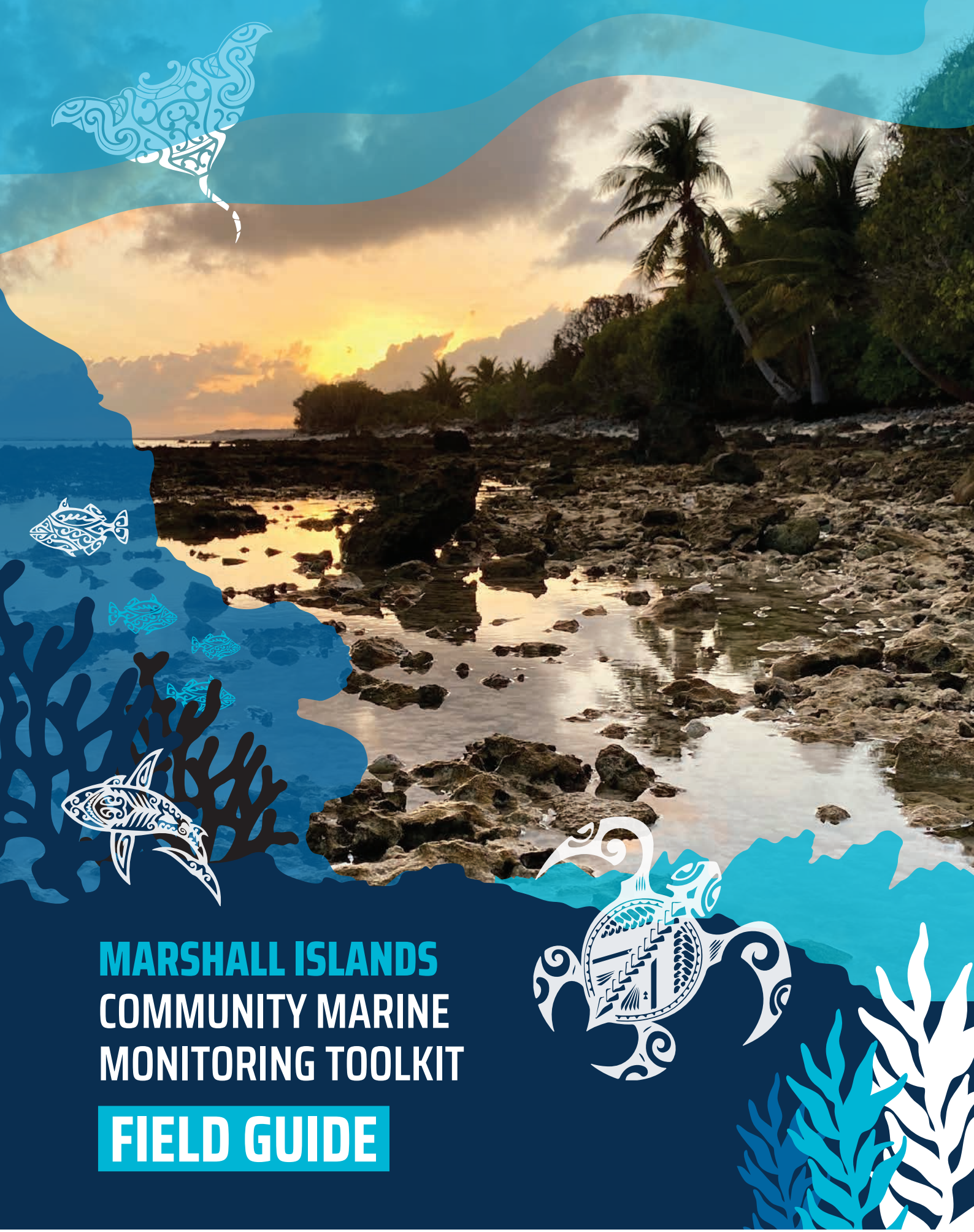


MARSHALL ISLANDS COMMUNITY MARINE MONITORING TOOLKIT

FIELD GUIDE

THE WORLD BANK
IBRD • IDA

CONTENTS

KOBBAN BOK IN

INTRODUCTION

This Field Guide has been developed to support the Marshall Islands Community Marine Monitoring Toolkit under the *Reiṃaanḷọk: National Conservation Area Plan* for the Marshall Islands. It provides guidance and tools to be used in the field when conducting monitoring using the Toolkit methods. The development of this Field Guide recognises that community members may need prompting when conducting monitoring and assistance while they become more experienced in the methods.

HOW TO USE THIS FIELD GUIDE

The Field Guide is designed to support trained community monitors and empower them to provide leadership and training for others in their community to raise awareness about local coastal resources and effective community-based resource management.

This Field Guide includes resources for each module: a quick start for monitoring methods, identification guides, data sheets, data analysis sheets, pictorial examples to assist with surveys and reporting posters. The Field Guide has five modules for community-based monitoring:

1. Fish catch surveys
2. Intertidal invertebrate surveys
3. Coral reef surveys
4. Mangrove surveys
5. Seagrass meadow surveys

Each module is independent, and community monitors can use one or more modules, depending on their local needs, issues and resources. The Field Guide provides all the steps to establish and conduct community monitoring for each module, and how to share the results with communities to inform local decisions.

IKIJJIEN FIELD GUIDE IN

Field Guide in kar ejaake bwe en jipañ im kōṃakūt jabdewōt ṃakūtkūt im jerbal ko eṃōj kōllaajraki iuṃwin Marshall Islands Community Marine Monitoring Toolkit eo im ej jarjar tok wōt jān Reiṃaanḷọk: National Conservation Area Plan eo ilo Aelōñ Kein. Bok in enaaj jineete eok kilen bwe buñtōn kaṇe ilowaan Toolkit in ren jerbal. Unin kar ejaake Field Guide in ej ñan jineete armej ro ilo jukjuk-im-pād ko kijjien ekkatak ko im jerbal-in-etale ko ṃae iien eo renaaj oktak im jet ro retijemḷọk ilo jerbal kein.

KILEN KŌJERBALE FIELD GUIDE IN

Field Guide in ej ñan jipañ im jineete armej ro ilo jukjuk-im-pād ko me ewōr aer jeḷā im imminene kijjien jerbal ko rejelōt mennin jeraaṃṃan ko jān lọjet eo im parijet in aelōñ ko aer, im bok in ej ñan bar jipañ er tōl kab bareinwōt ñan aer leto-letak eḷap meḷeḷe ñan armej ro ṃōttaer ilo jukjuk-im-pād ko aer.

Elōñ kōmmeḷeḷe in kajjojo module ko ilowaan Field Guide in: elōñ meḷeḷe ko kijjien aṃ naaj ijjino juon ekkatak im jerbal-in-etale, kōmmeḷeḷe ko kijjien menin jeraaṃṃan ko jān lọjet eo, joñaer, oraer, data sheet ko, pija in mennin jeraaṃṃan ko jān lọjet eo ñan jipañ ilo iien eṇ kwōnaaj kōṃṃani ekkatak (survey) ko im kilen kōṃṃan ripoot ilo poster. Ewōr ḷalem module ko ilowaan Field Guide in:

1. Kōmmeḷeḷe ko im kajjitōk ko rejelōt ek in pedped ko: āinwōt oraer, kilepier, kain ek rōt
2. Kōmmeḷeḷe ko im kajjitōk ko rejelōt libbukwe ko, kapwōr ko, mejānwōd (jeṇọ) ko, jipenpen ko: āinwōt oraer, kilepier
3. Kōmmeḷeḷe ko im kajjitōk ko rejelōt wōd ko
4. Kōmmeḷeḷe ko im kajjitōk ko rejelōt joñ im kōnpat ko
5. Kōmmeḷeḷe ko im kajjitōk ko rejelōt wūjooj-in-lọjet ko

Kōmmeḷeḷe kaṇe ilo kajjojo module kaṇe rāinjuon jān doon, im armej ro kappeik er bwe ren kōṃṃani ekkatak ko im jerbal-in-etale ko remaroñ kōjerbal juon iaan ak elōñ ḷọk jān juon module, pedped wōt ioon aikuj eo aer, apañ eo rej jelṃae im kab men ko repād ippāer ñan kōṃṃani ekkatak im etale ko. Eṃōj kōllaajraki buñtōn ko ilo kajjojo module kaṇe ilowaan Field Guide in ñan ḷoori im kōṃṃani ekkatak ko im jerbal-in-etale ko bwe tōprak in ekkatak kein ren tōpar armej ro ilo jukjuk-im-pād ko im bwe ren kōṃṃani jokāālōt im karōk ko aer make ālikin aer jeḷā tōprak in jerbal kein.

