

# Prioritization of Fisheries Management Zones on Timor-Leste's North Coast

Prioritizasaun ba zona jestaun peskeira iha Timor-Leste nia tasi feto



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## Prefásiu

Seguransa alimentár no nutrisaun sai tema husi Prezidência Comissão Países de Língua Portuguesa (CPLP) ba tinan 2012-2013. Nu'udar Illa ki'ik no membru CPLP mesak deit iha rejiaun Sudeste Aziátiku, iha zona Coral Triangle peskas iha importánsia krusiál ba Timor-Leste nia seguransa alimentár no nutrisaun. Dokumentu ki'ik ne'e hatudu momós dedikasaun Governu Timor-Leste nian atu kumpri ninia kompromisu ba Konvensaun internasionál meu-ambiente nian no mós ninia dedikasaun atu integra klibur nasaun ASEAN liu husi pasu importante ida ne'ebé hametin jestaun ba rikusoin ne'ebé halibur ita hotu iha rejiaun, ita nia oseanu.

Sekretaria Estadu Peskas no Akikultura haksolok atu involve iha dezvoltimentu estratéjia dezvoltimentu Akikultura, ne'ebé sei fó matadalan banati tuir ba setór ne'e hodi kontribui hodi hametin seguransa alimentár iha rai laran no hadi'a nutrisaun iha Distritu oioin, liu-liu iha rejiaun montañosa ne'ebé la iha asésu ba tasi.

Oras daudaun importante ba nasaun atu tau atensaun ba polítika no estratéjia hodi dezvoltolve setór peskas tasi-nian. Relatóriu badak ne'e hato'o notas preliminar hodi loke dalan ba diskusaun tuir mai kona-ba investimentu iha jestaun rikusoin kosteiru no mariñu. Relatóriu ne'e identifika fatin xavi ne'ebé importante ba produtividade peskeiru no ne'ebé Governu rekoñese nu'udar fatin prioritáriu hodi hahú hametin sistema jestaun.

Ami haksolok atu servisu ho Conservation International (CI) iha preparasaun relatóriu ne'e no hein katak relatóriu ne'e sei hakat ida iha dalan hodi dezvoltolve Polítika no estratéjia ba dezvoltimentu sustentável setór Peska mariñu iha Timor-Leste. Dokumentu hirak ne'e sei hametin fundasaun hodi setór ne'e bele hamriik metin no kontriu di'ak liu tan ba dezvoltimentu ekonómiku no seguransa alimentár iha futuru.



Eng. Rafael Pereira Gonçalves  
Sekretáriu Estadu Peskas no Akikultura

## Preface

Food Security and nutrition was 2013's Portuguese Speaking Countries Presidency Theme. As the only small island state member of CPLP located in Southeast Asia and in the Coral Triangle, fisheries play crucial role in Timor-Leste food security and nutrition. This document goes some way to showing the Government's dedication to honour its commitments to international environmental conventions as well to demonstrate Timor-Leste's dedication to integrate in the wider community of nations which is ASEAN, by taking the first steps in managing our common resource, the ocean that unites us all.

The Office of the Secretary of State for Fisheries and Aquaculture was happy to lead the development of the country's first Aquaculture Development Strategy which provides a clear vision of how the aquaculture sector can contribute for strengthening household food security levels and improve nutrition of communities living in Timor-Leste's highlands which have limited access to the ocean.

Now, it is time to turn attention to the policy and strategy frameworks for development of the marine fisheries sector. This simple report provides the preliminary notes to guide coming discussions about investments in managing Timor-Leste's coastal and marine resources. In particular, it identifies key sites that are important for fisheries productivity, which the government recognises as priority sites to be pursued for improved management.

We were pleased to work with Conservation International in the preparation of this report and hope that it marks the first step in a journey towards the development of a Policy and Strategy for Sustainable Development of the Marine Fisheries Sector in Timor-Leste. Such documents would provide cornerstones for the sector's contribution to Timor-Leste's economic growth and food security into the future.



Honourable Rafael Pereira Gonçalves  
Secretary of State for Fisheries and Aquaculture

## A Glance at the Report

This report focused at prioritizing fisheries management areas in coastal and marine areas with depths between 0-40 meters depth, along the North Coast of Timor-Leste. New data has shown that there are additional sites that ought to be considered into the current Lesser Sunda MPA design. These new sites (Buruma ( $\approx 5.6 \text{ km}^2$ ) and entire reefs surrounding Atauro ( $\approx 98 \text{ km}^2$ )) would greatly improve the Lesser Sunda design for Timor-Leste.

New data has also shown that Government could start management efforts in smaller areas than those proposed in the Lesser Sunda MPA design. Government could prioritize investment of management activities in smaller management areas in Metinaro ( $\approx 10.9 \text{ km}^2$ ), Behau ( $\approx 33 \text{ km}^2$ ), Beacou ( $\approx 9.2 \text{ km}^2$ ), Loikere ( $\approx 2.6 \text{ km}^2$ ).

NDFFA could use the prioritized areas in this report to guide coming discussions with partners and ensure the efficiency of investments in areas described in the Lesser Sunda MPA design, as well as to honour the country's commitments to International Treaties.

## Summary of Key findings

**1. The preliminary analysis for the Lesser Sunda MPA design, conducted by Wilson et al. (2009) has certain gaps; there are habitats and ecological features that did not show up as important in the initial review due to the paucity of data available at the time. Further to this, several of the sites proposed in the Lesser Sunda MPA Design despite being ecologically important have experienced considerable damage since the initial design was produced.**

Results from other mapping exercises such as Bogg et al (2009), survey data from Erdman and Mohan (2012) and data collected by NOAA in 2013 are now being used by DNPA to cross check former MPA site selection. This new information has shown that several other sites which are important from a fisheries sustainability perspective have not been captured by the Wilson et al. (2009) design.

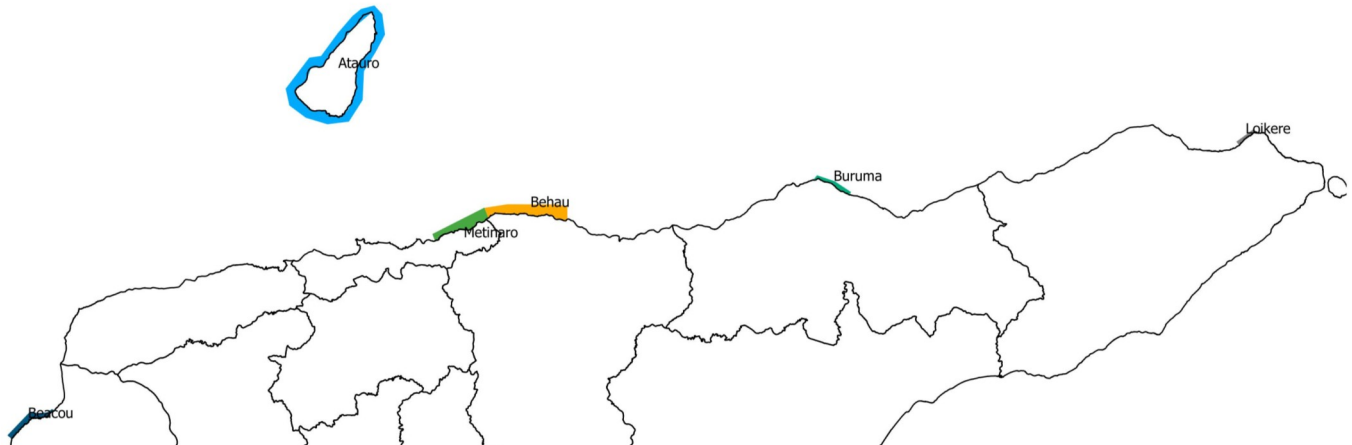
**2. There are a number of key sites which are significantly smaller than those in the Lesser Sunda design, but which would be useful to focus management towards in order to achieve maximum fisheries replenishment benefits in the short-medium term.**

Experience from previous attempts led by DNPA to manage marine and coastal areas in Timor-Leste have shown that sustainable financing of the large-scale marine and coastal areas proposed by Wilson et al. (2009) are almost impossible at this point of time. This is due to the many competing national priorities and limited State budget allocation for the Fisheries sector, combined with the trend for most bilateral and multilateral partners to provide financial support for projects of limited length.

