Changing oceans - impacts on iconic species

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SPREP

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PROE



Pacific Oceanscape

- Some 38 million sq km;
- Over 10% of the earth's surface;
- Threatened and endangered species of whales, dolphins, turtles, dugong and sharks;
- 30,000 diverse islands and 1000 languages;
- An area larger than the moon.





The Pacific Oceanscape

A secure future for Pacific Island Countries and Territories based on sustainable development, management and conservation of our Ocean.

"We are the sea,
we are the ocean,
we must wake up
to this ancient truth."

Epeli Hau'ofa (2008)

© Stuart Chape

The Pacific Oceanscape Framework report can be downloaded at www.sprep.org

Key conclusions of IPCC report (1)

- The ocean has absorbed about 30% of the emitted anthropogenic CO2, causing ocean acidification . About half of the anthropogenic CO2 emissions between 1750 and 2011 have occurred in the last 40 years;
- Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90% of the energy accumulated between 1971 and 2010 - i.e. most of the warming caused by recent human-generated emissions (half the total since the Industrial Revolution) has come in the last 40 years and have been largely absorbed by the oceans.

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Key conclusions of IPCC report (2)

- The ocean will continue to warm and acidify, and global mean sea level will continue to rise;
- Models project a global increase in ocean acidification for all scenarios by the end of the 21st century;
- Oceania is one of the most vulnerable regions.

Impacts of Climate Change on Oceans (1)

- **Temperature rise:**
  - **Changes in ocean currents and upwellings**
  - **Changes in prey availability**
  - **Coral bleaching**
  - **Changes in distribution of migratory species**
  - **Changes in larval dispersal**
  - **Changes in timing of migrations (e.g. humpback whales)**

Impacts of Climate Change on Oceans (2)

- **Ocean Acidification:**
  - Warmer water holds more CO_2
  - CO_2 dissolves in water to form Carbonic Acid
  - The greater the amount of CO_2 in water, the more acidic it becomes and the more easily it dissolves calcium and silicon
  - This will have profound effects on marine wildlife, from plankton to coral reefs to whales

WARMING OCEANS
OCEAN ACIDIFICATION

SPREP WILL IMPLEMENT A PROGRAMME ON OCEAN ACIDIFICATION FUNDED BY NZ GOVT TO:

- **Increase ecosystem resilience to Ocean Acidification;**
- **Develop a knowledge base for improved policy and planning;**
- **Improve the monitoring of Ocean Acidification; and**
- **Develop a Framework of Action for adapting to Ocean Acidification at the local level**

WARMING OCEANS

IMPACTS ON CORAL REEFS

- At a temperature increase of 1.5 degrees, small islands will encounter severe climatic stresses – coral reefs will bleach and eventually die at 2 degrees;
- Global mean temperature will increase in a variable manner so localised impacts may be more intense than just 2 degrees increase;



WARMING OCEANS
CHANGES IN FISH DISTRIBUTION

- Predictions are that warming oceans will result in a displacement of the main tuna stocks from West to East;
- Besides unknown impacts of temperature rise on fish, this may result in tuna spending more of the life cycle in Areas Beyond National Jurisdiction (ABNJ), where PI countries will not receive access fees.