MODULE 1: FISH CATCH

The ***purpose*** of the fish catch surveys is to assess whether overfishing of target coastal reef fish species is occurring. Further, the catch surveys assess the level of compliance with the national *Fish Harvest Regulations 2020* that ban certain harvesting methods that are detrimental to the fish stock and set minimum size limits for key species.

Fish catch surveys also provide an opportunity to raise awareness with communities about the national regulations, the importance of not catching juvenile (immature) fish and choosing fishing practices that avoid catching juvenile fish.

MODULE JUON: EK IN PEDPED KO

Unleplep in ekkatak in im kajjitōk kein kijjien ek in pedped ko eo̧ñwōdi ej ñan ekkatak im etale eļaññe ewōr ek eṇ eļe jān joñan eo̧ñwōde (lukkuun iiet ļo̧k). Ekkatak in ej bareinwōt ñan etale im lale eļaññe ri-eo̧ñwōd ro rej ļoori karōk im koṇ ko rej kōmlōt ilo *Fish Harvest Regulation 2020* eo me ej bareinwōt kamo̧ kōjerbali kein eo̧ñwōd ko me rejelōt an lōñ ļo̧k oran jet iaan ek in pedped ko, ekoba joñan kilepier.

Ekkatak in im kajjitōk kein renaaj bareinwōt jipañ ai tok meļeļe ko ñan kōļapļo̧k jeļa eo an armej ro ilo jukjuk-im-pād ko kijjien wōt kakien im mo̧ ko, aorōkin ek jiddik ko, im kab kain eo̧ñwōd rōt ko rekkar tata bwe ek jiddik ko ren jab po.

FISH CATCH SURVEYS
SPECIES IDENTIFICATION

EK IN PEDPED KO
ETAN EK EO

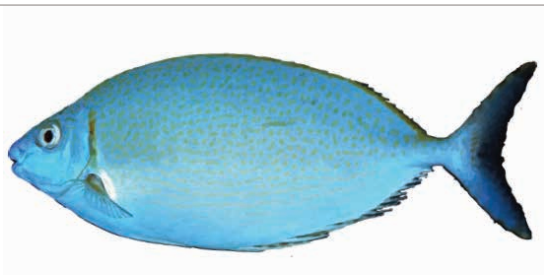
Lined surgeonfish	**Kwi**

Convict tang	**Kupañ**

Humpback red snapper	**Jato, Jaap**

Dash and dot goatfish	**Ṃōtal**

Orangespine unicornfish	**Bwilak**



Forktail rabbitfish	**Ṃọle, Ellōk**

Sabre squirrelfish	**Jerā**

Longnose parrotfish	**Ekmouj**

Chub	**Pājrōk**

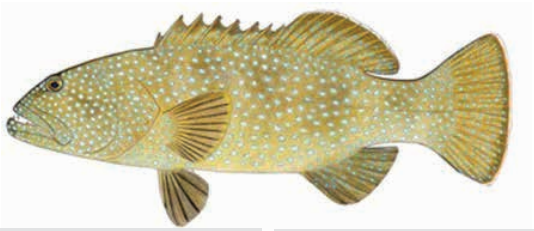
Bluespine unicornfish	**Ṃọṇe**

Yellow-edged lyretail	**Oļaļo**

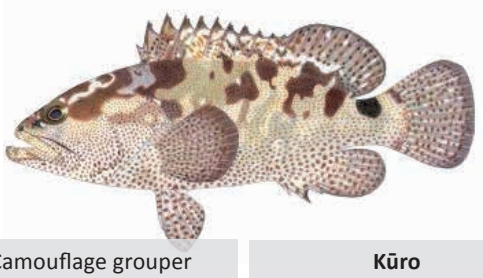
Humpnose bigeye bream	**Mejmej**

Bigeye trevally	**Ikbwij**

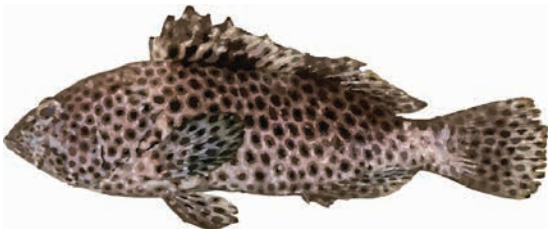
Bluefin trevally	**Ļañe**



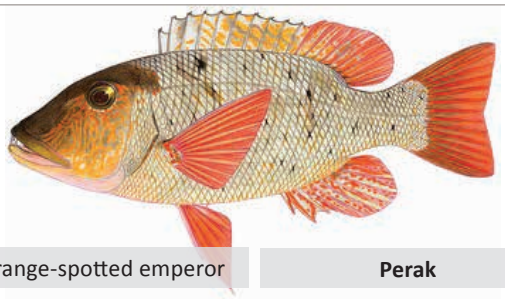
Squaretail coral grouper	**Jọwe**



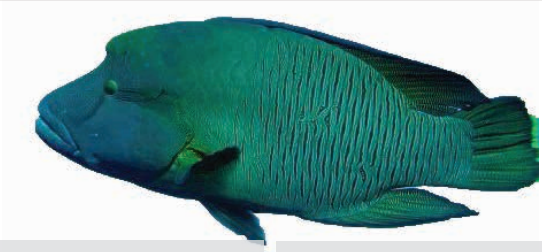
Camouflage grouper	**Kūro**



Highfin grouper	**Ļōjepjep**



Orange-spotted emperor	**Perak**



Humphead wrasse	**Ļappo**

Bumphead parrotfish	**Mem**

Blacksaddled coralgrouper	**Jutaklola**

QUICK GUIDE TO FISH CATCH SURVEYS

JIDIK KŌMMEḶEḶE ÑAN JINEETE EOK KŌN KILEN AṂ NAAJ KŌṂṂANI EKKATAK KO KIJJIEN EK KO KOṆAN RI-EṆÑWŌD RO

Site selection

Surveys should be carried out in your local community by meeting different fishermen and women when they come back from catching fish.

Kilen ekkāālel site

Aolep kajjitōk kaṇe rej aikuj in kōṃṃan ilo bukwōn im wāto kaṇe turiṃ ippān kajjojo ri-eọñwōd ro ālikin wōt aer kar etal im eọñwōd.

Method

Carry out the surveys opportunistically over a 3-to-6-month period and collate all surveys for analysis.
A minimum of 10 surveys should be carried out during each survey period – the more the better.

Kilen aṃ kōṃṃane ekkatak eo

Wōnṃaanḷọk wōt kōn kajjitōk kein aolep 3-ñan-6 allōñ, im ai aolep meḷeḷe ko ñan aṃ liñōri im etali tok ālik.
Kōṃṃane bwe en 10 alen aṃ iwōj im kajitūkin ri-eọñwōd raṇe – akō eṃṃan ḷọk ñe ekkutkut ḷọk.

One person is needed to ask the fishermen and women about their fish catch and measure their fish.

Naaj aikuji juon bwe en ilen jijet im bwebwenato ippān ri-eọñwōd ro kōn ek ko koṇaer.

Equipment you will need includes:

- Fish measuring ruler (or tape measure)
- Pencil
- Survey sheet
- Fish identification sheet

Men ko kwōnaaj aikuji ñan aṃ kōṃṃane ekkatak in rej:

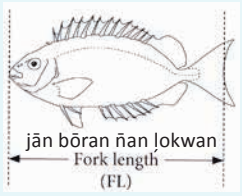
- Juon ruler ñan aṃ joñi kilep im aitokan ek ko
- Juon pinjeḷ
- Peba in survey kaṇe & folder
- Peba in pija in ek in pedped kaṇe

Fill in every section of the survey sheet:

- Survey details
- Fishing details
- Catch details

Kanni kobban survey sheet kaṇe – lukkuun lale bwe kwōn uwaaki aolep kajjitōk:

- Kadkad in ekkatak in
- Aolep meḷeḷe ko kijjien kain eọñwōd rōt
- Aolep meḷeḷe ko kijjien ek ko koṇan



Measure fork length of each fish.

Joñi jān bōraer ñan ḷokwan aolep ek.

Reporting

- Use the manual data analysis sheet once you have completed surveys for the 3–6 month period.
- Store data sheets in a safe place for computer entry by MIMRA.
- Transfer the data analysis results on the graph to the data reporting poster and discuss what management actions are needed.