These experiences—along with the latest data available—have been taken into account during the process of prioritizing smaller, more manageable areas within the formerly proposed larger

areas. The proposed smaller areas would still afford protection to the key ecological features and functions required for fisheries replenishment. Smaller areas could be achieved in a relatively short period of time, with future expansions of the protected areas able to be pursued as the NDFA becomes better equipped to do so.

Five priority areas for fisheries replenishment have been identified — Atauru, Batugade, Behau, Metinaro, Buruma and Mehara.



## Atauru

The entire marine habitat surrounding the island is of ecological importance and crucial to the livelihoods of its people. Despite so, only a part of the Island has been captured and set forward as a priority. Data from NOAA collected in 2013 has clearly shown correlations between fish biomass and population density in different parts of the island. Furthermore, fish biomass within the proposed protected areas was markedly lower than sites under no form of management but with lower population densities. Given these complexities, the entire Atauru Island should be considered a management priority zone. Efforts should be made to protect the habitats and stocks found in the West Coast of Atauru, and restocking areas which take into account the bathymetric uniqueness of this Island need to be considered.

## Batugade

Berluli, the area in West Timor which borders Batugade, is an area of high biological importance due to mangrove and other associated habitats. The area past Berluli from the Timor-Leste border (Mota Ain) until the rock which gives the name “Batuk gede” (Big Rock) has virtually no coral reef based on NOAA survey data which struggled to find hard-substrate bottoms for Fish biomass surveys. There is a big continual area of reef within the greater unit which Wilson et al. (2009) called Batugade where coral reef health is good and fish stock and biomass appeared healthy. This area close to the Fishing Centre of Beacou ought to be considered a priority area for management interventions.

Importantly, population growth in the Bobonaro and Liquica districts has led to an increase in the number of fishermen since 2005, and associated increases in fishing pressures. It is important that Government focuses some efforts in awareness raising to establishing a co-managed fisheries replenishment area (a no take area) in Beacou to ensure the sustainable growth of this fishing centre.

It is important to note that some level of finance has already been channelled to areas *nearby Beacou but not in Beacou*. Such efforts include those of the ADB through its GEF funded CT-Pacific program. Efforts should be made to ensure the alignment of that program with current findings.

## **Behau**

Behau area is important from both an ecological and socio-economic perspective. Field survey data shows an area with high coral cover, important fish spawning habitats and a continuous seagrass bed stretching from Suco Duyong to Suku Uma Kaduak. Despite this, Wilson et al. (2009) design does not include this area. This is an area under increasing threat from pressures associated with population growth and rural development and requires additional management interventions.

Conversely, the area immediately to the east of Behau (Lamsana) was included in the original Lesser Sunda design but the area of ecological importance has been found to be fairly small and localized. The area is also under considerable threat and has suffered impacts of sedimentation and bloom in Crown of Thorns which have damaged several reef patches (Erdman & Mohan, 2012). Subsequent surveys have shown similar results and the absence of coral reefs (NOAA & DNPA unpublished data, 2013).

The Lamsana area is currently under local management arrangements with the Suco Council. This process was led by the District Fisheries Officer and established with support from the Locally Managed Marine Areas group in Indonesia, funded through the Coral Triangle Support Partnership (CTSP). It is important to strengthen the current management systems which have been put in place so as to deal with land based threats, particularly sedimentation, which has been identified as a significant threat around Ma'abat. Furthermore, more support should be provided to the district to start exploring the possible expansion of the management zone to include a replenishment zone in the area between Suco Duyong and Uma Kaduak (Behau).

## **Metinaro**

Metinaro is covered by the proposed area that Wilson et al. (2009) somewhat confusingly called Behau (it doesn't include Behau at all). This area is biologically important due to the Mangrove, Seagrass bed and coral reef association which they host, an association hard to find in country as well as in the region. Notably, Timor-Leste's largest continuous mangrove forest and seagrass bed are found in the area of Metinaro. This is an area under increasing threat from pressures associated with population growth and rural development and requires additional management interventions.

## **Buruma**

Unfortunately former prioritization exercises failed to identify an area in Baucau. Despite this, new biological data points to the importance of an area called Buruma which has healthy fish stocks, good healthy habitats and a markedly high number of apex predators which are not found elsewhere in the island. For these reasons, Buruma should be considered as a priority area for the establishment of a fisheries replenishment area as well as the introduction of guidelines for sustainable artisanal fisheries. Additionally, further surveys ought to be conducted in this area to ascertain if the biological values justify the proposal of this area as a Marine Protected Area.

While this zone is still far away from the nearest managed area (Nino Konis Santana National Park) [about 80 km apart] having an area in Baucau may be seen as the Government taking one step towards connecting different fisheries management areas and increase connectivity between sites.

## **Mehara**

In 2012, NDFA worked with the USAID Coral Triangle Support Partnership (CTSP) to conduct a Rapid Assessment Program in the Nino Konis Santana National Park. The surveys recommended the establishment of a “no take” area between Com and Tutuala to ensure biological connectivity between the sites and improved climate resilience for the system as a whole. The site of Loikere, in Suco Mehara, was identified with strong scientific evidence demonstrating its ecological importance and value. Loikere has high biodiversity and is thought to play an important role in the life cycle of several important species. Despite this, the site is under increasing threat from illegal fishing. Loikere is a priority area for the establishment of a “fisheries no take area”.

Importantly, the CTSP project also reviewed the design of the MPA system within the National Park and recommended the establishment of an additional protected site on the South Coast, near the Lore 1—Maupitine border. Again, the additional site was recommended to improve connectivity and climate resiliency. Insufficient data is available to identify a proposed site at this stage.



## **Prioritizasaun zona jestaun rikusoin peskeiru iha Timor-Leste nia Tasi Feto**

### **Tan sá mak ita prioritiza zonas asaun?**

Ita prioritiza zona asaun hodi aseguira alokasaun efisienti ba rekursu limitadu ne'ebé Diresaun Nasionál Peska no Akikultura (DNPA) iha hodi hala'o jestaun ba rikusoin peskeiru Timor-Leste nia.

### **Sá ida lolós mak ita prioritiza?**

Nu'udar nasaun membru ba Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) Timor-Leste haktuir matadalan banati tuir ba rede área protejida tasi laran ne'ebé esta-belese iha Lesser Sunda Marine Protected Area (MPA) Design.