(i) IUCN Red List



Critically Endangered

Hawksbill Turtle



Endangered

Green Turtle



Critically Endangered

Leatherback Turtle



Vulnerable

Olive Ridley Turtle



Endangered

Loggerhead Turtle



Data Deficient

Flatback Turtle



Kemp's Ridley Turtle

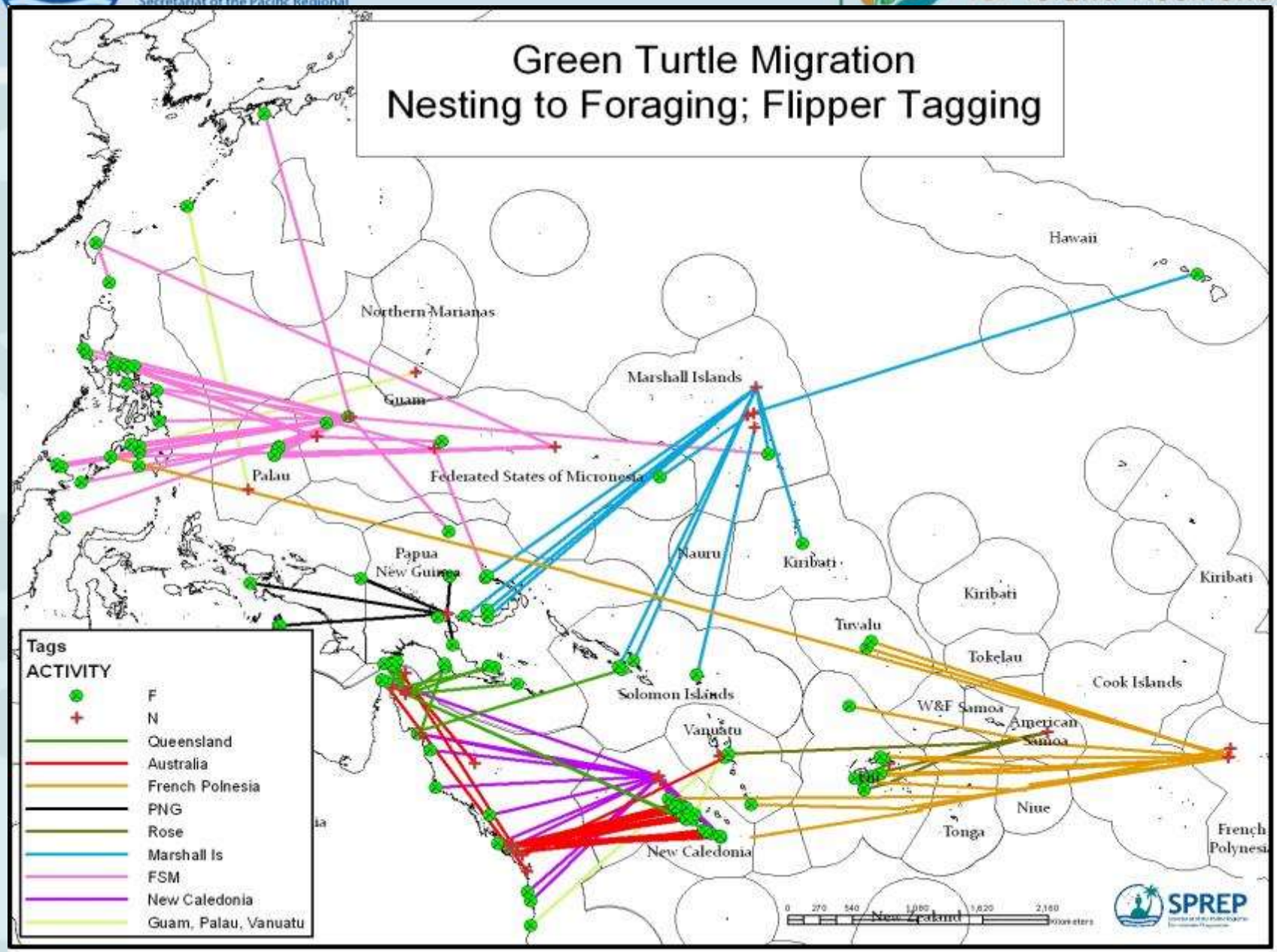
Critically Endangered

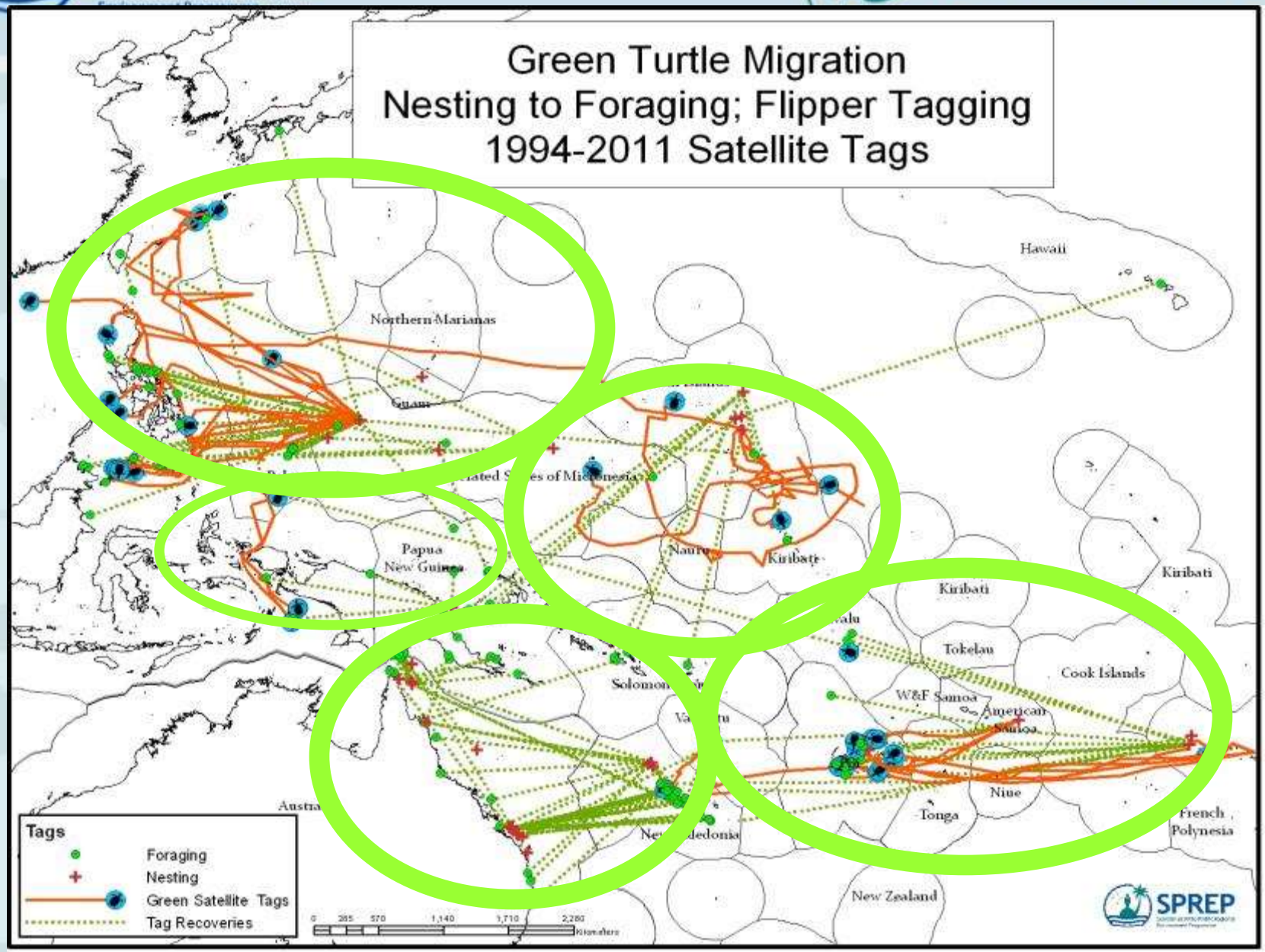
Critically endangered: one criteria is ≥80-90% population reduction measured over the longer of 10 years or 3 generations

