction is however active on the outer slope.

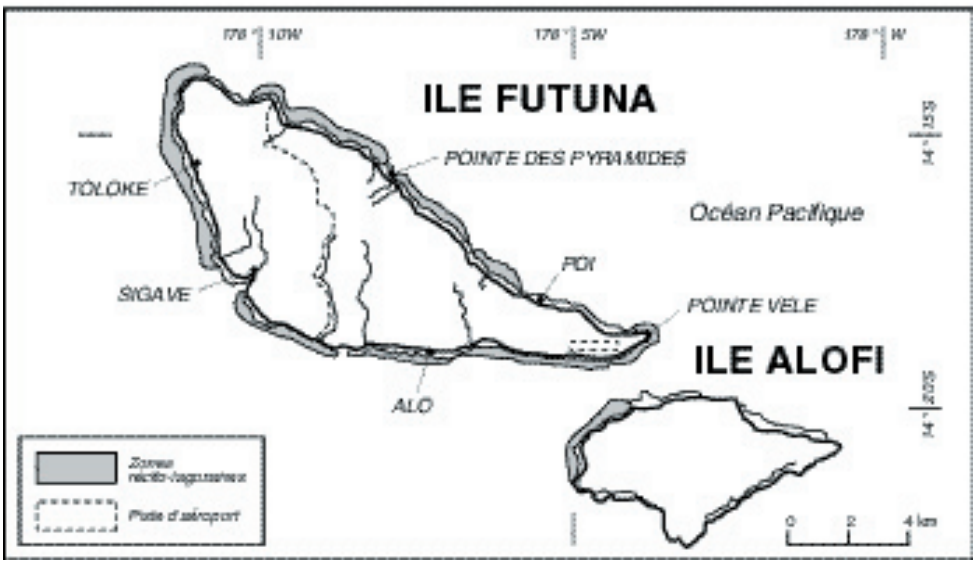
Evidence of coral sand extraction is visible on the northern and southern fringing reef of the island. The negative consequences of these activities appear to be limited in the particular case of the fringing reef zone of Wallis, as it is primarily made up of seagrass beds and not coral formations.

2.1.2 - Futuna and Alofi

Futuna and Alofi Islands do not have a lagoon but have variably developed fringing reefs. Near the shore, there is generally an accumulation of pebbles or sand. Subsequently there is a reef flat where algae are well represented (Padina, Valonia, Caulerpa …) and molluscs are often abundant. On the other hand, scleractinian corals are rare and restricted

Figure 1 : Map of Wallis, Futuna and Alofi Islands.