Kilen aṃ ripooti tōprak in ekkatak ko aṃ

- Kanne kobban data analysis sheet ṇe pedped wōt ioon meḷeḷe ko jān uwaak ko ilo survey sheet ko ālikin aṃ kar kōṃṃani ilowaan 3-ñan-6 allōñ.
- Kọkuṇi im kōjparoki aolep data sheet kaṇe aṃ bwe MIMRA en kab iwōj im kadeḷọñi ilo computer.
- Būki aolep meḷeḷe ko im liwaji ṇa ilo data reporting sheet ṇe bwe en kwaḷọk tok juon pija in aolep meḷeḷe kaṇe kwaar ai im bwe armej ro ren loi im kōnono kōn buñtōn im jekjek ko rekkar bwe ren būki im loloorjaki.

SURVEY SHEET EO ÑAN AṂ KANNE ILO IIEN EṆ KWŌJ KŌṂṂANE EKKATK EO AṂ KŌN EK KO KOṆAN RI-EOÑWŌD RO

Ikijjien Kajjitōk Kein: Kajjitōk kein rej ñan ai tok aolep meḷeḷe ko kijjien ek ko koṇami ri-eoñwōd ro ekoba kain eoñwōd rōt ko koṃij kōṃṃani bwe en eṃṃanḷọk adwōj meḷeḷe im lali buñtōn ko rekkar bwe jen būki ñan dāpij jeraaṃṃan kein ad jān lọjet eo. Kajjitōk kein rej kajjitōk kōn ek ko koṇaṃ ālikin wōt aṃ kar eoñwōd, ekoba buñtōn ko ñan joṇi joñan kilep in ek ko koṇaṃ. Naaj lukkuun in mālij im eṃṃan ḷọk ad meḷeḷe ñe elōñ ḷọk ri-eoñwōd renaaj bōk koṇaer. Juon-im-juon ri-eoñwōd ej an wōt pepe in bōk koṇaan ilo ekkatak kein ilo ejjeḷọk oṇāān im eban waḷọk etan ilo iien eṇ kōm naaj kwaḷọk tōprak in ekkatak kein. Kwōj ke ṃōṇōṇō in bōk koṇaaṃ?

1. KADKAD IN EKKATAK IN

Aelōñ eo:	Etan ri-eoñwōd eo: Ṃaan / Kōra (kāālōt juon)	
Rainin:	Awa in:	Etan ri-kajjitōk eo:

2. AOLEP MEḶEḶE KO KIJJIEN KAIN EOÑWŌD RŌT EO KŌJERBALE

Oran ri-eoñwōd ro:	Ewi toon aṃ kar eoñwōd:		Raan / Boñ (kāālōt juon)
Kain eoñwōd rōt eo kar kōjerbale (kāālōt juon):	Turọñ	Ilarak/Kōkkọjekjek	Ok Kadkad/Aitok
Eo laḷ	Bar jet kain eoñwōd (jouj im kōllajraki)		
Kain eoñwōd rōt ko jet kōjerbali (kāālōt juon):	Turọñ	Ilarak/Kōkkọjekjek	Ok Kadkad/Aitok
Eo laḷ	Bar jet kain eoñwōd (jouj im kōllajraki)		
Ñe ok kadkad (ak aitok), ewi joñan mejān ok eo:			

3. AOLEP MEḶEḶE KO KIJJIEN EK KO KOṆAN RI-EOÑWŌD EO/RO

Ek rōt eo		**Joñan kilep in ek ko koṇaṃ - joñan aitokan jān bōran ñan ḷokwan** (ñe ewōr joñak ko rejako ñan ek ko, je juon * iturin wōt etan ek eo)																			
Etan ilo Kajin Ṃajeḷ	**Etan ilo Kajin Pālle**																				
Kwi	Lined surgeonfish																				
Kupañ	Convict tang																				
Jato, Jaap	Humpback red snapper																				
Ṃōtal	Dash-and-dot goatfish																				
Bwilak	Orangespine unicornfish																				
Ṃọle, Ellōk	Forktail rabbitfish																				
Jerā	Sabre squirrelfish																				
Ekmouj	Pacific longnose parrotfish																				
Pājrōk	Chub																				
Ṃọṇe	Brown surgeonfish																				
Oḷaḷo	Yellow edged lyretail																				
Mejmej	Big-eye bream																				
Ikbwij	Bigeye trevally																				
Ḷañe	Bluefin trevally																				
Jọwe	Squaretail grouper																				
Kūro	Camouflage grouper																				
Ḷōjepjep	Highfin grouper																				
Perak	Orange-spotted emperor																				
Ḷappo	Humphead wrasse																				
Mem	Bumphead parrotfish																				
Jutaklola	Blacksaddled coralgrouper																				

DATA ANALYSIS SHEET EO ÑAN AṂ KANNE ILO IIEN EṆ KWŌJ KŌṂṂANE EKKATK EO AṂ KŌN EK KO KOṆAN RI-EṆÑWŌD RO

Bwine jete oran (%) ek killep ko koṇan ri-eṇñwōd eo aolep iien kwōj ilen bwebwenato im kajjitōk ippān (āinwōt aolep ḷak in jilu allōñ, ak jimettan juon iiō); eṃṃan ḷak kōṃṃane ekkatak ilo aṃ etal im bwebwenato ippān ri-eṇñwōd eo 10 alen ak lōñ ḷak.

KAIN EK RŌT EO	Size limit ak joñan killep in ek ko eṃṃan ñan koṇōki (in)	Oran aolep ek ko rekilep ḷọk ak dettaer wōt size limit ko	Oran aolep ek ko koṇan	% in ek killep ak ek ko eṃṃan joñaer emōj koṇōki	%	STATUS (EPĀD TOK IA ORAN EK) EO
		A	B	(A/B) X 100		
Kwi	7”				<100	
					= 100	☺
Kupañ	7”				<100	
					= 100	☺
Jato, Jaap	10”				<100	
					= 100	☺
Ṃōtal	10”				<100	
					= 100	☺
Bwilak	10”				<100	
					= 100	☺
Ṃọle, Ellōk	10”				<100	
					= 100	☺
Jerā	10”				<100	
					= 100	☺
Ekmouj	12”				<100	
					= 100	☺
Pājrōk	12”				<100	
					= 100	☺
Ṃọṇe	14”				<100	
					= 100	☺
Oḷaḷo	14”				<100	
					= 100	☺
Mejmej	14”				<100	
					= 100	☺
Ikbwij	14”				<100	
					= 100	☺
Ḷañe	14”				<100	
					= 100	☺
Jọwe	16”				<100	
					= 100	☺
Kūro – Camouflage grouper	16”				<100	
					= 100	☺
Ḷōjepjep	16”				<100	
					= 100	☺
Perak	18”				<100	
					= 100	☺
Ḷappo	20”				0-90	edik / eiiet
					90-99	ebwe / jejjo
					= 100	☺ elōñ / elap
Mem	24”				0-90	edik / eiiet
					90-99	ebwe / jejjo
					= 100	☺ elōñ / elap
Jutaklola	18”				0-90	edik / eiiet
					90-99	ebwe / jejjo
					= 100	☺ elōñ / elap

MODULE 2: INTERTIDAL INVERTEBRATES

The ***purpose*** of the intertidal invertebrate surveys is to assess whether locally important intertidal invertebrates are in a healthy or unhealthy (overharvested) condition.

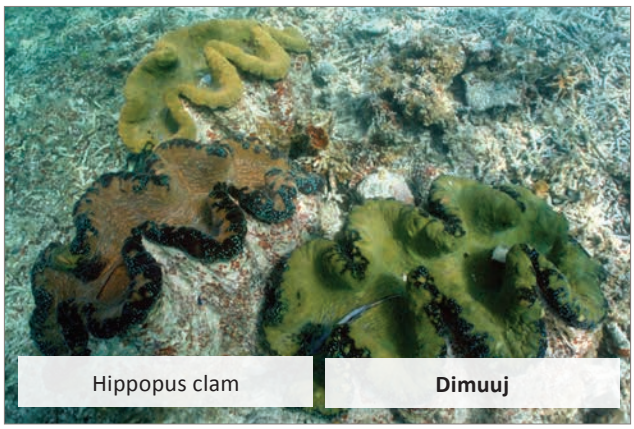
Invertebrate surveys also provide a valuable opportunity to raise awareness with communities about the important ecological roles that invertebrates play, how easily they are overharvested and actions that can reduce the risk of overharvest.