Prioritizasaun ne'e atu fó hanoin kona-ba zona iha área Lesser Sunda MPA nia laran ne'ebé bele sai "starting point" ka pontu partida ba asaun jestaun ba DNPA hamutuk ho parseiru.

Zona ne'e, ne'ebé ita buka atu prioritiza sai "zona biolójika xavi" hodi aseguira sustentabilidade setór peska artesanal iha Timor-Leste ne'ebé importante duni ba seguransa alimentár no nutri-saun nasaun nian.

Importante mós hato'o katak prosesu ne'e toma em konsiderasaun kapasidade rekursu ne'ebé DNPA iha atu hala'o jestaun zona tasi laran. Tan ne'e ekosistema tasi kle'an, maski inkorpora iha design husi Lesser Sunda tan difikuldade equipmentu (ró adekuadu), formasaun no akordu uzu infraestrutur (portu/jetty nst.) sai zona ne'ebé oras daudaun Timor-Leste seidak bele hala'o me-sak.

### **Sá ida mak rezultadu prioritizasaun hato'o ba ema interesadu servisu hamutuk ho setór peskas?**

Rezultadu ne'e la hato'o ba parseiru katak Timor-Leste iha hanoin atu se'es husi planu imple-menta Lesser Sunda MPA Network Design, maibé hato'o katak DNPA hahú planu asaun ne'ebé tuir faze ne'ebé reflète kapasidade no kondisaun real iha Timor-Leste.

Karik iha parte interesadu balun ne'ebé iha hanoin atu ajuda DNPA explora jestaun zona seluk iha área ne'ebé define iha Lesser Sunda MPA Design nia laran, DNPA haksolok atu explora pusi-bilidade hala'o ida ne'e tuir prosesu klaru atu define objetivu projetu nian.

### **Halo nusa mak ita halo prioritizasaun?**

Ita hahú ho prosesu halibur dadu biolójiku no sosió-ekonómiku ne'ebé iha to'o oras daudaun. Dadu ne'e inklui relatóriu. Publikasaun akadémika, referénsia husi baze dadu online no relatóriu online oioin.

Tuir fali mai, ita hala'o prosesu vizualizasaun ba dadus ne'e. Ita vizualiza no buka-tuir *padraun* (trends and patterns) tuir métodu vizualizasaun oioin ba dadu hanesan mapas, gráfiku nst.

Tuir rezultadu vizualizasaun dadu no padraun ne'e, ita buka atu hetan zona ne'ebé tékniku hare'e katak importante atu hatene kle'an liu tan. Iha kazu zona interese ne'e, ita hahú explora dí'ak liu tan dadu biolójiku ne'ebé iha no mós kondisaun xavi atu aseguira uzu responsavel ba rikusoin peskeiru.

Liu husi análize ne'e ita bele hetan informasaun detalladu liu ne'ebé permite simplifika mapa zona prioritáriu.

Ikus fali ita hare'e fila-fali nível ameasa, tuir dadu sosio-ekonómiku no informasaun husi servisu distrital peska nian, relatóriu insidente, projesaun ba kreximentu populasionál no dadu sosio-ekonómiku seluk. Ita hare'e hikas tuir dadu ne'e se ita bele afina prioridades.

### **Tan sá mak mak prioritizasaun investimentu jestaun rikusoin peskeiru importante?**

Peska (subsisténsia no artesanal) sai atividade importante ba ema ne'ebé moris iha Timor-Leste nia tasi ibun, no sai fonte proteína no rendimentu ba uma kain ida-idak. Timor-Leste ne'ebé hakru'uk ba Millenium Development Goal (MDG) ne'ebé ratififa konvensaun internasionál oioin hahú hetan ona finansiamentu atu investe hodi aseguira sustentabilidade husi setór no mós katak setór ne'e bele kontinua nafatin kontribui hodi hametin seguransa alimentár no diversifika rendimentu uma-kain ida-idak. Zona prioridade, loke dalan ba Governu atu servisu hamutuk ho ajénsia ne'ebé responsavel atu jere fundu hodi aseguira katak investimentu ne'e kontribui duni hodi hametin jestaun setór peskas.

### **Sa matadalan mak ita uza atu hametin ita nia prosesu desizaun zona prioridade?**

Timor-Leste sai nasaun membru Coral Triangle Initiative on coral reefs, fisheries and Food Security (CTI-CFF). Nu'udar nasaun membru, tékniku peskas husi Timor-Leste tuir diskusaun oioin atu hamosu matadalan banati tuir ba rejiaun no ne'ebé ajuda nasaun ida-idak atu hametin jestaun rikusoin peskeiru.

Ferramenta xavi mak "*Designing Marine Protected Areas Networks to achieve Fisheries, biodiversity, and climate change objectives in Tropical Ecosystems: A practitioner Guide*". Maski Timor-Leste seidak iha rede areas protejida (redi ida ne'ebé inklui área protejida terrestre no mariña) Diresaun Nasionál Floresta, ne'ebé iha kna'ar atu dezenvolve rede ne'e sei servisu hela atu hetan aprovasaun ba esbosu lejislasaun rede areas protejida.

Haktuir esbosu Polítika Peskas nian, objetivu daruak, Diresaun Nasionál Peska sei buka atu estabelese área jestaun mariña (iha inglés MMA) hanoin ne'ebé Timor-Leste sei kontinua buka atu alkansa tuir Ferramenta xavi mak "*Designing Marine Protected Areas Networks to achieve Fisheries, biodiversity, and climate change objectives in Tropical Ecosystems: A practitioner Guide*".

Ferramenta xavi ne'e adekuaudu atu establesimentu área jestaun mariña no haktuir Governu Timor-Leste nia kompromisu ba Konvensaun Nasoins Unidas oioin ne'ebé Timor-Leste ratifika no asina.

Konvensaun hirak ne'e inklui: United Nations Convention on Biological Diversity (UNCBD), United Nations Framework Convention on Climate Change (UNFCCC). Alem de ne'e, matadalan ne'e mós tuir Technical Guidelines for Responsible Fisheries ne'ebé prepara husi Organizaesun Mundiál ba Alimentasaun (FAO).

### **Dadu biolójiku atu halo mapa hirak ne'e foti husi ne'ebé lolós?**

Tuir lolós prosesu dauluk atu estabele rede zona protejida mariña mosu iha Coral Triangle Initiative (CTI-CFF) nia mahon. Timor-Leste sai komponente ida iha unidade biogeográfika ho naran Lesser Sunda Marine. Dadu kona-ba Timor-Leste kompila husi Wilson et al. (2009) hamutuk ho

tulun husi tékniku Diresaun Nasionál Peska no Akikultura ne'ebé involve prosesu ne'e durante tinan 2007-2009.

Dadu biolójiku hirak ne'ebé uza iha Lesser Sunda MPA design inklui dadu ne'ebé prodús liu tiha independénsia no mós durante período okupasaun.

Durante tempu ezersísiu ne'e hala'o, Diresaun Nasionál Floresta, tuir fundu husi Global Environmental Facility (GEF) hahú projetu Program of Works on Protected Areas (PoWPA) ne'ebé biban atu hetan asésu ba dadu balun ne'ebé Wilson et al. (2009) uza iha sira nia prosesu prioritizasaun, ne'ebé hamosu relatóriu National Ecological Gap Assessment (NEGA).