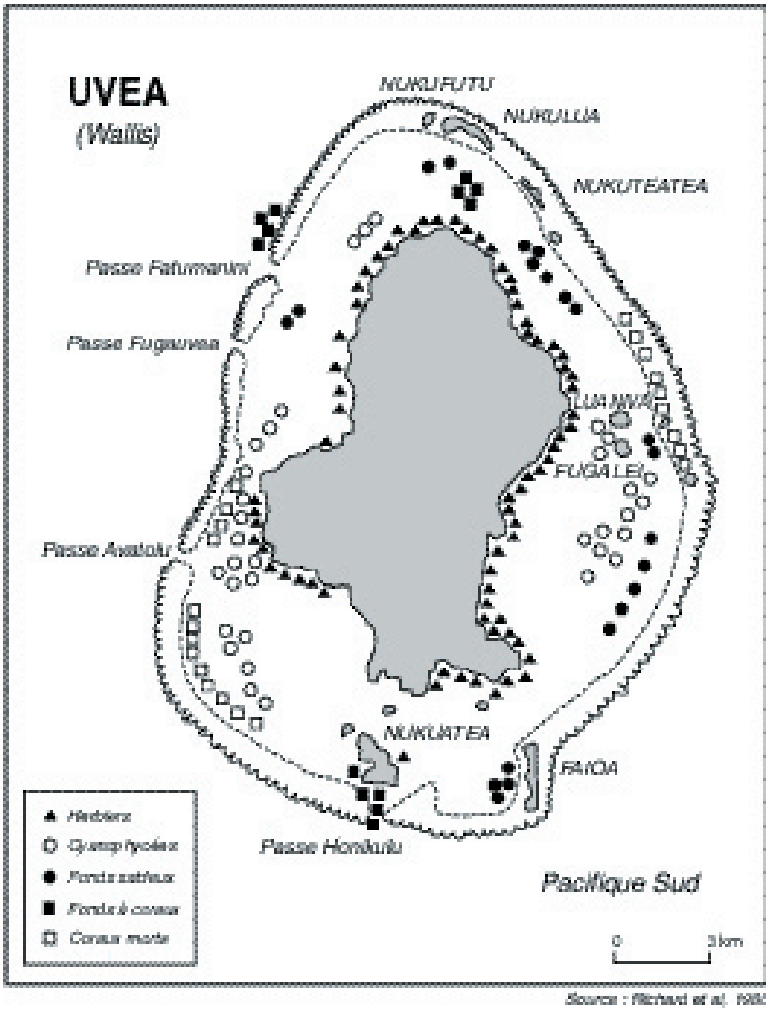




to certain genera (Pavona, Porites, Montipora). On the reef front, zoanthids are present (Palythoa) and more corals. On the outer slope, corals are more numerous with cover varying from 30 to 50%. The most abundant genera are Pocillopora, Acropora and Porites.

The coral reefs of the Horn Archipelago already showed significant degradation in 1980. Destructive fishing practices which were very widespread at this time (use of poison) and physical destruction of corals (trampling, use of crowbars) are the causes of the degradation. Finally, no bleaching phenomenon has been observed.

Figure 2 : Simplified map of the major biotopes found in the reef-lagoon complex of Wallis.



2.2 - After 1998

2.2.1 - Monitoring results

The establishment in 1999 of a coral reef monitoring network employing the photographic method used in French Polynesia henceforth allows a more rigorous tracking of the state of health of coral reefs of the territory. The method used involves photographing a rectangular plot of reef 20 m long by 1 m wide, giving an area of 20 m^2. The photographic records (1 m^2/record) allow evaluation of the percentage coral cover in the chosen zone (quantitative variable) on the one hand, and, on the other hand, identification of coral genera to establish an inventory (qualitative variable). This information can be collected at the same place at different dates in order to assess temporal variation of the variables measured.

At Wallis, two stations have been established, one on the outer slope of the western coast (to the north of Avatolu Pass) and the other in the lagoon on the eastern coast, in Mata-Utu Bay. At Futuna, one station has been set up on the outer slope in the northwest of the island at the place called «Sagole» ; at Alofi, one station has been chosen on the western point of the island at the place named «Alofitai». Relocating the position of the stations is facilitated by using GPS. The observations at the stations are complemented by an evaluation of substrate cover using manta tows.

The first qualitative and quantitative results are shown below in table 1.

The quantitative results show that the three outer slope stations studied have a scleractinian coral cover of a similar order of magnitude. The percentage cover is between 16.03% (Futuna) and 21.79% (Wallis) with an intermediate value of 19.45% for Alofi. The Wallis lagoon station is characterized a very low coral cover (0.98%) ; the community at this station is dominated by soft corals which occupy 15.80% of the total surface area. These results confirm the observations of Richard et al. (1982).

The qualitative results are also comparable with respect to the number of genera recorded on the outer slopes. There are 14 genera of scleractinian corals at Alofi, 13 genera at Futuna and 12 genera at Wallis. At Futuna and Alofi, the genus Acropora clearly dominates the community, and for Wallis the genus Favia is dominant. At the Wallis lagoon station, there are only 3 different genera recorded from the photographic transect.

2.2.2 - Transect method

To complement the monitoring observations, a study of the substrate has been undertaken using the line intercept transect method at Wallis. This method involves classifying the nature of the substrate according to different sedimentological criteria for the zones not colonized by living organisms and according to biological group and the form of the colonies for the living organisms. A diver recorded the percentage cover of each of the classes encountered along a transect of 50 m. The location of the stations studied is indicated below in figure 3.