MODULE RUO: KAPWŌR KO, MEJĀNWŌD/JENỌ KO, JIPENPEN KO, LIBBUKWE KO

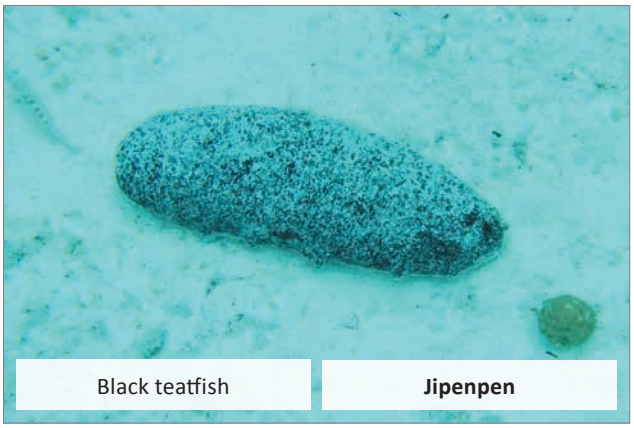
Unleplep in ekkatak in im kajjitōk kein kijjien libbukwe ko, jukkwe ko, kapwōr ko, mejānwōd ko, jipenpen ko, aorak ko, lōkeed ko im kain menin mour rōt in kwōj loi parijet ej ñan etale im lale eḷaññe ej lōñ wōt im wōr wōt ilo lọjet eo ak eḷaññe relukkuun iiet ḷak im renañin jako.

Ekkatak in im kajjitōk kein rej ñan jipañ kōḷapḷọk jeḷā im meḷeḷe eo armej in jukjuk-im-pād eo kōn aorōkier ñan lọjet eo im peḷaak eo, kōn wāween wāween im jekjek ko rej kōṃṃan aer iiet ḷak im jako ḷak, im kab kōn buñtōn ko rekkar ñan būki im kōṃṃani ñan kōjparoki.

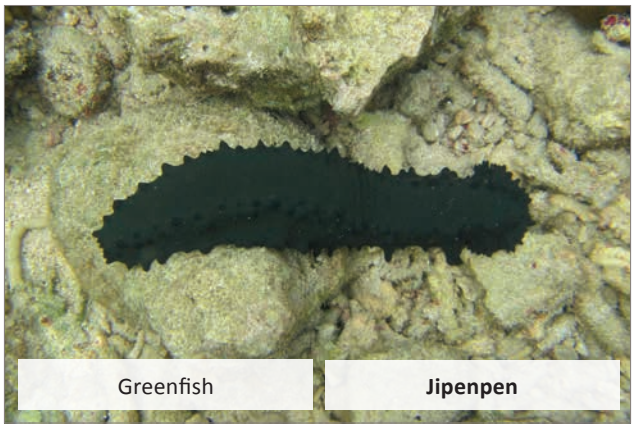
Tridacna clam | **Kapwōr; Mejānwōd/Jeṇọ**



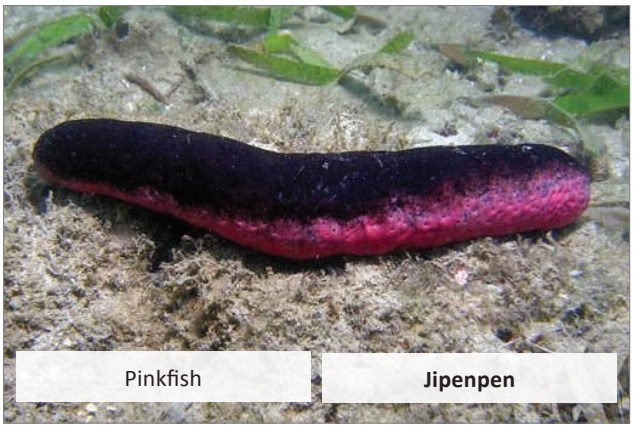
Hippopus clam | **Dimuuj**



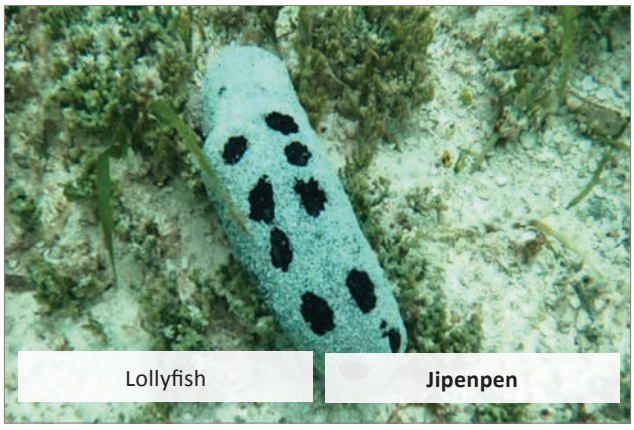
Black teatfish | **Jipenpen**



Greenfish | **Jipenpen**



Pinkfish | **Jipenpen**

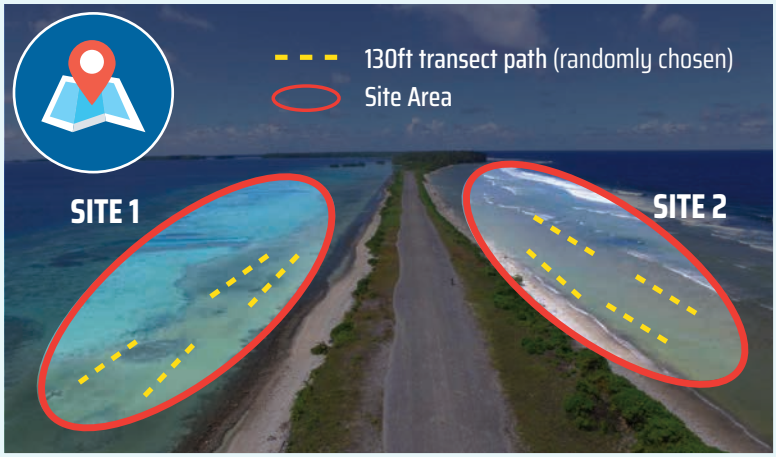


Lollyfish | **Jipenpen**

Cowrie shell | **Libbukwe**

QUICK GUIDE TO INTERTIDAL INVERTEBRATE SURVEYS

JIDIK KŌMMEḶEḶE ÑAN JINEETE EOK KILEN KŌṂṂANI EKKATAK KO KIJJIEN INTERTIDAL INVERTEBRATE KO *(KAPWŌR KO, MEJĀNWŌD/JENO KO, JIPENPEN KO, LIBBUKWE KO)*



Site selection

- Choose sites that are typical of your intertidal marine area
- Choose sites that are easy and safe to access at low and high tide
- Choose a combination of sandy and hard bottom habitat

Kilen ekkāālel site

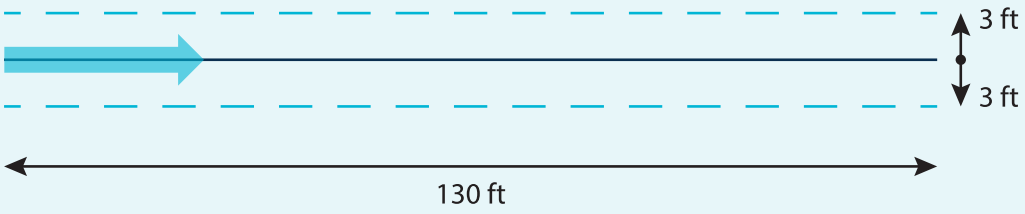
- Kāālōti site ko ekkā an lōñ libbukwe, jukkwe, kūkōr, jipenpen, mejānwōd, jeṇo ie
- Kāālōti site ko me repidodo tōpari ñe ej pāāt im ibwij
- Kāālōti site ko me rebokboki im ewōr pedped ḷak laḷ

Method

- Carry out monitoring surveys once every 6 to 12 months
- Walk at low tide or swim if necessary
- 2 people should monitor together
- Choose TWO random sites on the reef flat, with 3-4 straight lines (transects) **at least 30 ft (10 m) apart** (6-8 lines in total)
- Each transect should be 130 ft (40 m) long and 3 ft (1 m) wide