Liu tiha 2009, ho Timor-Leste nia involvimentu ativu iha Coral Triangle Initiative (CTI-CFF) no forum rejionál seluk ne'ebé estabesele nanis CTI hanesan, Arafura Timor Sea Expert Forum (ATSEF), Partnership in Environmental Management of Seas of East Asia (PEMSEA), Diresaun Nasionál Peska no Akikultura hetan asésu ba dadu biolójiku tan ne'ebé loke dalan atu hala'o hadi'a rezultadu ne'ebé prepara husi Wilson et al. (2009).

Dadu biolójiku inklui dadu habitat kosteiru (Boggs et al. 2009) kona-ba dezvoltamentu peskeiru iha ponta leste (Lloyd et al. 2009), kona-ba biodiversidade espésie mariñu iha Parke Nasionál Nino Konis Santana (Ayling et al., 2009), kona-ba produtividade mariña no ligasaun entre sistema terrestre no mariñu (Wasson et al., 2009).

Haktuir esforsu makás ne'e, Diresaun Nasionál Peska no Akikultura (DNPA) tuir forum CTI-CFF nian asegura finansiamentu husi Governu Estadu Unidus Amérika nian no biban atu hala'o levantamentu biodiversidade mariñu (Erdman & Mohan, 2012), Levantamentu biomasa ikan iha tasi feto (NOAA & DNPA seidauk publika) no hahú prosesu foti dadu kona-ba impaktu alterasaun klimátika ba ekosistema tasi ibun (peskiza la'o hela).

Dadu biolójiku kona-ba espésie invertebradu hanesan Ahu-ruin, ita hetan diskrisaun iha Erdman no Mohan (2012) no dadu kona-ba kobertura husi National Oceanographic Atmospheric Administration (NOAA).

Dadu biolójiku densidade espésie invertebradu balun iha Parke Nasionál Nino Konis Santana mai husi Ayling no kolega (2009) no espésie invertegradu seluk, krustasio no sel-seluk husi Australian National Museum (unpublished) ne'ebé hala'o peskiza iha tinan 2012.

Para além de dadu ne'e rekonstrusaun stock peskeiru iha Timor-Leste 1950-2009 halo tuir projetu *Sea Around Us Project* tuir esforsu makás husi belun Barbosa (2009).

Além de ne'e ita mós uza dadu Catch Per Unit effort (CPU) ne'ebé rejistu iha logbook husi distritu balun ne'ebé revé husi Departamentu Jestaun Rekursu Mariñu no Peskiza Akuátika ho tulun husi Local Marine Managed Areas (LMMA) Foundation Indonesia iha tinan 2011-2012.

Dadu seluk ne'ebé asésu mak dadu husi Fishbase, husi relatóriu Reefs At Risk (Burke et al, 2012) no Reefchek. Dadu seluk mós Rezultadu husi diskusaun husi ezersísiu prioritizasaun husi Critical Ecosystem Partnership Fund (CEFP) (Burung Indonesia, 2013, unpublished).

Tuir lolós ho dadu biolójiku nato'on ne'ebé ita iha ita bele hahú iha vizaun jerál kona-ba rikusoin no ita bele loke dalan ba desizaun, tuir evidénsia kona-ba halo nusa mak ita bele jestaun rikusoin peskeiru iha Timor-Leste nia tasi feto.

Tahan ka “Layers” mapa nian ho dadu oioin halibur tiha ona husi Ministériu Komérsiu, Indústria no Ambiente (2009-2013) hamutuk ho tulun husi Governu Noruega ne'ebé kria database “Ambiente TL” ne'ebé permite ema hotu-hotu uza no halo mapa gratis ho dadu oioin ne'ebé iha.

### **Dadu Sosio-ekonómiku foti husi ne'ebé lolós?**

Governu Timor-Leste biban atu halibur dadu sosio-ekonómiku oioin, eskala nasionál nian mak Census uma-kain ne'ebé hala'o iha 2010 (RDTL, 2010) no mós dadu oioin lokalizadu tuir programa rejionál hanesan Regional Fisheries Livelihood Program (RFLP) ne'ebé hetan finansiamentu husi Governu España no mós programa seluk iha CTI-CFF nia mahon, hanesan, Coral Triangle Pacific, ne'ebé hetan fundu husi Banku Aziátiku Dezenvolvimentu (ADB). Importante re-alsa katak programa ADB ne'e mós asésu fundu ne'ebé Nasoins unidas aloka ba Timor-Leste tuir Global Environmental Facility (GEF) no sai parte ki'ik ida husi benefísiu Timor-Leste nian atu ratifika konvensaun UNCBD no UNFCCC.

Dadu sosio-ekonómiku hotu-hotu husi Diresaun Nasionál Estatística iha geo-referénsia nune'e mós ita bele hare'e pozisaun uma-kain ida-idak iha ita nia prosesu explora dadus. Alem de ne'e, tuir dadu sensu-peskadór ne'ebé DNPA hala'o iha tinan 2012 ho tulun husi FAO tuir ninia Regional Fisheries Livelihood Program (RFLP) ne'ebé mós geo-referénsiadu, ita bele vizualiza sentru peskadór no hatene nia artes de peska no número embarkasaun nu'udar dadu aproximadu/ “proxy” atu iha vizaun kona-ba presaun.

Kondisaun sosio-ekonómiku mós importante ba ita atu hatene presaun, alein de informasaun ne'e, DNPA mós hetan asésu ba mapeamentu ameasas “*overfishing*” sobre-captura. Dadu hirak ne'e mós tradús ba mapa.

### **Rezultadu análize:**

#### ***Zona prioridade tuir análize preliminar husi Wilson no kolega (2009) falta fatin balun no fatin balun hetan ona estragu makás.***

Prosesu selesaun ne'ebé Wilson no kolega hala'o iha 2009 tuir **prinsípiu danein** (6) husi ferra-menta rejionál ne'ebé hatete katak: “Area Mariña Protejida ho uzu multiplu (ne'ebé permite ativi-dade peska artesanal no subsisténsia iha zona balun) tenke luan-liu.

Maski ne'e, rezultadu husi ezersísiu mapeamentu husi Bogg et al. (2009), dadu husi Erdman no Mohan (2013) no mós dadu ne'ebé NOAA halibur iha Juñu 2013, peskiza hirak ne'e, ne'ebé DNPA uza nu'udar dalan atu hala'o validasaun ba análize ne'ebé Wilson no kolega halo iha tinan 2009, ita hare'e katak mapa ne'e la inklui zona seluk ne'ebé importante pontu vista sustentabili-dade setór peskeiru.

Realidade hatudu durante tempu DNPA buka atu hala'o finansiamentu ba sistema jestaun área boot ne'ebé Wilson no kolega propoin iha tinan 2009, DNPA susar atu aseguara finansiamentu liu husi orsamentu jerál do estadu (OJE) no mós husi parseiru dezenvolvimentu ne'ebé dala barak **la biban atu halo kompromisu ba tempu naruk.**

Kompromisu finansimanetu husi parseiru dezenvolvimentu durante períodu ne'ebé liu tinan 3 importante tebes atu fó tulun ba DNPA atu hametin kapasidade funsionáriu DNPA, tékniku iha distritu no comunidade hodi ema hotu bele servisu integradu tuir modelu ko-jestaun. Tempu ne'e mós permite ba DNPA atu hatama zona ne'e iha planu anuál asaun no mós asegura finansiamentu sustentável liu husi OJE.