Endangered: one criteria is ≥50-70% population reduction measured over the longer of 10 years or 3 generations

TURTLE MIGRATIONS

- **Many turtle stocks in the Pacific Ocean have been significantly reduced, because of the traditional take of turtles and turtle eggs, habitat loss, by-catch in fisheries and the impacts of invasive species and climate change.**
- **We know something about the migration routes from flipper tagging – SPREP has distributed some 56,000 tags around the region, of which about 19,000 have been deployed and over 300 tagged turtles have been recaptured.**
- **Data is stored in the TREDS database.**


Green Turtle Migration
Nesting to Foraging; Flipper Tagging
Hawaii
Northern Marianas
Guam
Marshall Islands
Palau
Federated States of Micronesia
Papua
New Guinea
Nauru
Kiribati
Kiribati
Kiribati
Tuvalu
Tokelau
Cook Islands
W&F Samoa
American
Samoa
Solomon Islands
Vanuatu
Niue
Tonga
New Caledonia
French
Polynesi
New Zealand
Tags
ACTIVITY
F
N
Queensland
Australia
French Polnesia
PNG
Rose
Marshall Is
FSM
New Caledonia
Guam, Palau, Vanuatu
SPREP


Green Turtle Migration
Nesting to Foraging; Flipper Tagging
1994-2011 Satellite Tags
Hawaii
Northern Marianas
Guam
Papua New Guinea
Nauru
Kiribati
Kiribati
Tokelau
Cook Islands
W&F Samoa
American Samoa
Niue
Tonga
French Polynesia
New Zealand
Tags
Foraging
Nesting
Green Satellite Tags
Tag Recoveries
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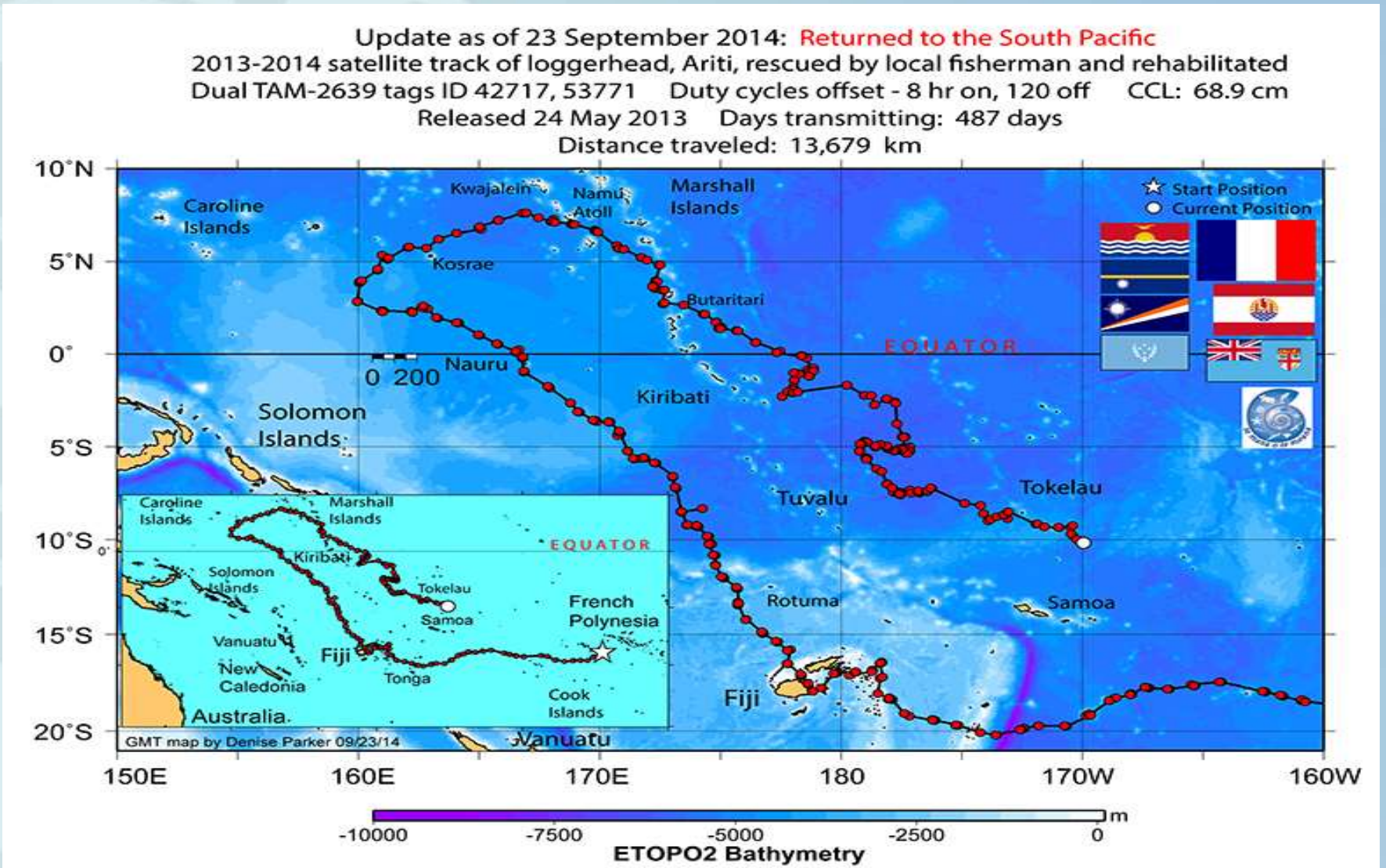
Natural Solutions for Island Resilience

Satellite tagging

Satellite tags provide precise information about individual turtles



Ariti – a much-travelled loggerhead turtle



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Climate Change Impacts - Turtles

- **Temperature rise:**
  - **Feminising of eggs with higher sand temperatures**
- **Storm surges:**
  - **Damage to breeding beaches**







Turtle Monitoring and Eco-tourism Development (in association with NZODA and NZ DOC)

(Fiji, Kiribati, Solomon Islands, 2012 - 2015)

PROJECT AIM:

- **to enhance capacity and commitment in the Pacific Region to conserve and sustainably manage endangered marine turtle populations.**
- **to achieve, through turtle related management & ecotourism activities:**
  - **increased skills,**
  - **sustainable economic benefits,**
  - **improved livelihoods for local communities.**

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ACTIVITIES :

1.capacity building workshops & field training,

2.establishing turtle monitoring & conservation management programmes,

3.education and awareness-raising,

4.investigation & establishment of turtle-related eco-tourism initiatives



Dugong in the Pacific Islands

- 6 range states (Australia, New Caledonia, Palau, PNG, Solomon Is, Vanuatu) - all have signed CMS MoU
- Largest global population PNG/Torres Strait/Australia
- 3rd largest global population New Caledonia
- Only current abundance estimates: Torres Strait/Australia and New Caledonia
- Palau is most isolated global population
- Very little known about Vanuatu, PNG and Solomon Islands







Dugong and Seagrass Conservation

- GEF-funded Project - $5.88 mill globally
- 8 countries inc Solomon Islands and Vanuatu ($800k approx);
- Opportunity to share information between range states; maximise technical support for design and implementation of projects; support conservation outcomes;
- GEF and Dugong MoU projects will support the conservation priorities identified in Dugong Action Plan, part of the SPREP Regional Marine Species Programme (2013–2017);



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Seagrass – a productive ecosystem and a natural protection against climate change

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Provide nursery for some fisheries (fish and prawns)



Juvenile emperors, Micronesia



Rabbit fish, Solomon Is

Food for animals protected or vulnerable to extinction

- a **dugong** can eat 28-40kg of seagrass in a day



- a **green turtle** can eat 2kg of seagrass leaves in a day



Provide important ecosystem services

- **oxygen pumps** (1m^2 of seagrass can produce up to 10 litres of O_2 per day)



- **nutrient cycling** (1 ha of seagrass absorbs 1.2 kg of nutrients per year)