The first results are shown below in table 2. The analysis of the results from the transects undertaken at the different stations at Wallis (Wantiez et al., 1999) show four characteristic types of substrates. The substrate of the coastal reef stations is primarily sand with a mean cover of 55.55%. This sand is often colonized by seagrasses or macroalgae. Living corals only occupy a small part of the substrate (2.6%). The mean cover of dead coral is 12.65%. Finally, algae occupy 18.10% of the total surface area.

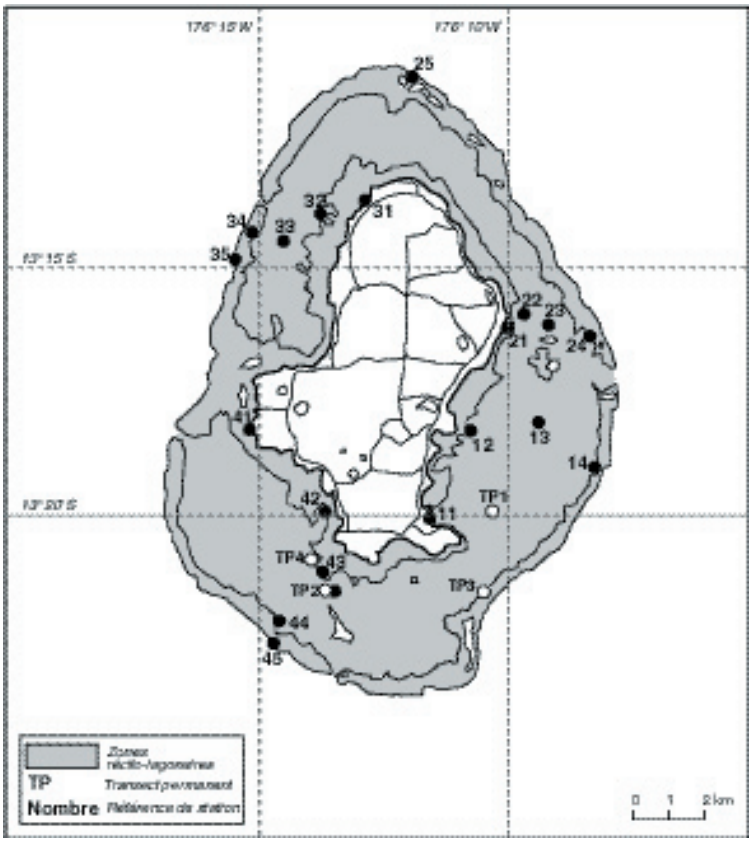
Table 1 : Initial results of living coral cover by genus for the three islands of the territory.

	% Cover			
Genus	Alofi Outer slope	Futuna Outer slope	Wallis Outer slope	Wallis Lagoon
Acropora	9.88	9.75	1.48	-
Favia	0.43	1.60	13.02	0.74
Favites	0.19	-	-	-
Galaxea	0.19	-	-	-
Goniastrea	0.06	0.06	0.19	-
Leptastrea	2.47	0.19	0.19	-
Leptoria	0.56	1.60	0.93	-
Leptoseris	-	-	0.06	-
Lobophyllia	0.06	-	0.12	-
Montastrea	0.12	0.06	-	-
Montipora	1.05	0.31	-	-
Platygyra	0.74	0.86	0.06	-
Pocillopora	0.99	0.49	-	0.12
Porites	0.12	-	0.06	0.12
Seriatopora	0.37	0.06	-	-
Stylophora	-	0.19	-	-
Synaraea	-	-	4.07	-
Turbinaria	-	0.12	0.56	-
Others	2.22	0.74	1.05	-
Total % cover	19.45	16.03	21.79	0.98
Generic richness	14	12	11	3
% manta tow	0 - 10	-	-	-
Comments	-	Recent dead coral	Coral debris abundant	Soft corals 15.8%

Table 2 : Mean substrate characteristics of reef stations studied by the line intercept transect method at Wallis (% cover).