### **Haktuir esperiênsia ne'e DNPA no parseiru servisu hahú hala'o prioritizasaun**

**Zona Batugadé** – Tuir lolós zona iha Mota-ain sorin (NTT) “Berluli” iha importánsia biolójika tan nia ai-parapa no ninia tipu habitat. Husi Mota-ain mai to'o Batugade no to'o fatuk tasi ne'ebé fó naran ba fatin “Batuk-gede” dadu preliminar husi espedisaun NOAA rua (2012-2013) susar atu hetan zona ho ahu ruin. Maski nune'e área liu área ida ne'e iha ahu-ruin ho saudi di'ak no stock peskeiru ne'ebé fó moris ba peskadór iha sentru Beacou.

Maski volume ikan ohin loron sei iha, se ita hare'e kreximentu populasionál iha Distritu Bobonaro no Distritu Liquiça, kreximentu número peskadór no espansaun sentru peskadór, presaun ba rekursu peskeiru sei aumenta iha tinan 5 tuir mai nune'e mós importante hahú atividade sensibilizasaun no estabelese “zona repovoamentu peskeiru” iha ne'e.

Importante mós hanoin katak zona ne'e hetan finansiamentu husi parseiru Dezenvolvimentu, Banku Aziátiku Dezenvolvimentu (ADB) tuir programa CT-Pacific ne'ebé mós asésu ba fundu husi Global Environmental Facility (GEF).

**Zona Behau** – Zona Behau, importante tebes (pontu vista ekolójiku, no pontu vista sosio-ekonómiku), maski nune'e Wilson no kolega (2009) halibur zona Hera no Cristo Rei, la inkorpora zona Behau iha unidade ne'ebé sira bolu Behau. Ida ne'e hamosu difikuldade interpretasaun lokalizasaun no komunikasaun kona-ba zona atu proteje.

Dauluk, *Zona Cristo Rei*, hetan tiha ona estatutu espesial nu'udar área protejida, ida ne'e signifika katak oras daudaun, Diresaun Nasionál Floresta sei responsabiliza ba ninia jestaun. Maski nune'e, jestaun ne'e tenke hala'o em konjuntu tuir komité jestaun ida.

Daruak, Zona Hera no Metinaro iha importánsia biolójika makás tan ninia asosiasaun Ai-parapa, Du'ut Tasi no Ahu-ruin, asosiasaun ne'ebé difisil atu hetan iha rejiaun. Zona Hera-Metinaro hetan ameasa oioin ne'ebé la hanesan fatin seluk, nune'e mós ninia sistema jestaun ba área ne'e úniku. Maski Zona Hera iha Ai-parapa, maioria ai-parapa no du'ut tasi iha hetan iha zona Metinaro.

Datuluk, Ahu-ruin husi Behau la tama ba zona ne'ebé Wilson no kolega hanaran Behau. Importante realsa katak iha Metinaro ita hetan duni Ahu-ruin no faixa ne'e kontinua husi Suku Duyong to'o Suku Uma-kaduak (NOAA, DNPA unpublished).

Iha área jestaun ne'e, ne'ebé Wilson no kolega hanaran Behau, rekomendasaun mak fahe ba Zona tolu (3): Cristo Rei, Hera-Metinaro, Behau.

**Haktuir análize** ba dadu biolójiku, análize ba dadu sosio-ekonómiku, análize ba ameasa **zona ho prioridade a'as liu** iha unidade ne'e **mak zona (1) Metinaro no (2) Behau**.

**Zona Atauro** - Illa Ataúru tomak iha importánsia ekolójika makás. Maski parte balun deit husi Ataúru hetan proposta ba área protejida, tuir lolós dadu husi NOAA ne'ebé foti iha Juñu 2013 hatudu katak pontu vista biomasa ikan nian, zona ne'ebé la sai área protejida iha volume ikan makás liu duke ida ne'ebé atu sai zona protejida. Ne'e rezultadu husi atividade peska no densidade populacional besik área protejida. **Ataúru tomak zona prioritáriu ba jestaun prioridade jestaun no protesau stock peskeiru iha kosta oeste, zona prioritáriu ba atividade atu hala'o restocking (zona repovoamentu peskeiru) kosta este.**

**Zona Lamsanak** – Tuir lolós zona Lamsanak, ho área luan lós maibé zona ho importánsia ekolójika makás mak zona ki'ik ai-parapa iha uma lisan Lamsana nian kraik, maski nune'e, zona ne'e hetan estragu makás husi impaktu sedimentasaun no mós atake biolójiku ne'ebé hamate ahu-ruin lubuk ida iha zona Lamsanak (Erdman & Mohan, 2013). Estudu tuir mai iha zona ne'e nia laran (NOAA & DNPA, unpublished) mós hatudu rezultadu ne'ebé hanesan.

Tuir lolós zona Lamsana hetan ona protesau liu husi Regulamentu Suku, ne'ebé lidera husi servisu Distrital Peskas iha Distritu Manatuto ho tulun husi LMMA Indonesia iha programa Coral Triangle Support Partnership (CTSP) nia mahon.

Importante tebes atu hametin sistema jestaun rai maran iha zona adjasente ba zona Lamsana hodi hamenus impaktu sedimentasaun ba zona ahu-ruin ne'ebé importante ba produtividade peskeira no mós importante ba comunidade iha Suku oioin liu-liu suku Ma'abat.

Haktuir análize, rekomendasau mak atu kontinua nafatin suporta atividade peska distritu atu hala'o jestaun ba zona Lamsana (Tasi no rai maran) no mós fó tulun tan ba Distritu Manatuto atu jere di'ak liu tan unidade Behau.

**Zona Buruma** – Infelizmente iha análize husi Wilson no kolega, área Baucau la dun hetan pontu ho importánsia ba konsersasaun. Tuir dadu biolójiku ne'ebé foti iha fulan Jullu tinan 2013 ho tulun husi ekipa NOAA, ita hare'e katak zona Baucau, liu-liu iha Buruma iha habitat no biomasa kapás no mós ita hare'e katak iha número ikan predadór a'as kompara ho fatin seluk.

Maski zona ne'e ki'ik no ho distánsia liu 80 km husi Parke Nasionál Nino Konis Santana, nia bele fó tulun iha prosesu hamosu ligasaun (connectivity) entre zona protejidas no aban bainrua, tuir estudu sientifiku kle'an liu bele sai posível área protejida.

**Buruma zona prioritáriu iha prosesu estabelesimentu zona repovoamentu peskeiru no mós introdús regra peska ne'ebé sustentável.**

**Parke Nasionál Nino Konis Santana** – Haktuir servisu husi DNPA hamutuk ho programa Coral Triangle Support Partnership (CTSP) no peskiza ne'ebé hato'o husi Erdman no Mohan (2012) ita tenke hamosu zona repovoamentu peskeiru ka “no take” area ida tan entre Tutuala no Com, ne'e halo katak design ne'e tuir prinsipiu daualuk husi matadalan rejionál.

