# Annex 4. Summary of Field Visits

RESEX Delta do Parnaíba

**8 December 2017**

From the city of Parnaíba to Porto dos Tatus, prefeitura de Ilha Grande, where a passage for Canárias was negotiated. Arrived in the island with the same name on the left bank of the Parnaíba river, and greeted by informant. First stop was at the Associação de Moradores e Pescadores de Canárias, where "aulas de reforço" were being held for some 10 students of between 10 to 14 years of age. The secretary of the organisation was imparting the class. In another room a computer lab was idle, but very much in use during the day, said the volunteer (estagiario) of the prefeitura who was in charge. We drove on his quad (quadriciclo) for over 15 minutes and arrived at the community of Passarinho, where we stopped at a "club", a brick enclosure with a bar where I met with three crab collectors. We continued towards the community of Caiçara, where we met with informant. The drive to Caiçara took probably half an hour and then we moved towards Torto, our final stop. Conducted extra tour around the community of Caiçara with community informant and the tour took much longer than anticipated. The island is sandy, covered in low vegetation, including *Byrsonima crassifolia* (murici) and *Anacardium occidentale*, as well as *Copernicia prunifera* (carnauba). Bounded by mangrove forest on its river (South) side and dunes and beaches on its seaward (North) side. There is at least a big, now dry pond or lagoon, maybe some 10 hectares big. It dries yearly. There, according to informant, fish and turtles thrive, then bury in the mud during the dry season, although he is not sure if the fish do that or it is just the newly hatched juveniles out of eggs left in the mud, who fill the lake when the rains come. However, informant said that people grow tilapia, and other fishes enter the lagoon from the sea in the rainy season, notably cumurupin (*Megalops atlanticus*) and cará (*Geophagus brasiliensis*). Most houses I saw were tilled and with brick walls, consisting of a main body and an open, covered hall. Many had satellite dishes.

Crab collectors' attitude to the project and its results, here, mostly the management of the Uçá crab fishery depended mostly on how successfully they have been for the last five years. Thus, some more entrepreneurial community members have taken advantage of the incipient tourism to setup apparently successful business, inducing catering, fishing and tourism guiding undertaking. Active members of crab collector associations are optimistic about what they perceive to be further security of tenure over the fishery resources in the RESEX granted by the protected area management plan. Less active members transmitted a rather pessimistic picture of their communities and way of life. Concern about perceived environmental degradation was high, but moderated by experience and knowledge by older members that assume changes as part of wider natural changes. However, transformational changes such as the drying up of an economically important seasonal lagoon were observed with deep concern and linked to climate change. However, some younger community members also associated changes in delta channels and associated mangrove mortality to climate change, which was dismissed by older, more experienced collectors. As to the involvement of future generations, almost all interviewed did not with their offspring to continue in this way of life, and generally aspired to provide for education and off-site jobs. This notwithstanding, there were also perceived opportunities in tourism development. Moreover, collector's children accompanied the mission and the collectors stressed the importance of them learning the trade, as a security and means of ensuring a steady livelihood in times of crisis.

**9 December 2017**

Walking tour of the community of Torto we collected and eat murici. Many carnauba groves were along our path: wax lies at the leaves, which must be cut with great care, as the palm's spines can inflict deep wounds. Leaves are burned, to reduce volume for transport. The wax is exported. Basin mangroves seem to be mostly *Avicennia spp*, tall of 15-20 meters. Avicennia spp (siriúba) is the preferred mangrove for fences, while R. mangle (mague vermelho) is preferred for roof beans and ceiling joists. We came across areas of some hectares of dead *Avicennia germinans*. Informant mentioned that they have no explanation and that it is a recent phenomenon. However, such mortality would not be uncommon, associated with dry years and changes and shifts in the dunes and water streams. In fact, *Avicennia germinans* is prone to plagues and mass mortalities have been recorded in Latin American mangroves. The water edge is dominated by *Rhizophora* mangle, also reaching 20 meters tall, with some *Laguncularia racemosa* on the land edge of the *Rhizophora* belt. Conocarpus erectus (Mangue butão) also to be seen on the landward fringe of the mangrove forest. This species is the preferred one for charcoal. We came across one pit used to make charcoal. Several species of bird, *Cebus paella* (tufted capuchins), domestic donkeys and tracks by tufted capuchins and racoons (guaxinin) along the way. Encounter with crab "catador" who had completed his quota of 10 cords (40 crabs) within three hours. The only target species is *Ucides cordatus*. Informant keeps crabs collected from the wild in a pen of brick, some 3 square meters (2x1x1) with an incline to keep an end with water. Crabs (*Ucides cordatus*) are kept on mangrove mud and Rhizophora mangle leaves. Uça crabs preferred these leaves. Informant also keeps oysters. The purpose is to have them ready for sale, without needing to go on capture some for each order.