Kilen aṃ kōṃṃane ekkatak eo

- Kōṃṃani ekkatak ko aolep ḷak in 6 ñan 12 allōñ
- Etetal ñe epāāt ak aō ñe eibwij
- Jerbal in aikuj 2 armej
- En jabdetak wōt aṃ kāālōti site ko ioon pedped, kōṃṃane 3-4 ḷain ko ren jiṃwe im lale bwe ren ettoḷọk jān doon 30 ne (10 m) kōtaer (kajjioñ kōṃṃane 6-8 ḷain)
- Kajjojo ḷain ko rej aikuj 130 ne (40 m) aitokaer jān jabōn ñan jabōn im 3 (1 m) ne depakpakier



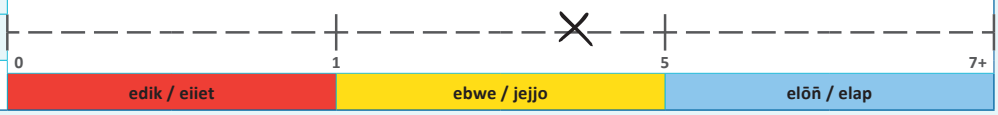
- Count the number of invertebrates you see 3 ft either side of the line
- For each species, add the total number counted and divide by how many transect lines you surveyed.
  For example, 11 + 16 + 30 + 6 = 63 ÷ 4= 16

- Bwine jete oran libbukwe ak jukkwe ak mejānwōd ak jipenpen ak aorak ko kwōj loi im rej pād wōt 3 ne iturin wōt ḷain ko
- Bwine aolep oran kajjojo libbukwe ḷak iaan, jukkwe ḷak iaan, mejānwōd ḷak iaan, jipenpen ḷak iaan, aorak ḷak wōt iaan im ajeeje kōn oran aolep ḷain ko kwaar loi turier.
  Ñan waanjoñak, 11 + 16 + 30 +6 = 63 ÷ 4 = 16

KAPWŌR/MEJĀNWŌD/JENṆ TRIDACNA SPECIES

Oran aolep kapwōr, mejānwōd/jeṇọ:

T1	T2	T3	T4	Average
3	8	2	3	16/4=4



Reporting

- Transfer the survey results onto the data reporting poster for each species you survey

Kilen aṃ ripooti tōprak in ekkatak ko aṃ

- Likūti aolep bōnbōn ko aṃ ñan kajjojo menin mour kein ilo data reporting poster eo

SURVEY SHEET ÑAN AṂ KANNE ILO IIEN EṆ KWŌJ KŌMMANE EKKATAK EO AṂ KŌN INVERTEBRATE *(KAPWŌR, MEJĀNWŌD/JEṆO , JIPENPEṆ, LIBBUKWE)* KO

MEḶEḶE KO KIJJIEN SITE EO (JUON SHEET ÑAN JUON SITE)

Etan ri-monitor ro:			Aelōñ eo:		
Etan site eo:			Raan eo:	Awa eo:	
Katu eo an raan eo:			**Wāween kar bōnbōn (kāālōt juon):**	Etetal ioon pedped	Aō
Kain peḷaak rōt eo (kāālōt juon ak elōñ ḷọk):	Ewūjooje	Ebokboke	Edekāke	Elōn Algae	Ko jet

KAPWŌR/MEJĀNWŌD/JENỌ *TRIDACNA* SPECIES

Transect / Ḷain 1	Transect / Ḷain 2	Transect / Ḷain 3	Transect / Ḷain 4

Oran aolep kapwōr, mejānwōd/jenọ:

T1	T2	T3	T4	Average

0 — 1 — 5 — 7+

edik / eiiet | ebwe / jejjo | elōñ / elap

DIMUUJ *HIPPOPUS* SPECIES

Transect / Ḷain 1	Transect / Ḷain 2	Transect / Ḷain 3	Transect / Ḷain 4

Oran aolep dimuuj:

T1	T2	T3	T4	Average

0 — 1 — 4 — 6+

edik / eiiet | ebwe / jejjo | elōñ / elap

JIPENPEN *LOLLYFISH*

Transect / Ḷain 1	Transect / Ḷain 2	Transect / Ḷain 3	Transect / Ḷain 4

Oran aolep jipenpen rōt in:

T1	T2	T3	T4	Average

0 — 1 — 8 — 10+

edik / eiiet | ebwe / jejjo | elōñ / elap

JIPENPEN *BLACK TEATFISH*

Transect / Ḷain 1	Transect / Ḷain 2	Transect / Ḷain 3	Transect / Ḷain 4

Oran aolep jipenpen rōt in:

T1	T2	T3	T4	Average

0 — 0.05 — 0.15 — 0.2+

edik / eiiet | ebwe / jejjo | elōñ / elap

JIPENPEN *GREENFISH*

Transect / Ḷain 1	Transect / Ḷain 2	Transect / Ḷain 3	Transect / Ḷain 4

Oran aolep jipenpen rōt in:

T1	T2	T3	T4	Average

0 — 0.5 — 2 — 4+

edik / eiiet | ebwe / jejjo | elōñ / elap

JIPENPEN *PINKFISH*

Transect / Ḷain 1	Transect / Ḷain 2	Transect / Ḷain 3	Transect / Ḷain 4

Oran aolep jipenpen rōt in:

T1	T2	T3	T4	Average

0 — 1 — 25 — 30+

edik / eiiet | ebwe / jejjo | elōñ / elap

LIBBUKWE *COWRIE SHELLS*

Transect / Ḷain 1	Transect / Ḷain 2	Transect / Ḷain 3	Transect / Ḷain 4

Oran aolep libbukwe:

T1	T2	T3	T4	Average

0 — 0.5 — 1.5 — 2+

edik / eiiet | ebwe / jejjo | elōñ / elap

MODULE 3: CORAL REEFS

The ***purpose*** of the coral reef surveys is to assess the condition of local reefs and identify any impacts that can affect condition.

Coral reef surveys also provide a valuable opportunity to raise awareness with communities about the importance of healthy reef habitats, local activities that damage the reef and actions to maintain healthy reefs.

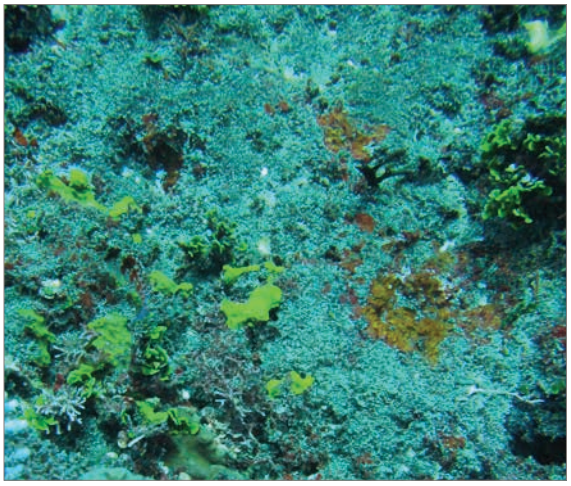
MODULE JILU: WŌD KO

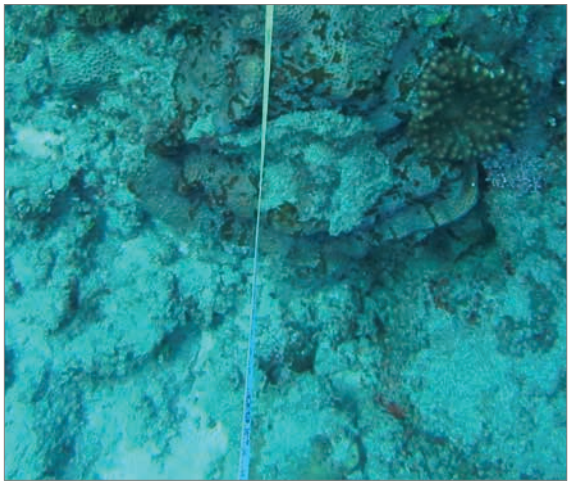
Unleplep in ekkatak in im kajjitōk kein kijjien wōd ko rej ñan lali wōd im ekkatak kōn jabdewōt wāween eo ak men eo me emaroñ jelōti wōd ko.

Ekkatak in im kajjitōk kein kijjien wōd ko rej bareinwōt ñan jipañ kōḷapḷọk jeḷā im meḷeḷe eo an armej in jukjuk-im-pād eo kōn aorōkier ñan lọjet eo im peḷaak eo, jabdewōt ṃakūtkūt ko armej rej kōṃṃani me rejelōti, im kab buñtōn ko rekkar ñan būki im kōṃṃani in kōjparoki wōd ko.