Tuir dadu ekolójiku iha Loikere, Suku Mehara, zona ne'e iha indise biodiversidade a'as no fó

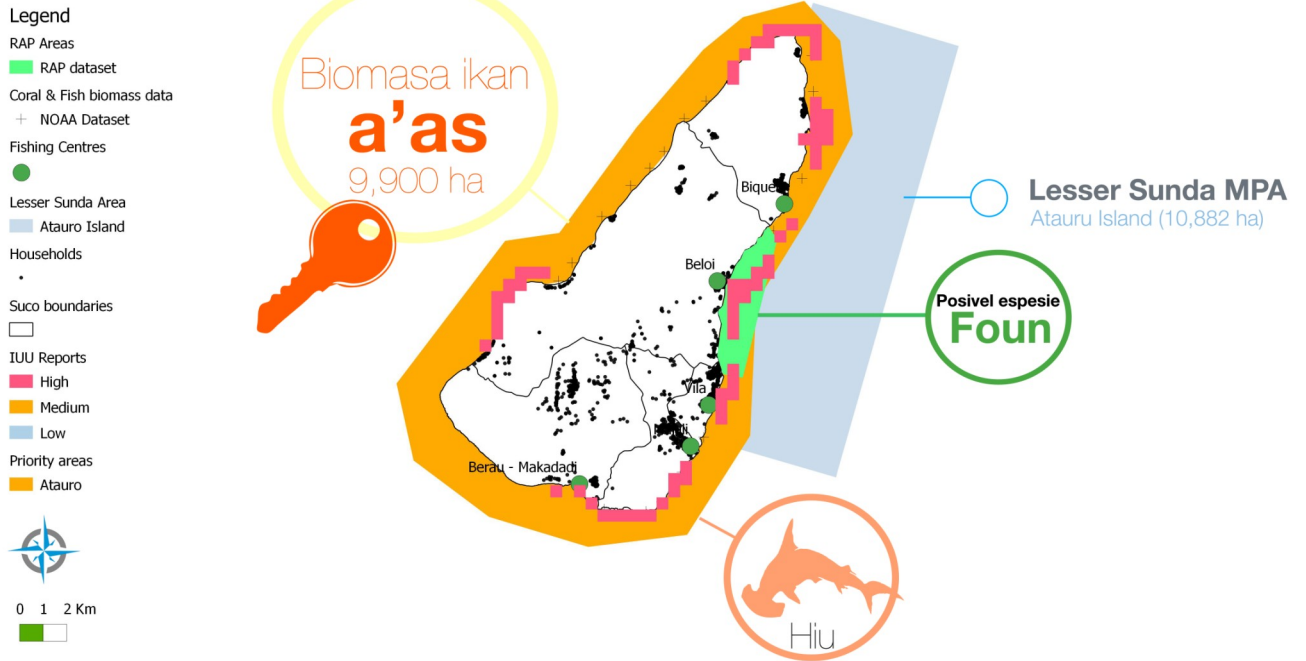
habitat di'ak ba espésie oioin nia siklu-moris. Ida ne'e hamutuk ho interese husi lideransa lokal Suku Mehara nian atu proteje fatin ne'e, no mós relatóriu atividade peska ilegal iha Loikere, zona ne'e sai pontu importante atu jere.

## **Loikere zona prioritáriu ne'ebé tenke halo zoneamentu no estabelese zona repovoamentu peskeiru**

### **Sumáriu**

1. Ho dadu ne'ebé iha Timor-Leste bele hahú prioritiza zona jestaun iha tasi badak (0-~40 metru profundidade);
2. Dadu foun hatudu katak iha zona balun ne'ebé seidak tama ba zona importante ba jestaun tuir Lesser Sunda MPA Design
3. Dadu foun hatudu katak DNPA bele hahú konsidera nu'udar zona prioritáriu ba jestaun: Buruma ( $\approx 5.6 \text{ km}^2$ ), Ataúru tomak ( $\approx 98 \text{ km}^2$ );
4. Dadu foun hatudu mós hatudu katak esforsu jestaun Lesser Sunda MPA bele hahú iha zona Metinaro ( $\approx 10.9 \text{ km}^2$ ), Behau ( $\approx 33 \text{ km}^2$ ), Beacou ( $\approx 9.2 \text{ km}^2$ ), Loikere ( $\approx 2.6 \text{ km}^2$ );
5. Hodi fasilita investimentu iha zona jestaun tasi nian ne'ebé foin teme, DNPA bele uza zona hirak ne'e, hodi sai pontu partida atu fasilita no asegura efesiénsia servisu DNPA nia iha Lesser Sunda MPA areas no konsentra esforsu atu kumpri responsabilidade naraun nian ba tratadu internasionál ne'ebé Timor-Leste asina ona.
6. Tuir dezvoltamentu kapasidade, ekipamentu no infra-estrutura, no peskiza DNPA bele habellar zona prioritáriu hodi inklui área tomak iha Lesser Sunda MPA design ka altera design ne'e tuir estudu viabilidade no estudu biolójiku no sosio-ekonómiku atu asegura efesiénsia investimentu;