	Coastal station	Intermediate station	Inner barrier reef station	Outer slope station
Living coral	2.60	14.8	5.85	27.50
Algae	18.10	2.27	10.15	41.06
Dead coral	12.65	1.00	23.5	23.67
Sand	55.55	23.67	26.3	1.33
Debris	2.20	4.33	26.4	3.33
Blocks, pavement	4.85	34.26	7.5	0.00
Crevices	0.05	0.00	0.15	0.60
Mud	0.00	0.00	0.00	0.00
Other	4.00	3.67	0.15	2.51
Total	100	100	100	100

Figure 3 : Location of stations studied at Wallis.



The intermediate reef stations show two different facies. Some stations are characterized by pavement which is partly colonized by massive corals ; other stations are characterized by a substrate composed mainly of sand and dead corals covered by an algal film. Some small formations of branching and sub-massive corals develop on these substrates.

The stations of the inner barrier reef have a substrate composed primarily of coral sand, debris and pavement. This substrate is colonized by algae and living corals, which have a low cover (5.85%). The outer slope is characterized by a substrate made up primarily of encrusting, foliate and tabular living corals and calcareous algae. The mean cover of living corals is 27.50%. These figures are slightly higher than those obtained by the photographic method.

This study shows that, despite the low cover of living coral recorded at Uvea, the substrate of the reef formations is characteristic of environments not subject to significant anthropogenic impacts. The percentage of living organisms is relatively high due notably to the presence of seagrasses in the lagoon and living corals on the outer slope. Moreover, the non-living substrate is primarily sandy. Further, no silted reef formation, the result of terrigenous pollution, has been recorded at Uvea. Finally, no bleaching phenomenon has been observed during these different studies, as well as during the dives undertaken by the Diving Club, which is responsible for the maintenance and monitoring of the network.

3 - State of Coral Reef Fish

3.1 - State of fish populations

3.1.1 - Species richness, density and biomass

The first study done in the territory in 1980 recorded 330 species of benthic fish distributed among 55 families. This fish fauna includes representatives of the diverse levels of the trophic pyramid of Indo-Pacific reef waters. The 1999 study (Wantiez et al.) only recorded 194 species from 32 families at Wallis. The difference between these two studies is probably related to the lower sampling effort in 1999 compared to 1980.

The general characteristics of the fish fauna are shown below in table 3. The most diverse families are Labridae (wrasses, 34 species), Pomacentridae (damselfish, 33 species) and Chaetodontidae (butterflyfish, 23 species). These families are representative of reef environments in good health. On the other hand, some families are poorly represented in Uvea lagoon and some species abundant in the Western Pacific have not been recorded. They are notably species of commercial interest :

- Serranidae of the genus Epinephelus (groupers) and the coral trout (Plectropomus leopardus)
- Lethrinidae such as some emperors (Lethrinus nebulosus, Gymnocranius spp)
- Labridae, notably the goldspot hogfish (Bodianus perditio)
- Acanthuridae of the genus Naso, notably the bluespine unicornfish («dawa», Naso unicornis)
- Siganidae (rabbitfish, Siganus spp).

Table 3 : General characteristics of the fish fauna sampled in Uvea lagoon.

Stations	Species richness	Density (fish/m^2)	Biomass (g/m^2)
Coastal	42.75	2.77	62.44
Intermediate	46.33	3.02	26.12
Inner barrier	44.50	3.20	28.12
Outer slope	56.33	1.80	56.94
Mean	47.47	2.69	43.40

The results obtained at Wallis show that mean species richness per station (47.47 species/station) is within the range of values generally observed in the region. The mean density recorded is 2.69 fish per m^2 with a minimum of 1.18 fish/m^2 and a maximum of 5.43 fish/m^2 at two stations. The most abundant species are small planktophagic Pomacentridae. This value is within the range generally observed in the Indo-Pacific region but at the lower end. The mean biomass is 43.40 g/m^2. This figure is low compared to the values generally observed in the region.

In conclusion, the coral reef fish communities of Wallis have global characteristics consistent with those generally observed in the Indo-Pacific region, but they are among the most depauperate communities.