GUIDE FOR ESTIMATING CORAL (%) COVER

JIDIK KŌMMEḶEḶE ÑAN JINEETE EOK KILEN ETALI WŌD KO

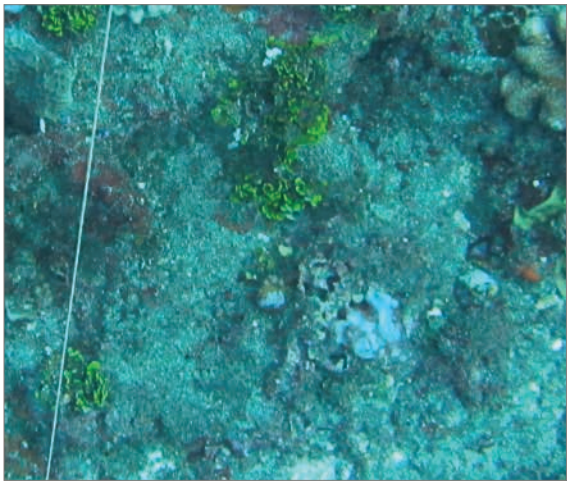




0%

LOW = EDIK / EIIET

10%



MODERATE = EBWE / JEJJO

25%

HIGH = ELŌÑ / ELAP

100%

HEAT STRESS
KŌN WŌT AN MĀṆĀĀṆ LOJET EKŌṂṂAN AN EOR IM MOUJ WŌD KO

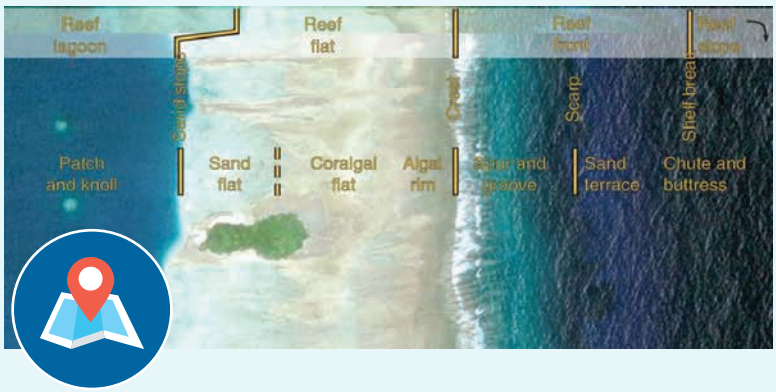
PREDATION COTS
KŌN WŌT AN JIMAKWEL KO MŌÑĀ WŌD KO

PREDATION SNAIL
KŌN WŌT MENIN MOUR KO JEṬ REJ ṂŌÑĀ WŌD: ĀINWŌT LIDIDK KO

DISEASE
KŌN WŌT AN NAÑINMEJ WŌD KO

QUICK GUIDE TO REEF SURVEYS

JIDIK KŌMMEḶEḶE ÑAN JINEETE EOK KŌN KILEN AṂ NAAJ KŌṂṂANI EKKATAK KO KIJJIEN WŌD KO



Site selection

- Choose sites that are typical of the main reef type in the local area
- Choose sites that are easy and safe to access at low and high tide
- Choose sites that are less than 26 ft (8 m) deep

Kilen ekkāālel site

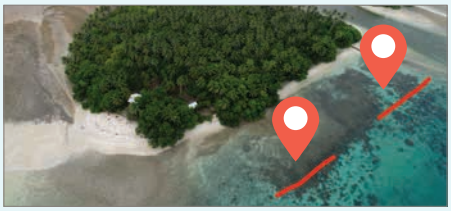
- Kāālōti site ko rewōdwōdi (ak elōñ wōd ie)
- Kāālōti site ko repidodo tōpari ñe ej pāāt im ibwij
- Kāālōti site ko rejjab ṃwilaḷḷọk jen 26 ne (8 m)

Method

- Carry out monitoring surveys once every 12 months
- If you are monitoring after an impact, monitor within 1 month of the impact, e.g. storm or long hot water period
- At least 2 people should monitor together but more people can do the survey at the same time

Kilen aṃ kōṃṃane ekkatak eo

- Kōṃṃani ekkatak ko aolep ḷak in 12 allōñ
- Ne kwōj kōṃṃan ekkatak ālikin an kar waḷọk juon wāween eo ejelōti wōd ko, innām kwōn ṛọọl ḷak im lale 1 allōñ ālikin, āinwōt ḷañ ak iien ṃōrā
- Ej aikuj wōr 2 armej ro ñan kōṃṃane jerbal in ekkatak in akō eṃṃan ḷọk ñe elōñ ḷọk



- Choose 2 random sites for each survey
- Sites should be at least 100 ft (30 m) apart, if possible
- Sites can be inside or outside your MPA

- En jabdetak wōt aṃ kāālōt 2 site ko
- Site ko rej aikuj in 100 ne (30 m) kōtaan aer ettoḷọk jān doon
- Site ko remaroñ deḷọñ lowaan ak pād nabwōjin MPA eo aṃ

Equipment you will need includes:

- Underwater slate or paper
- Pencil
- Mask & snorkel (fins optional)

Kein jerbal ko kwōnaaj aikuj rej:

- Peba rōt ṇe komaroñ kōjerbale ñan aṃ jeje buḷōn lọjet
- Pinjeḷ
- Māj in turọñ

- Start at one end and swim steadily over the reef **parallel** to the shore for 15 minutes and record information on the 5 reef indicators
- Once you finish the first site, complete the second site, then return to the shore to discuss as a team

- Jino ṃokta ilo juon iaan jabōn ḷain kaṇe innām eppepe ioon wōd kaṇe tarrin 15 minit akō **lale bwe bōraṃ ñan neeṃ ren ḷoor jiṃwe im aitokan parijet**
- Ñe dedeḷọk site in ekkatak ko ruo, wōnāne im kōnono ippān team eo aṃ kōn ta ko koṃ ar loi

Reporting

- Discuss what you recorded with the other monitors and reach consensus to fill in a **single** survey sheet together for each site
- Transfer the survey results onto the reef data reporting poster

Kilen aṃ ripooti tōprak in ekkatak ko aṃ

- Kōnono ippān ri-jerbal ro jet ṃōttaṃ kōn meḷeḷe ko kwaar jei ālikin aṃ kar jerbale site eo bwe koṃin errā ippān doon kōn juon wōt meḷeḷe ilo aṃi kanne **juon wōt** survey sheet ikijjien site eo
- Būki aolep meḷeḷe ko jān tōprak in ami kar jerbal im jeiwaj ṇa ilo data reporting poster eo

SURVEY SHEET ÑAN AṂ KANNE IIEN EṆ KWŌJ KŌṂṂANE EKKATAK EO AṂ KŌN WŌD KO

MEḶEḶẸ KO KIJJIEN SITE EO (JUON SHEET ÑAN JUON SITE)		
Wōn eo/ro	Etan ri-monitor ro:	
Ia eo	Aelōñ Eo:	Etan site eo:
Ñāāt	Raan eo:	Awa eo:
Katu ko	Katu eo an raan eo:	Bōkā eo:
Peḷaak rōt eo (kāālōt juon ak elōñ ḷọk)	Pedped (iaar)	Tūrin baal
	Pedped (lik)	Jiruṃle

TA KO KWAAR LOI…

1. Hard coral cover
Oran wōd ko remour

MeḶeḷẹ ko jet:

0% | 10% | 25% | 100%

edik / eiiet | ebwe / jejjo | elōñ / elap

TA JORRĀĀN KO KWAR LOI…

1. Algae Cover
Oran algae ko

MeḶeḷẹ ko jet:

0% | 10% | 25% | >50%

edik / eiiet | ebwe / jejjo | elōñ / elap

2. White Coral
Wōd ko remouj

MeḶeḷẹ ko jet:

Estimated area (in f^2):

0% | 25% | 25% | 100%

edik / eiiet | ebwe / jejjo | elōñ / elap

3. Crown-of-thorn starfish (COTS)
Jimakwel

MeḶeḷẹ ko jet:

0% | 1 | 5 | 50+

edik / eiiet | ebwe / jejjo | elōñ / elap

4. Broken coral
Wōd ko rerup

MeḶeḷẹ ko jet (kōmeḶeḷeik jorrāān rōt eo):