# Zona ekolojika xavi ba peska iha Atauru





# Zona ekolojika xavi ba peska iha Batugade

## Legend

Fish & Coral surveys  
+ NOAA Dataset

Fishing centres

IUU Reports  
High  
Medium  
Low

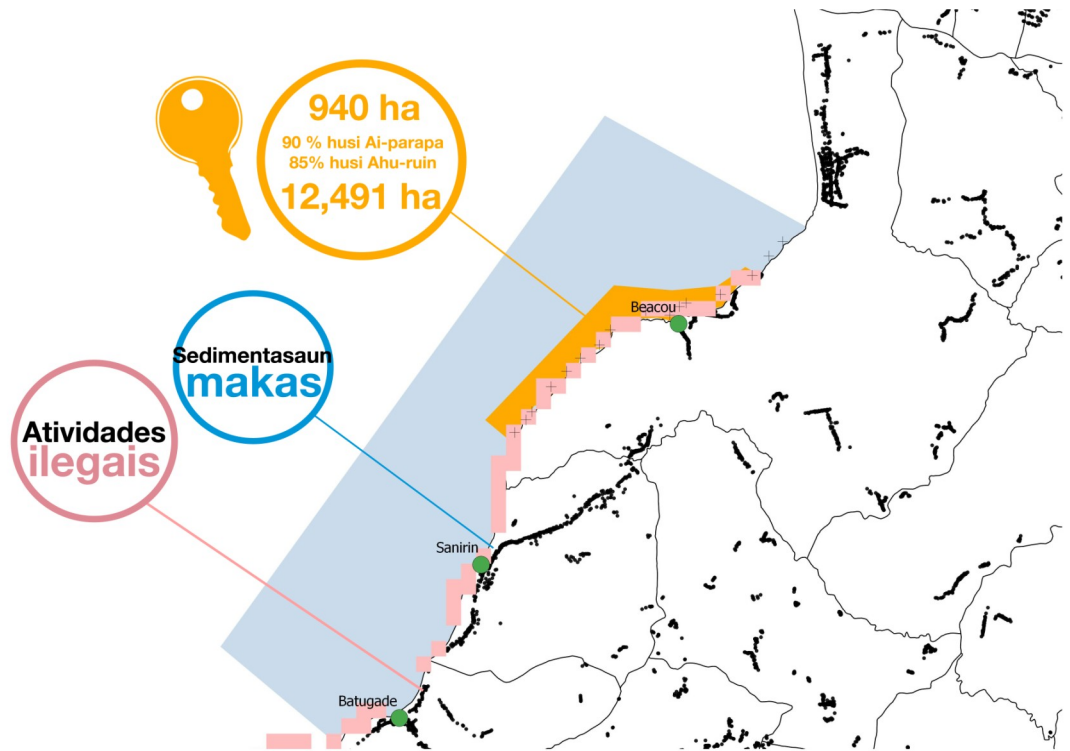
Households

Suco Boundaries

Priority areas  
Beacou

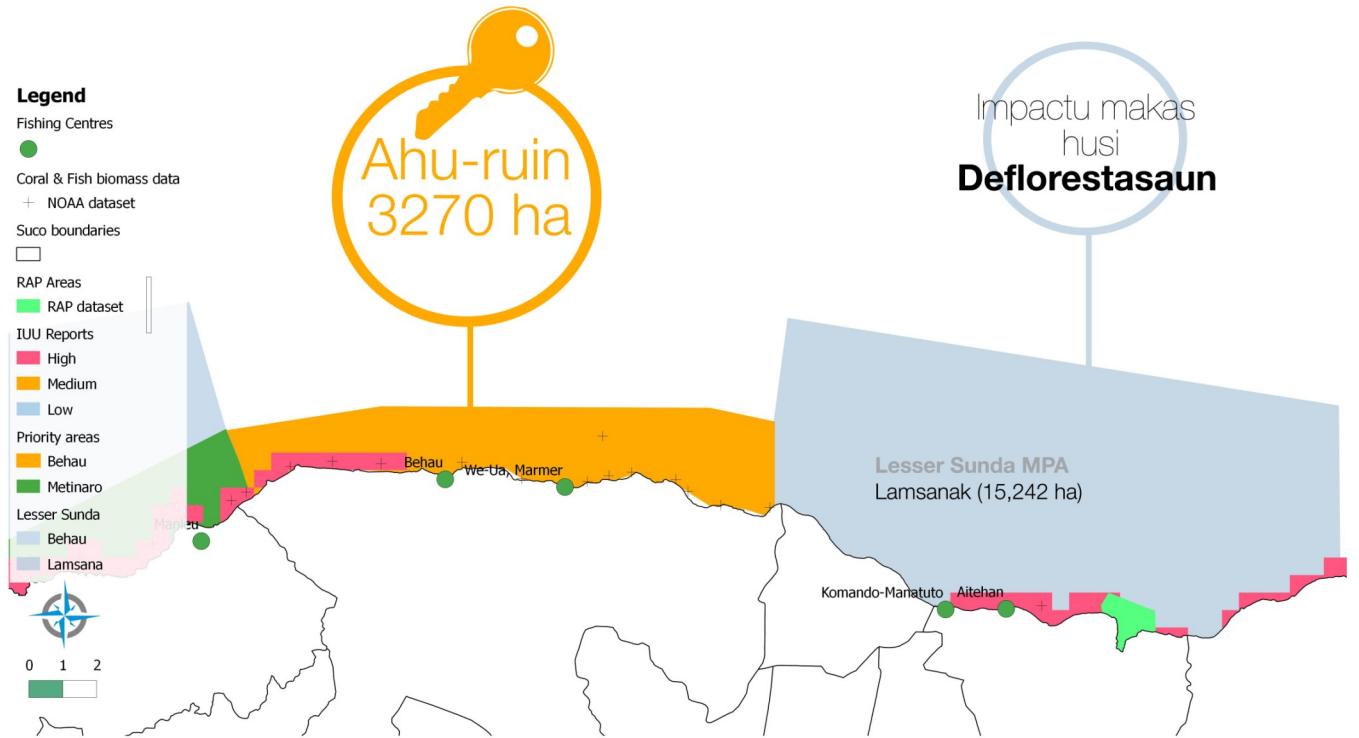
Lesser Sunda Area  
Batugade

Lamsana

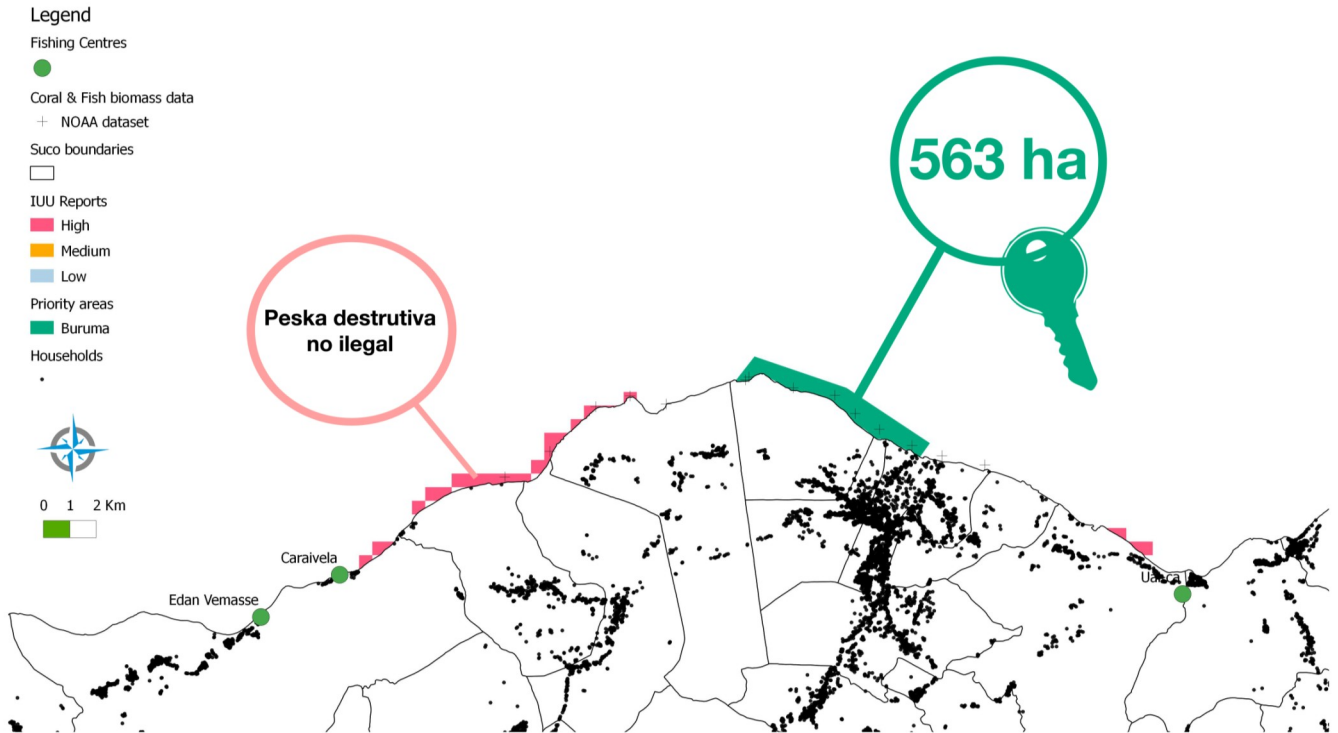


Wilson J.P., Darmawan A. and Subianto J. 2009. Rancangan Ilmiah Ielaria Kawasan Konservasi Laut vano tanaouh di Ekoreion Sunda Keol. Lacoran Akhir. Lacoran TNC Indonesia Marine Program No 2B/09. 27 hal. - NOAA (2013) unpublished data