Provide important ecosystem services

Carbon sequestration

- **12% of global carbon stored in ocean sediments**
- **Globally, seagrasses are as important as forests in storing CO_2 *(on an areal basis)* and <u>can store carbon 35 times faster than rainforests</u>**



Lavery et al 2013 PLOSone 8(9), e73748

Seagrass offsets ocean acidification

- **Tropical seagrass meadows near coral reefs could offset local effects of ocean acidification, because they can increase the pH of surrounding water up to 0.38 units, making it much less acidic;**
- **In shallow water reef environments, the ability of coral to be hardened or calcified can be 18% greater downstream of seagrasses than without seagrasses.**



from Unsworth et al. (2012) Environ. Res. Lett. 7: 1-9

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Global decline of seagrass meadows

- **Globally, approximately 58% of seagrass meadows, have lost part of their distribution;**
- **Documented losses in seagrass meadows globally since 1980 are equivalent to two football fields per hour.**

Waycott et al (2009) *PNAS* 106(30): 12377–12381

Seagrass extent poorly mapped in the Pacific Islands

Globally mapped **177,000 km²**

but estimated to be **300,000 – 600,000 km²**

Pacific Islands urgently need further mapping:

Melanesia	*1,156 km²*
Micronesia	*162 km²*
Polynesia	*53 km²*

TOTAL **1,371 *km²***

Why is SPREP concerned about sharks?

- Many are threatened and migratory;
- Populations have declined significantly in the SPREP region in recent years;
- Fisheries agencies have been ineffective in halting this decline;
- SPREP is the regional coordinating agency for CMS and CITES.



Pacific Islands species listed on Annex I of the CMS Shark MoU

- Whale shark
- Basking shark
- Great white shark
- Shortfin mako shark
- Longfin mako shark
- Porbeagle shark



New CITES shark and manta ray listings – effective 14 September 2014

- Oceanic whitetip shark
- Porbeagle shark
- Scalloped hammerhead shark
- Smooth hammerhead shark
- Great hammerhead shark
- Manta rays



CITES and CMS parties in the Pacific Islands region

Country	CMS Party	CMS shark MoU Signatory	CITES Party
Cook Islands	√		
Fiji	√		√
Nauru		√	
Palau	√	√	√
PNG			√
Samoa	√		√
Solomon Islands			√
Tuvalu		√	
Vanuatu		√	√

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Fiji listings of Mobulid rays for CMS COP 11

- Giant Devil Ray
- Spinetail Mobula
- Bentfin Devil Ray
- Box Ray, Chilean Devil Ray
- Pygmy Devil Ray
- Shortfin Devil Ray
- Atlantic Devil Ray
- Lesser Guinean Devil Ray
- Munk's Devil Ray
- Reef Manta Ray



Priority Actions - Sharks

- Support initiatives for the conservation of sharks in the SPREP region, in particular coastal species;
- Promote CMS MoU on sharks;
- Collaborate with SPC, FFA, governments and other stakeholders to support initiatives to successfully implement new CITES regulations on sharks in the SPREP region;



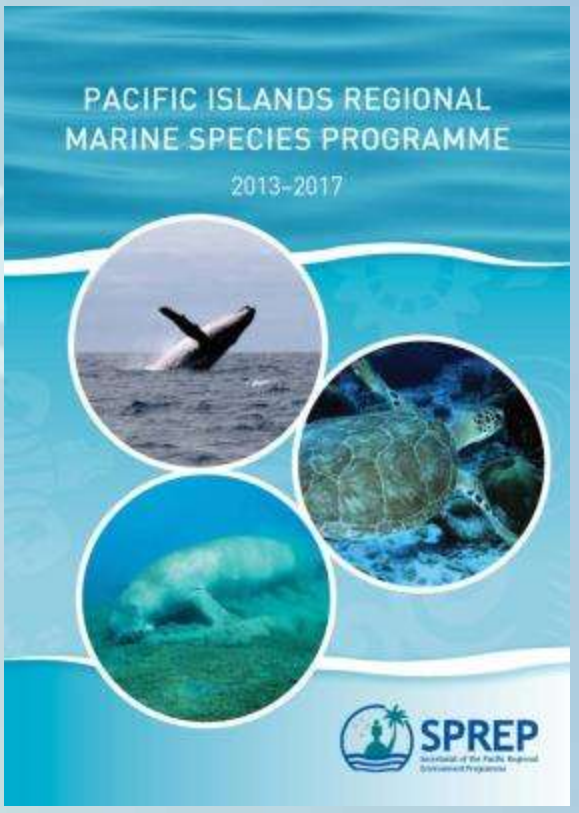
Collaboration with other agencies- Western Central Pacific Fisheries Commission

- WCPFC has conservation measures in place for blue, silky, oceanic whitetip, mako, thresher, porbeagle and hammerhead sharks;
- Whale sharks have Conservation Management Measures to protect them from purse-seining.