0% | 25% | 25% | 100%

edik / eiiet | ebwe / jejjo | elōñ / elap

Kwaar ke ellolo kwōpej?	Bwijin	Jet	Ejjeḷọk
Kwaar ke ebbōk pija?	Aaet	Jaab	
Kakkobaba ko jet:			

MODULE 4: MANGROVE FORESTS

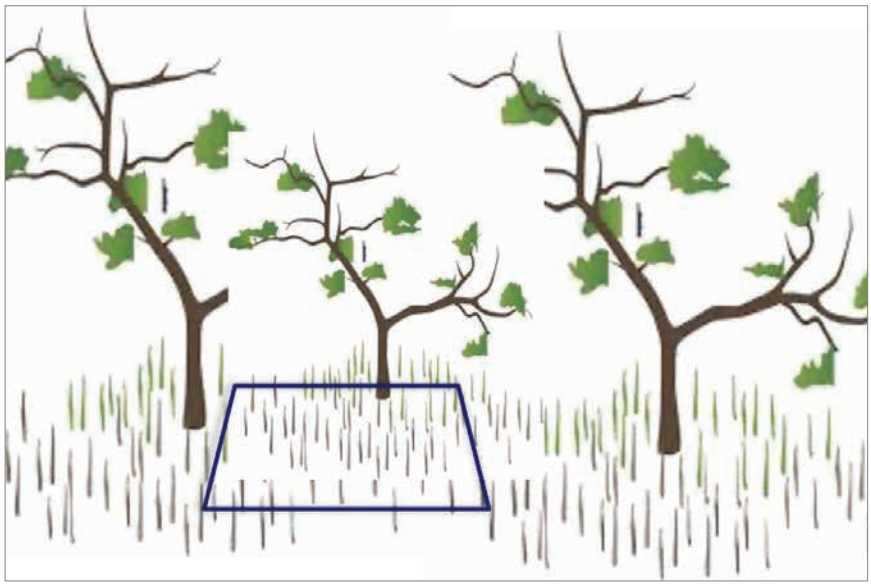
The ***purpose*** of the mangrove surveys is to assess the condition of local mangrove habitats and identify any impacts that can affect condition.

Mangrove surveys also provide a valuable opportunity to raise awareness with communities about the importance of healthy mangrove habitats, local activities that damage mangroves and actions to maintain healthy habitats.

MODULE EMĀN: JOÑ KO & KŌNPAT KO

Unleplep in ekkatak in im kajjitōk kein kijjien joñ ko im kōnpat ko rej ñan etale im lale peḷaak eo ekkā aer pād ie im lale eḷaññe ewōr men eṇ ej kōṃṃan an jelōt joñ im kōnpat ko.

Ekkatak in im kajjitōk kein rej bareinwōt ñan jipañ kōḷapḷọk jeḷā im meḷeḷe eo an armej in jukjuk-im-pād eo kōn aorōkier ñan peḷaak eo, jabdewōt ṃakūtkūt ko armej rej kōṃṃani me rejelōti, im kab buñtōn ko rekkar ñan būki im kōṃṃani ñan kōjparoki joñ im kōnpat ko.

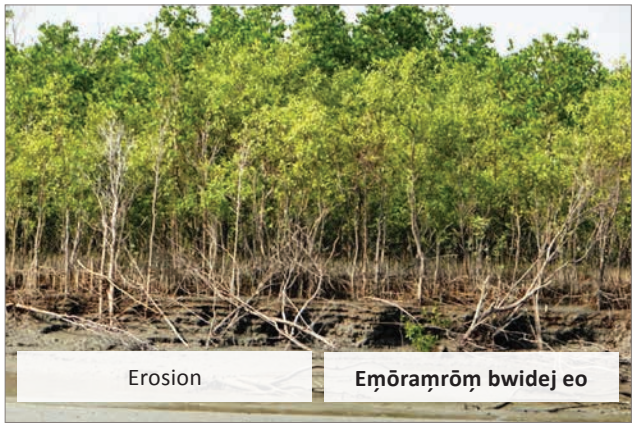


Select 3 random 32 ft x 32 ft (10 m x 10 m) quadrats (replicates) at each site about 100 feet (30 m) apart.

Kāālōt 3 jikin ko ilo peḷ aak eo ijo ewōr joñ im kōnpat ie, joñi im kōkkaḷ ḷ eik ijekein 3 bwe ren 32 ne depakpakier im 32 ne aitokaer im lale bwe ren pād 100 ne ettoḷ ak jān doon.

Twisted roots | **Aolep okar im waḷọk im pokjaljaḷ**

Storm damage | **Ālikin an kar waḷọk juon ḷañ**



Erosion | **Eṃōraṃrōṃ bwidej eo**

Timber harvesting | **Jokai wōjke ko ñan kōṃṃan aḷaḷ**

QUICK GUIDE TO MANGROVE SURVEYS

JIDIK KŌMMEḶEḶE ÑAN JINEETE EOK KŌN KILEN AṂ NAAJ KŌṂṂANI EKKATAK KO AṂ KIJJIEN JOÑ IM KŌNPAT KO

Site selection

- Choose sites that are typical of the local mangrove area
- Choose sites that are easy and safe to access at low and high tide

Kilen ekkāālel site

- Kāālōti site ko ekkā an joñ im kōnpat ko waḷọk ie
- Kāālōti site ko repidodo tōpari ñe ej pāāt im ibwij

Method

- Carry out monitoring surveys once every 12 months, or within 1 month after an impact, e.g. storm
- Mangrove surveys are better carried out at low tide
- At least 2 people should monitor together but more people can do the survey at the same time

Kilen aṃ kōṃṃane ekkatak eo

- Kōṃṃani ekkatak ko aolep ḷak in 12 allōñ, ak 1 allōñ ālikin wōt an kar wōr ḷañ im jelōt ijo kwōj kōṃṃane ekkatak eo ie
- Eṃṃanḷọk kōṃṃani ekkatak ko kōn joñ im kōnpat ko ñe bōkā e epāāt im idik
- Ej aikuj wōr 2 armej ñan jerbale ekkatak ko akō eṃṃanḷọk ñe elōñ ḷọk

- Choose a random site for each survey, with 3 replicate 32 ft x 32 ft (10 m x 10m) quadrats (or squares) at least 100 ft (30 m) apart, if possible
- The replicate quadrats can be one close to land (A), one mid-forest (B), and one close to sea (C), if your mangrove area is large enough

- Kāālōte juon site - ejabdetakwōt - ñan juon survey, im lale bwe aolep site ko 3 ren 32 ne depakpakier kōn 32 ne aitokaer (10m x 10m) im lale bwe ren 100 ne (30 m) kōtaan aer ettoḷọk jān doon
- Komaroñ karōki site ko 3 me juon wōt joñan aitokaer kab depakpakier bwe juon en pād ioon āne ṃōrā (A), juon ilo ijeko rebukwekwe (B), im āliktata en epaake parijet (C), eḷaññe peḷaak eo ijo joñ im kōnpat ko repād ie ekilep

Equipment you will need:

- Field survey sheet & pencil
- Rope to measure quadrat (optional)

Kein jerbal ko kwōnaaj aikuji:

- Field survey sheet eo & juon pinjeḷ
- Juon to ñan joñe site eo (komaroñ jab aikuji)

- Place the first 32 x 32 ft quadrat (using rope) and record information on the 4 mangrove indicators
- Once you finish the first quadrat (replicate), move 100 ft away (if possible) and repeat the second replicate, and then the third replicate
- Record what you see at each quadrat as 1, 2 or 3 on the same survey sheet

- Erḷoke to eo bwe en waḷọk depakpakin (32 ne) im aitokan (32 ne) ijo kwōj pojak in bōnbōn joñ im kōnpat ie innām je jabdewōt meḷeḷe ko ilo mangrove survey sheet eo
- Ñe ededeḷọk, kāālōt site eo kein karuo kin 100 ne ettoḷọk jān ijo kwaar ijjino ie, innām ḷoori aolep buñtōn kein ilo ijeṇe āliktata kein kajilu
- Jei jabdewōt meḷeḷe ko kwaar loi ke kwaar kōṃṃane ekkatak eo ñan ijekaṇe aolep - 1, 2, 3 - ilo survey sheet eo

Reporting

- Discuss what you observed with the other monitors and reach consensus to fill in a **single** survey sheet and mark the average of all quadrats using an 'X'
- Transfer the survey results onto the mangrove data reporting poster