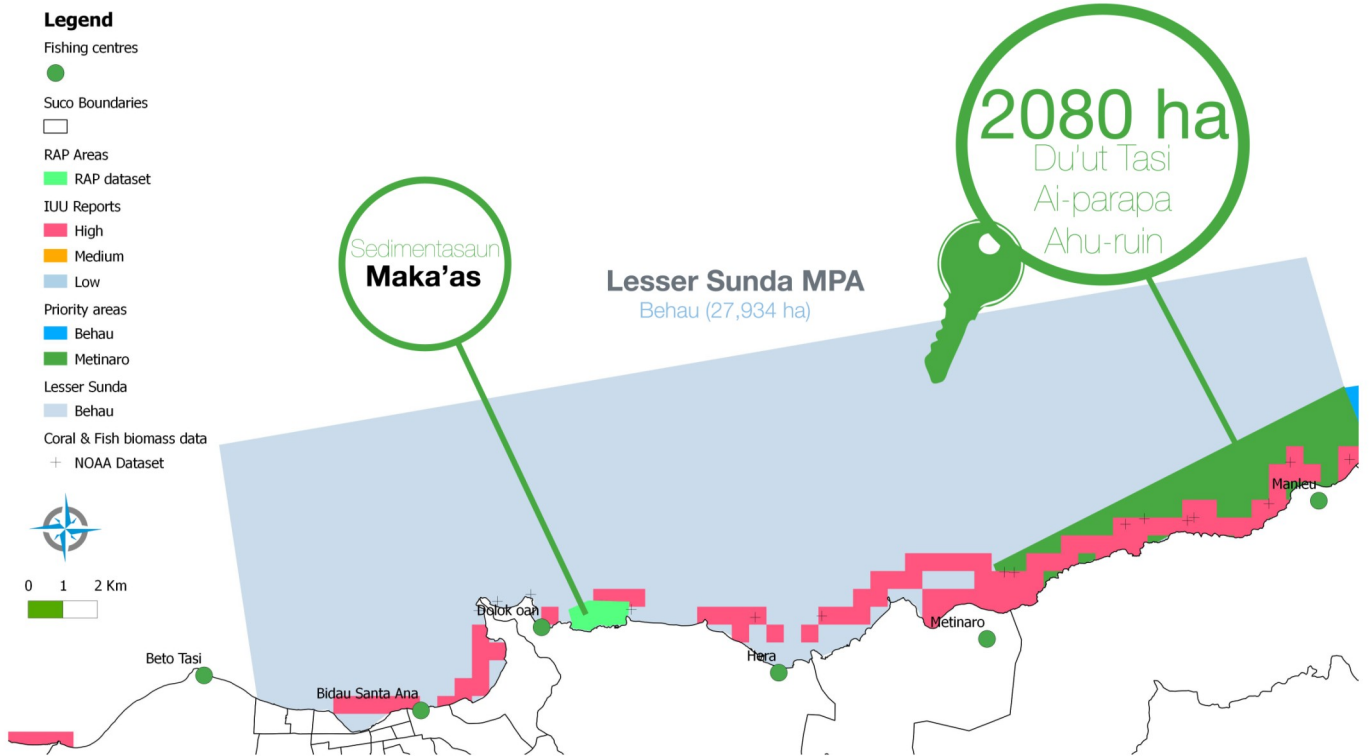
# Zona ekolojika xavi ba peska iha Behau



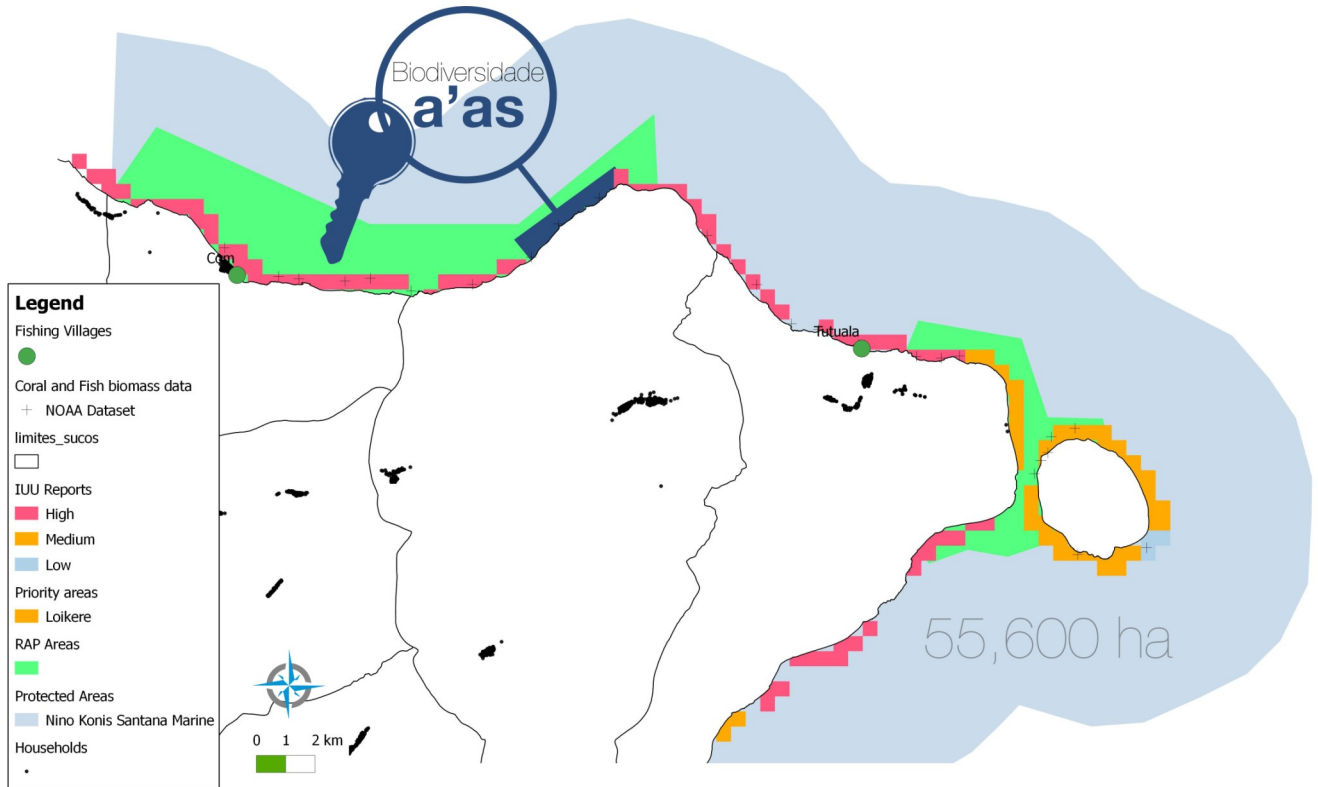
# Zona ekolojika xavi ba peska iha Buruma



# Zona ekolojika xavi ba peska iha Metinaro



# Zona ekolojika xavi ba peska iha Mehara



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