A better future for sharks in the Pacific Islands

- **SPREP members are leading the way in declaring shark sanctuaries and promoting shark tourism;**
- **SPREP will work with all interested member countries, relevant agencies and NGOs to update the 2008 RPOA Sharks and include it as a new Action Plan in SPREP's Regional Marine Species Programme.**



OCEANS AS A DUMPING GROUND

Marine debris: any persistent, manufactured or processed solid material discarded, disposed of, lost or abandoned in the marine and coastal environment.

Source: Secretariat of the Convention on Biological Diversity and the Scientific and Technical Advisory Panel – GEF (2012). *Impacts of Marine Debris on Biodiversity: Current status and Potential Solutions*, Montreal, Technical Series No.67, 61 pp.


© Dave Bretherton I Olive Ridley Project

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SPC/FFA REGIONAL OBSERVER POLLUTION REPORT — FORM GEN-6

OBSERVER NAME	VESSEL NAME	OBSERVER ID NUMBER	PAGE OF

- fill in one form for each pollution incident -

INCIDENT DETAILS

Ship's DATE and TIME DD MM YY hh mm	LATITUDE (dd°mm.mm') N / S	LONGITUDE (ddd°mm.mm') E / W	EEZ / HARBOUR

WIND DIRECTION	WIND SPEED	SEA CONDITIONS (C, S, M, R)	CURRENT (knts and direction °)	OBSERVER'S VESSEL ACTIVITY

NAME OF OFFENDING VESSEL	IRCS	TYPE OF VESSEL	YOUR POSITION FROM OFFENDING VESSEL: Compass Bearing	Distance (nautical miles)

WASTE DUMPED OVERBOARD

Material (Tick each box that applies)		Describe Type	Describe Quantity
Plastics			
Metals			
Waste oil			
Chemicals			
General garbage (within 12 miles of shoreline)			
Describe:			

OIL SPILLAGES AND LEAKAGES

Source	Tick each box that applies	Visual Appearance / Colour	Describe Area and Quantity
Vessel Aground / Collision			
Vessel at Anchor / Berth			
Vessel Underway			
Land based source - Describe source			
Other - please specify			

Abandoned or Lost Fishing Gear

Source	Activity	Describe Gear	Estimate Quantity
Lost during fishing			
Abandoned			
Dumped			

Other comments:

Were there any stickers/ posters displayed to remind the vessel about MARPOL Regulations? Y / N

Did you take any photos? Y / N

If yes, please state the number(s) of the photo frames or files.

MARPOL Regulations - state

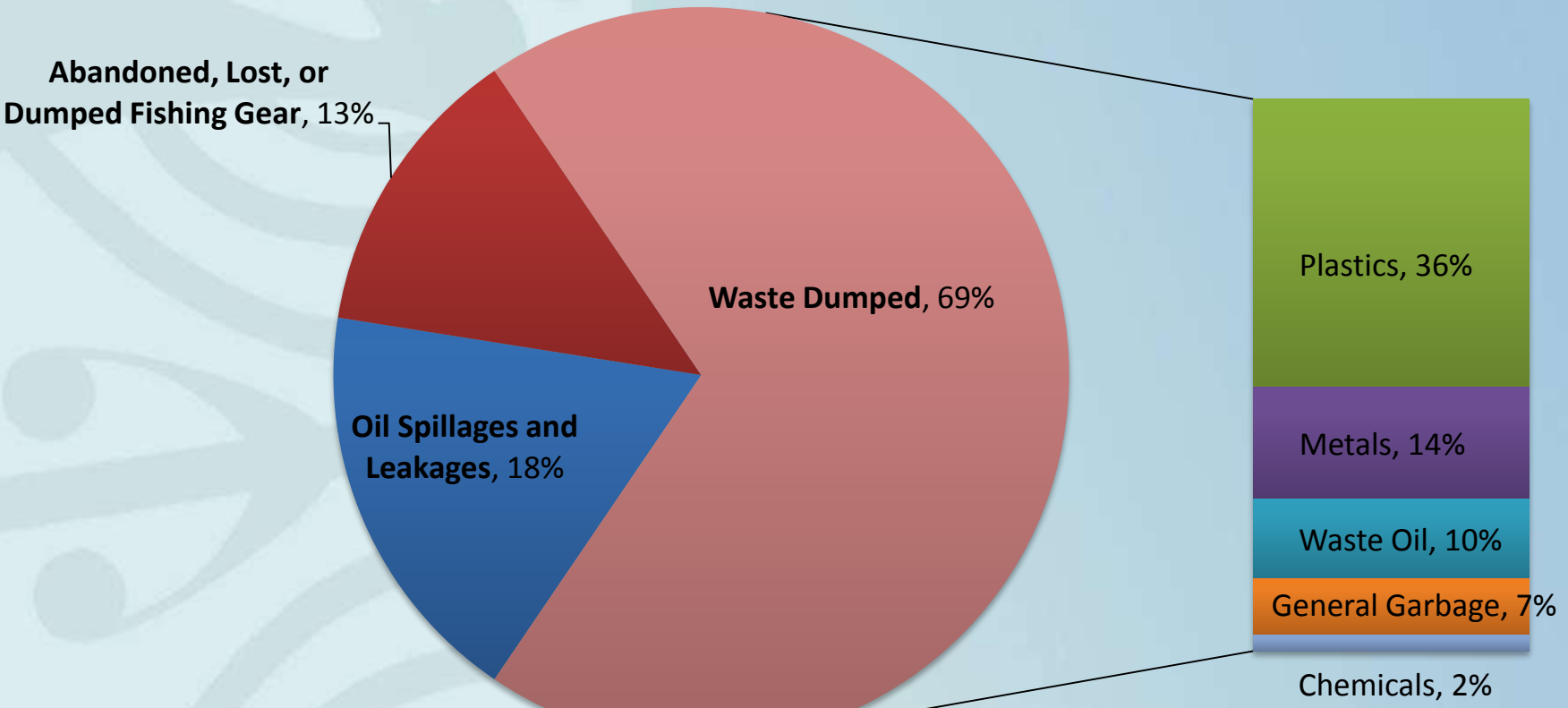
It is illegal for any vessel to discard any form of plastics into the sea at anytime.