3.1.2 - Community structure

The fish fauna shows four communities across a gradient moving offshore from the coast. The zonation appears to be related to oceanic and terrigenous influences on one hand and substrate characteristics on the other : an outer slope community, a seagrass bed community, and a lagoon community which can be split in two parts. The principal characteristics of these different communities are summarized below in table 4.

Table 4 : Characteristics of the different fish communities at Wallis.

Community	Species richness	Density (fish/m^2)	Biomass (g/m^2)
Seagrass bed	38	2.14	8.47
Lagoon 1	41.25	1.43	44.36
Lagoon 2	47.5	3.69	42.46
Outer slope	56.3	1.8	56.94

The outer slope community is characterized by many reef species associated with living corals, notably Chaetodontidae, Pomacanthidae and Pomacentridae. This community can further be distinguished by the presence of species associated with environments under an

oceanic influence, typical of the outer slope, such as Elagatis bipinnulata, Aphareus furca and Chaetodon ornatissimus. The outer slope communities are diverse (56.33 species/station), with an average density (1.80 fish/m^2) and the highest biomass (56.94 g/m^2).

The coastal seagrass bed community is distinguished by species characteristic of these environments, notably benthic carnivores which eat the numerous invertebrates found in these biotopes. They are principally Lethrinidae (Lethrinus spp), Nemipteridae (Scolopsis trilineatus), Mullidae (Parupeneus multifasciatus), Labridae (Novaculichthys taeniourus), Balistidae (Rhinecanthus aculeatus) and Tetraodontidae (Arothron hispidus). This community is characterized by the lowest diversity (38 species/station), a relatively high density (2.14 fish/m^2) and the lowest biomass (8.47 g/m^2). These results thus indicate the presence of numerous individuals of small size using the seagrass beds as a nursery.

The differences in structure between the two lagoon communities reflect the differences in substrate characteristics. The first lagoon community was sampled at stations where algae and debris are more abundant. The second lagoon community was found at stations where living corals and reef pavement are more abundant. The first community is characterized by species which are in part herbivores and common in the lagoons (Pomacentridae, Labridae, Scaridae and Acanthuridae). The species richness and biomass are average with values of 41.25 species/station and 44.36 g/m^2 respectively. The density is the lowest recorded (1.43 fish/m^2). The second lagoon community is distinguished by the presence of other species common in the lagoons. They are planktophagic species, notably Clupeidae (Spratelloides spp), and Serranidae (Pseudanthias spp) and Pomacentridae usually associated with living coral. These communities are relatively rich compared to the others (47.5 species/station and 42.46 g/m^2) and have the highest density (3.69 fish/m^2).

3.2 - Status of fishing

The fishing undertaken on the coral reefs of Wallis and Futuna is exclusively artisanal. The infrastructure currently used remains modest. The fishing techniques employed are mainly hand line fishing, speargun fishing and net fishing. Some destructive fishing practices while banned (poison or dynamite) are still used from time to time. Many information campaigns have however raised the awareness of the population of the damage caused by these methods of fishing.

In 1997, the territorial fisheries department recorded 286 FAO type flat bottom boats used principally for lagoon fishing. As a result of the improvement in sea safety, fishing outside of the lagoon is developing but remains unimportant. The annual production of coral reef fish is estimated at about 300 tonnes, although demand reaches 900 tonnes according to the South Pacific Commission. The fish families which are the target of significant artisanal subsistence fishing are the following : Acanthuridae, Balistidae, Chaetodontidae, Cirrhitidae, Dasyatidae, Labridae, Lethrinidae, Lutjanidae, Malachanthidae, Mugilidae, Mullidae, Muraenidae, Ostraciidae, Pomacanthidae, Pomacentridae, Scaridae, Serranidae and Tetraodontidae.

For some years, commercial operations have been set up with the creation on Wallis Island of a few fish shops which offer greater capacities for preservation but also fresh seafood products.