Short ride in a rented speed boat took the group composed of crab collector association members, as well as two ICMBio representatives. The shore is normally dominated by *R. mangle*, but at some spots along the water edge, there are *Spartina-Batis* marshes, flanked by *Conocarpus erectus*, like our landing point. The basin forest behind the water fringe is mixed of *Avecinnia germinans* and *Rhizophora mangle*. Crab collection takes place mostly at burrows closed to prop roots of *R. mangle*. Our expert companions managed to capture 16 crabs in one hour. The trick lies in capturing the crab with all its legs; and incomplete crab would be discarded, although the collector may keep it for self-consumption. Extracting a single crab takes just five minutes, and involves introducing a metal hook with an approximately one meter long handle, bypassing and trapping the crab inside its burrow with the hook, and carefully pulling the crab till the collector can safely catch it with his/her hand. The crab is then tied up with a palm string. The mangrove forest is infested with sandflies and midges that feast on the uncovered visitor. Sesarmid and fiddler crabs are also common but are left unmolested by crab collectors. Crab eating racoon (*Procyon cancrivorus*) tracks were also seen. We proceeded to interviews at a riverside restaurant. As we sat there, two groups of tourists, probably from Parnaíba came by. Sport fishing and motor water sports have become very popular and e.g. the port of Tatús at Ilha Grande has a new jetty for fast craft. While tourists would normally hire somebody from the community to serve as guide and assistant, this is not yet a rule. The riverside wharf (River Igaraçú) at Parnaíba has several agencies offering delta tours. According to ICMBIO staff they would normally pass by the reserve on their way to a sandy beach just at the Eastern mouth, at the private Ilha dos Poldos. Ilha dos Poldos and Ilha do Cajú, at the Western mouth of the Parnaíba river are claimed by big families, Spanish in the first case and Brazilian in the second. The presence of two groups of tourists may be due to the holiday of Nossa Senhora da Concepção. During our visit, ICMBio staff pointed out the importance of their current good relationship with the municipal government (prefeitura).

We proceeded to a dunar belt on a South-Western corner of Ilha das Canárias. A section of dunes, bordered by water on the Southern edge and restinga on their northern move in crescent shapes from west to east, leaving vegetated, grassy "valleys" in between. Satellite pictures (Google Earth) shows that almost the entire southern section of the island is "scarred" formed by vegetated dunes, which we traversed in a quad on arrival. It would seem that the island, effectively a barrier island, is accreting west. Upon arrival to the dunes, we came across a group of fishermen in a canoe about to settle for the night in one of the three fishing huts at the shore. They were equipped with a motorised canoe and what appear to be an entangling net. Their main target is pescada amarela (*Cynoscion acoupa*), although camurupin (*Megalops atlanticus*) is also an important fishing target. The dunes reach some 20-20 meters high and and made of fine yellowish sand.

Our last stop was at the island of the guarás (*Eudocimus ruber). E. ruber* is a gorgeous scarlet ibis which flocks in mass to roost at this island.

From 19:00 hours, already dark, in Porto dos Tatus, boats started arriving, loaded with uçá crabs and castanha de cajú (cashew nuts). Cashew nuts are collected from the wild cashew trees on the islands, in response to a growing demand for it. Some of the crab "packages", i.e. several "cordas" of crab bound together are collected by purchasers, who had them previously ordered. No money is exchanged openly at the pier. A track apparently from Fortaleza showed up with a professional appraiser who selected and classified the crabs into plastic baskets. Many other crabs were already packed in covered plastic baskets. At least three persons, of whom one, at least was a restaurant owner gathered to collect their orders. We took the change to interview two of them.

The value chain for *Ucides cordatus* is dominated by few wholesalers that controlled supply to the main demand zones, namely growing coastal tourist centers, especially Fortaleza for the Parnaíba Delta region. Fishing effort on crabs is determined mostly by seasonal demand, as bulk buyers commission crab collectors for precise amounts of crabs. Crabs are also sold locally to cover local demand by both restaurants and a smaller proportion is directly sold to consumers by peddling or at the local market. Wholesalers are supportive of the improved transport standard as it considerably sinks their costs. Ironically, **crab collectors interviewed**, while acknowledging the positive effect on fishing effort and understanding the need to keep effort low to prevent population collapse, **have seen their income reduced as demand for crabs subsided**. Wholesalers can earn over 10 times more than an individual crab collector monthly. For both groups, **the main threat to the fishery is the unregulated collection of crabs, using illegal gear and disrespectful of closed seasons (during the crab's mating season, when they are most vulnerable).** Formal crab collectors in the protected area visited collect crabs by hand, and complete their assigned catch within four hours, averaging 40 crabs in this period. Low prices have already discouraged some interviewed households from the fishery, while other, better off households have started to engage in the growing tourism industry at the delta of Parnaiba. Judging by the amount of travel articles in national newspapers (see below), and the observations and interviews made in the framework of the terminal evaluation, mangrove areas are becoming increasingly attractive as leisure and gastronomic destinations.

**10 December 2017**

City of Parnaíba. At one fresh market, at Avendia Deputado Pinheiro Machado, fresh crabs were being retailed, but outside the building, not at the stalls. Further away at least two people were peddling crabs. The market was divided into vegetable, meat and fish section. At the fish section, shrimp was the most common item, followed by Spanish mackerels and snappers. No tarpon in sight. Also, Characid fresh water fishes and tilapia were being sold.