It is illegal for any vessel to discard any form of oil into the sea at anytime.

It is illegal for any vessel to dump any form of rubbish into the sea within 12 nautical mile of the sea shore.

Observer Name	Put first name first, and your family name last.
Vessel Name	Record the full name of the vessel. Do not use any abbrevations.
Observer ID Number	Use the number assigned by the observer programme e.g. AA 03-01
Page of	Number all GEN-6 pages in sequence from the start until the end of the trip
Date of Incident (dd/mm/yy)	Date pollution seen in day, month and year. *Use ship's time as defined in other observer data collection forms*
Time (00.00 hrs)	Report the time using the 24hr clock.
Latitude / Longitude	Record the GPS positon of the host vessel when the pollution was first seen.
EEZ / Harbour	Record the EEZ or, for shorebase staff, mark port or Harbour name here.
Wind Direction	The prevailing wind direction. Use degree eg. 90 degrees for an east wind
Wind Speed	Record the prevailing wind speed.
Sea Conditions	C- Calm, S- Slight, M- Moderate, R - Rough.
Current (knts and direction)	If the vessel has a current meter find out what the current strength is.
Observer's vessel activity	State the host (observer's) vessel activity at the time of the pollution incident. Some activities to consider might be: fishing; transhipping; bunkering; transitting; aground.
Name of offending vessel	Make an effort to record the complete and proper name of offending vessel. Be careful not to make any spelling mistakes which may make it difficult to prosecute the vessel if the report goes through legal proceedings.
IRCS	The international callsign is marked in large letters on the side of the boat.
Type of vessel	Consider the full vessel and aircraft codes on the front of Form GEN-1.
Your positon from offending vessel.	Use the vessel compass to get direction of offending vessel from host vessel. The radar can be used to get an extact distance in nautical miles. Otherwise give best estimate and note if it is the observer's or someone else's.
WASTE DUMPED OVERBOARD	
Material	Tick each correct box to show which types of materials were dumped. Only tick two or more materials if vessel has dumped more than one material type over at the same time - e.g.: it dumped plastic and metal at 10:00hrs. If plastic was dumped at 10:00hrs and metal at 16:00hrs - record separately.
Describe type	Give as good a description as possible of the type of dumped material. E.g.: - plastic bags; bait boxes plastic strapping; bait boxes plastic bags; etc.
Describe Quantities	Give a best estimate of the amount dumped. Sometimes this will be easy - e.g., 12 metal oil drums were dumped. At other times the material might be too far away to see the amount. If it is too far away then estimate the amount as well as possible and make note that it is only a rough estimate at distance.
OIL SPILLAGES AND LEAKAGES	
Source	Tick to indicate where the spillage or leak came from
Visual Appearance / Colour	Describe the colour/ thickness/depth of the spill as well as able.
Describe Area and Quantity	Give a best estimate of the size of the spill. The boat could be a size reference - e.g.: it was 4 times bigger than the boat.
Abandoned or Lost Fishing Gear	
Lost during fishing	Lost by host vessel. Describe activity when gear lost (setting/hauling/soak)
Abandoned	For any fishing gear abandoned by another vessel and found by host vessel
Dumped	For any gear dumped by host vessel, see above.