It remains difficult to provide exact statistics on fishing, given the fact that almost all of the population fish the lagoon either for recreation or as a means of subsistence. In addition to fish which represent a large part of the resources extracted from the coral reefs by the population, there are two species which are currently exploited. They are trochus shells (Trochus niloticus) and more recently sea cucumbers. The quantities exported are estimated at a few tonnes per year.

4 - Anthropogenic Threats on Reef Biodiversity

4.1 - Erosion and sedimentation

Agricultural practices based on slash-and-burn techniques and the multiplication of poorly constructed road infrastructure are the cause of an acceleration of erosion phenomena which have been observed in the territory for some time. During rainy periods, the lagoon waters of Wallis and the coastal marine waters of Futuna become turbid. Laterites coming from deforested slopes or mountain tracks are therefore going to settle on corals. These phenomena are seen at Futuna Island where muddy zones have formed opposite mountain tracks (Toloke, Vaisei). This type of degradation has not been observed on the neighboring Alofi Island, which does not have these types of infrastructure.

4.2 - Coastal development

During the last ten years, the territory has undertaken a major program of shoreline protection. It consisted of building rockwalls along almost all of the eastern side of Wallis Island, thus about 15 km. The result of this activity has been the disappearance of all the beaches of the island. The conception of this construction work did not conform to any standards for maritime work. This coastal development was carried out without any preliminary impact study. Some mangroves have been completely destroyed by infilling and building

Extraction of coral material (coral sand and beach sand) to be used as construction material or infilling is more and more frequent. The turbidity near extraction zones is high and the coastline has receded more than 100 metres at certain places on Wallis Island (Utuleve area).

4.3 - Pollution by solid or liquid wastes

The improvement in living conditions of the population has logically entrained a greater production of wastes. The quantity of household waste collected each year is estimated at about 300 t/y, equivalent to 200 kg/y per inhabitant. Currently, household waste is deposited at dumps without preliminary treatment. The current procedure used for treating domestic wastewater is that of autonomous sanitation. Unfortunately, these installations do not meet standards and the quality of the wastewater at the outlet of the tanks does not conform with national recommendations for discharge of water in the wild. These septic tanks, which are generally made of concrete blocks, are not adequately sealed to allow normal functioning. Finally, no water treatment system for septic tank discharge is envisaged.

The wastewater from piggeries (25,000 head), which are usually set up near housing, is a source of major pollution of terrestrial and coastal marine water resources. The liquid manure is not treated and is directly discharged in the lagoon at a number of places in the same outfalls as rainwater. The quality of lagoon waters is currently being analyzed for bacterial numbers and the first results indicate a significant faecal pollution in the inhabited coastal zones and in particular in «Malaefoou» village (Wallis) where there are many piggeries.

The risks of hydrocarbon pollution also exist as a result of the significant increase in maritime traffic, notably in the lagoon waters of Wallis Island.

4.4 - Resource exploitation

The level of exploitation of lagoon resources is not known. The first estimates in 1980 (Richard et al.) and in 1999 (Wantiez et al.) noted a fish fauna characterized by a small number of individuals of small size. The risks of overexploitation are therefore of concern if fishing pressure was to become great.

The development of fishing outside of the lagoon through increase in the number of fish aggregation devices (FAD) may result in a reduction of the exploitation of lagoon resources. This development must be considered in the Horn Archipelago where the reef surface area is small.

5 - Current and Potential Impacts of Climate Changes

There has been no study to evaluate the impacts of climate changes. Scientific monitoring of this aspect should be considered within the framework of regional cooperation.

6 - Marine Protected Areas and Management and Conservation Capacity

There are no official marine protected areas in the territory. In practice, it is the customary authorities, being responsible for land tenure matters, who are involved in the management of coastal marine resources, for example in the case of marine aggregates. As a result, they would be in a position to draw up suitable regulations for the creation of marine protected areas and develop the management and conservation capacities.

The territorial authorities themselves plan to increase scientific and technical knowledge which will allow the customary authorities to draw up management and conservation programs for these marine protected areas.