Percent of Purse Seine Pollution Incidents by Pollution Types, 2004-2014



Purse Seine Pollution Incidents in Exclusive Economic Zones (EEZs) of SPREP Countries 2004 - 2014

SPREP Parties' EEZs*	Reported Incidents	Percent of Total Incidents
Papua New Guinea	4,151	52%
Federated States of Micronesia	969	12%
Kiribati	762	10%
Solomon Islands	521	7%
Marshall Islands	465	6%
Nauru	389	5%
*International Waters**	*313*	*4%*
Tuvalu	144	2%
Fiji	128	2%
Palau	73	<1%
Vanuatu	52	<1%
Cook Islands	18	<1%
Tokelau	16	<1%
Tonga	13	<1%
American Samoa	9	<1%
French Polynesia	8	<1%
Guam	7	<1%
Samoa	4	<1%
Northern Mariana Islands	1	<1%
Total	**8,043**	100%


Pacific Island whales are frequently the victims of marine debris, such as rope, carelessly discarded or lost from boats

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Whales may also become entangled in active or discarded fishing gear



SPREP's collaboration with IWC

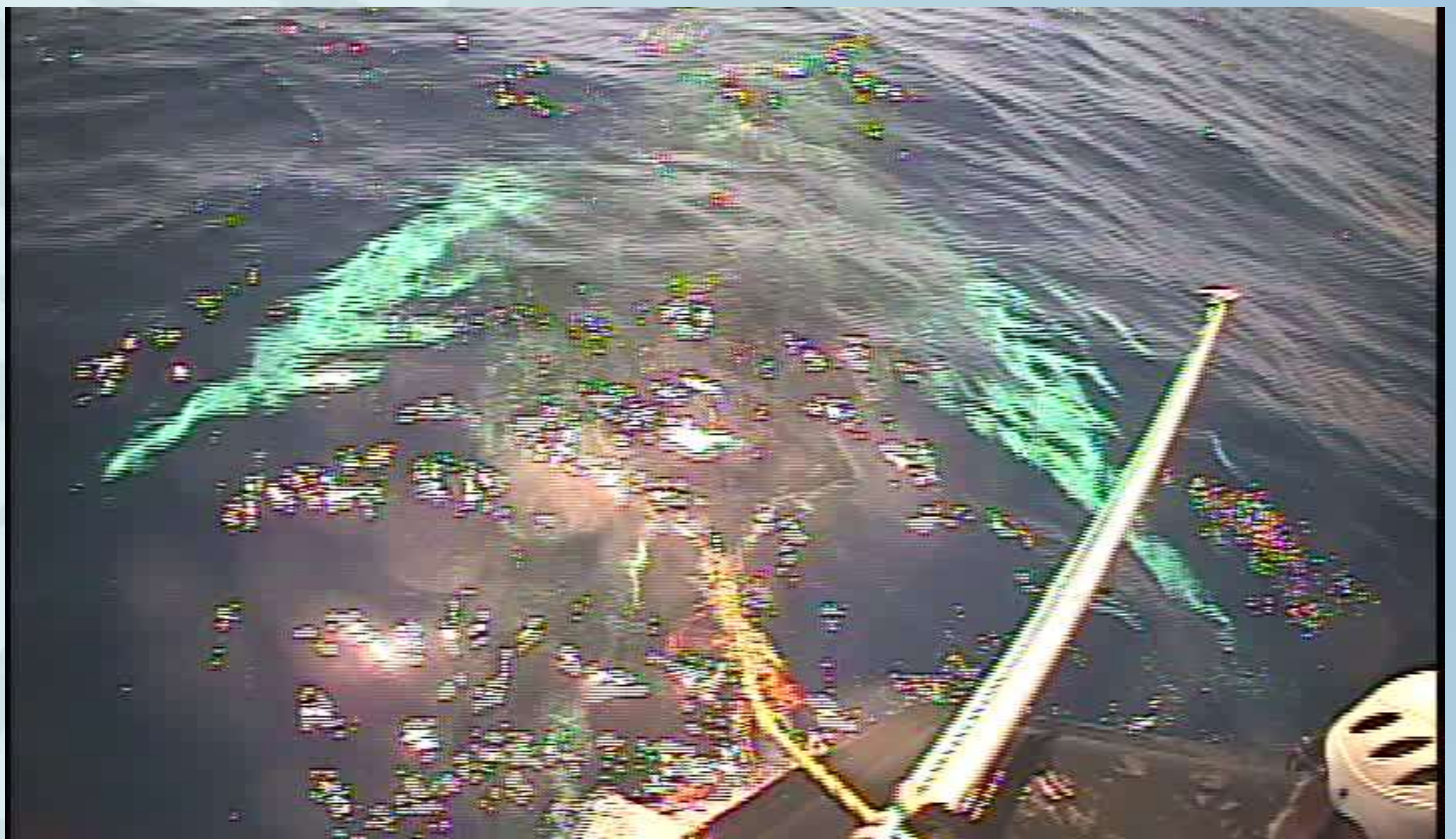
- **The International Whaling Commission has expertise in safely disentangling whales caught in marine debris such as rope and nets;**
- **SPREP and the IWC conducted a joint training workshop in July for Tonga and Vanuatu. Both countries now have specialist kits.**





SPREP's collaboration with IWC

- **This collaboration will enable Pacific Island countries to assist entangled whales**



Their future is in our hands



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