7 - Territorial Regulations

7.1 - Local regulations

The territory is responsible for environmental matters. However, no specific territorial regulations have as yet been developed concerning the environment. The territorial chief has passed a certain number of decrees which mainly regulate fishing. They concern regulations prohibiting destructive fishing practices (use of explosives, poison, crowbars), and governing speargun fishing with or without breathing equipment and the commercial size of some fished species. These regulations are not enforced due to the lack of means for surveillance by the administration.

The customary authorities issue bans where necessary to prohibit various activities but this procedure is rarely used. Moreover, the absence of means for surveillance by the customary authorities renders these directives ineffective.

7.2 - International conventions

There are 22 international conventions which apply to the French overseas territories. In Wallis and Futuna, no measures have yet been taken to apply these provisions locally. Such measures represent an important body of work to be undertaken so that the territory conforms with these international conventions.

8 - Gaps in the Current Capacity to Manage and Conserve Coral Reefs

The local authorities, like the majority of the territory's population, generally have little awareness of the need for environmental protection. The resources devoted to environmental matters in the development programs elaborated up until now are insignificant. Further, the actions undertaken have been isolated and the results are sometimes the opposite of what was expected. The best example is that of shoreline protection which has resulted in organized infilling of the fringing reef. Reinforced concrete structures and infilling by laterite along a large part of the shoreline have contributed to the acceleration of erosion processes and lagoon pollution by sedimentation.

The territory of Wallis and Futuna also has a considerable gap in its knowledge of coral reef environments. Therefore decision-makers do not have objective information to support their decisions. This situation greatly disadvantages the implementation of some development projects like fishing and aquaculture. The grey areas regarding the distribution of powers between the French state, the territory and the customary authorities do not facilitate the management and conservation of these environments. Indeed, this lack of clarity does not permit the

development of pertinent and applicable regulations under the right conditions, particularly with respect to zonation and protection of natural sites. The long-standing lack of coordination between different administrative departments of the territory has slowed the set-up under the right conditions of some projects, notably in the domain of sanitation. Finally, lack of financial resources does not always allow the implementation of action programs in favor of protecting coral reefs.

9 - Conclusions and Recommendations for the Conservation of Coral Reefs

This first assessment while incomplete reveals the gaps accumulated up until now by the territory of Wallis and Futuna Islands in the protection of the environment in general and of coral reef environments in particular. The first studies have however allowed an initial assessment of the state of the environment. The first results show that coral reefs of the territory of Wallis and Futuna are characterized by a naturally low living coral cover. With respect to the fish fauna, it has a low species richness and a low biomass compared to other Indo-Pacific regions. At Wallis Island, coral reef degradation is primarily due to the extraction of marine aggregates and the anarchic carrying out of many coastal construction activities which aggravate the erosion processes in some areas. At Futuna Island, where the coral reefs are easily accessible by the population and once upon a time by pigs, major anthropogenic degradation has been observed for 20 years. This degradation is mainly due to coral trampling and terrigenous pollution.

To improve its performance in environmental matters, the territory of Wallis and Futuna is beginning to equip itself with the resources to promote environmental protection. In 1997, a territorial environment department was created and is responsible for coordinating activities supporting environmental protection and improvement of the quality of life.

The creation in 1999 of the French national committee IFRECOR, on which the territory is represented, has raised the awareness of authorities on the importance of coral reefs in the development of the territory. In the next State/Territory development agreement (2000-2004), financing for the study and monitoring of coral reefs is provided. The implementation of a territorial policy with respect to the management of liquid wastes (creation of a treatment plant) and solid wastes (better management of wastes) will reduce significantly the effects of chronic pollution on coral reefs. Reforestation programs and particularly improvements in yields of agricultural production will undoubtedly bring about the beginning of the answer to the problems of soil erosion and coral reef sedimentation.

This first assessment of the state of coral reefs of the territory of Wallis and Futuna Islands shows that in order to assure the long-term conservation and use of these environments it is primordial to reinforce the knowledge of these ecosystems, clarify the jurisdictional powers of the different authorities, draw up local legislation with respect to the environment, and finally to actively involve local communities in the management of these environments.

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