Kilen aṃ ripooti tōprak in ekkatak ko aṃ

- Kōnono ippān ri-monitor ro jet ṃōttaṃ kōn meḷeḷe ko kwōtōpari im lale bwe koṃin errā ippān doon kōn **juon wōt kain** bōnbōn im jei ilo survey sheet eo – kōkkaḷḷeik peba eo kōn juon 'X' ekkar ñan bōnbōn ko ñan aolepān ijeko (quadrat ko) koṃ ar jerbali
- Būk aolep meḷeḷe ko ilo peba eo im likūti ṇae ilo reporting poster eo kōn joñ im kōnpat ko

SURVEY SHEET ÑAN AṂ KANNE IIEN EṆ KWŌJ KŌṂṂANE EKKATAK EO AṂ KŌN JOÑ IM

MEḶEḶE KO KIJJIEN SITE EO (JUON SHEET ÑAN JUON SITE)			
Wōn eo/ro	Etan ri-monitor ro:		
Ia eo	Aelōñ Eo:	Etan site eo:	
Ñāāt	Raan eo:	Ñāāt:	
Katu ko	Katu eo an raan eo:	Bōkā eo:	
Jikin eo	Turin lojet =1	Lukon jon ko =2	Loon āne ṃorā=3
Site eo kāālōte	Kar jabdetakwōt	Eṃōj kōkkaḷḷeiki	

TA KO KWAAR LOI...	
1. Mangrove canopy cover **Oran joñ im kōnpat ko eṃōj aer kaliboboik peḷaak eo**	Meḷeḷe ko jet: 0% 30% 75% 100% edik / eiiet | ebwe / jejjo | elōñ / elap
2. Seedlings (new trees) **Ine kāāl**	Meḷeḷe ko jet: 0 5 10 15 edik / eiiet | ebwe / jejjo | elōñ / elap

JORRĀĀN KO ÑAN JOÑ IM KŌNPAT KO	
3. Twisted or damaged roots **Okar ko eṃōj aer waḷọk iaejet im ṃōj aer pokjaḷjaḷ**	Meḷeḷe ko jet: 0% 40% 90% 100% edik / eiiet | ebwe / jejjo | elōñ / elap
4. Other Impacts **Wāween ko rejelōt joñ im kōnpat ko**	Meḷeḷe ko jet: edik / eiiet | ebwe / jejjo | elōñ / elap

Kain wāween rōt ko rejelōt an eddek im lōñ ḷọk oran joñ im kōnpat ko (Kāālōt uwaak eo ejiṃwe):	Jorrāān jān itak in ḷañ	Eṃōj jokai im juloḳ	Eḷap jokai ñan kōṃṃan aḷaḷ
	Emoj an roṃ bwidej eo ijo rej eddek ie	Jorrāān jān menin mour ko (āinwōt piik ko)	Eḷap kopejpej ḷak ṇai ijeko rej eddek ie

Kwaar ke ebbōk pija?	Aaet	Jaab	
Kakkobaba ko jet:			

MODULE 5: SEAGRASS MEADOWS

The ***purpose*** of the seagrass surveys is to assess the condition of local seagrass habitats and identify any impacts that can affect condition.

Seagrass surveys also provide a valuable opportunity to raise awareness with communities about the importance of healthy seagrass habitats, local activities that damage seagrass meadows and actions to maintain healthy habitats.

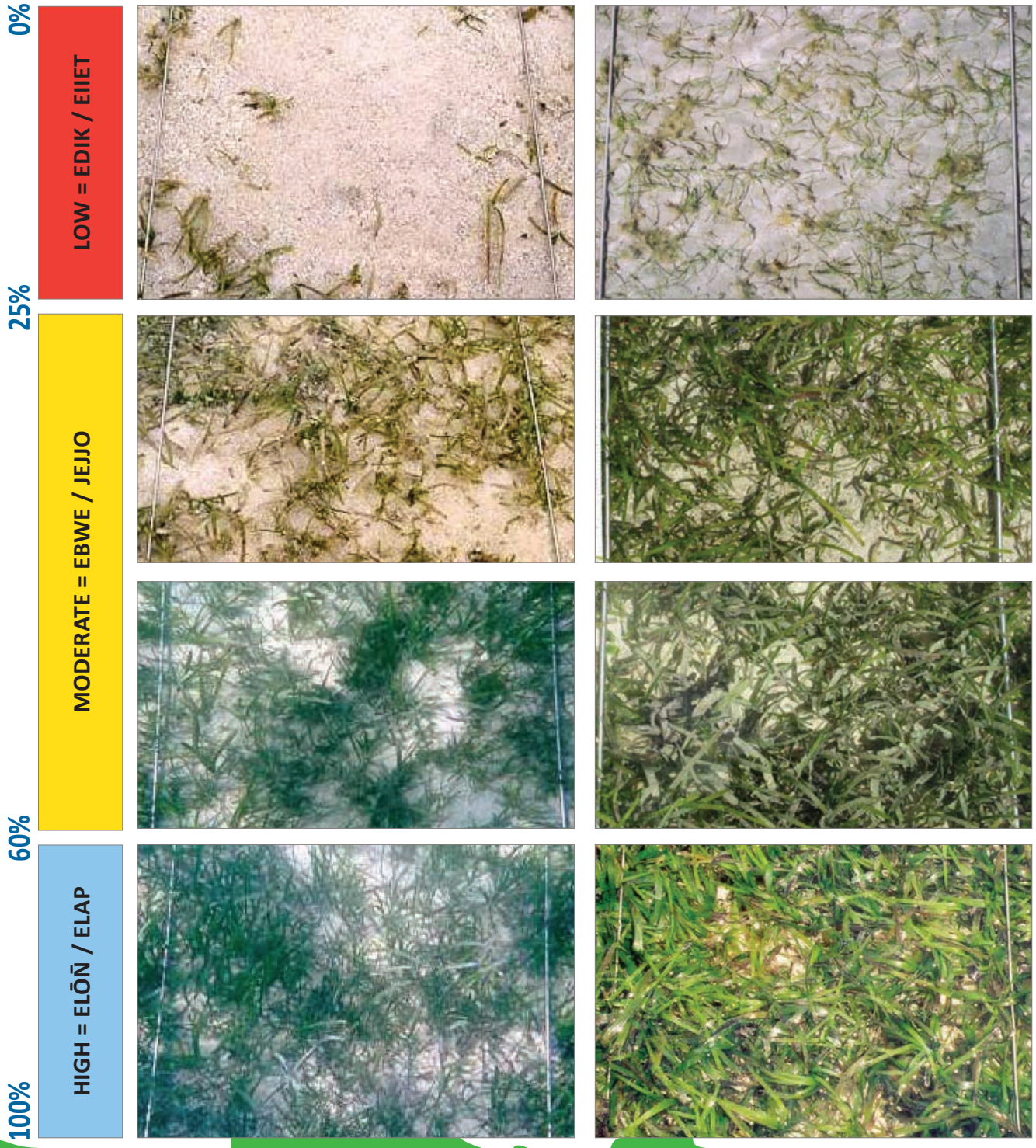
MODULE ḶALEM: WŪJOOJ-IN-LO̧JET KO

Unleplep in ekkatak in im kajjitōk kein kijjien wūjooj-in-lo̧jet ko rej ñan etale im lale peḷaak eo ekkā aer pād ie im lale eḷaññe ewōr men eṇ ej kōṃṃan an jelōt wūjooj-in-lo̧jet ko.

Ekkatak in im kajjitōk kein rej bareinwōt ñan jipañ kōḷapḷo̧k jeḷā im meḷeḷe eo an armej in jukjuk-im-pād eo kōn aorōkier ñan peḷaak eo, jabdewōt ṃakūtkūt ko armej rej kōṃṃani me rejelōti, im kab buñtōn ko rekkar ñan būki im kōṃṃani ñan kōjparoki wūjooj-in-lo̧jet ko.

GUIDE FOR ESTIMATING SEAGRASS (%) COVER

JIDIK KŌMMEḶEḶE ÑAN JINEETE EOK KILEN AṂ LALE EWI JOÑAN AN WŪJOOJE IJO



Source: Seagrass-Watch

QUICK GUIDE TO SEAGRASS SURVEYS

JIDIK KŌMMEḶEḶE ÑAN JINEETE EOK IIEN EṆ KWŌJ KŌṂṂANI EKKATAK KO AṂ KIJJIEN WŪJOOJ-IN-LOJET KO

Site selection

- Choose sites that are typical of the main seagrass areas near your village (not just the healthiest site)
- Choose sites that are easy and safe to access at low and high tide

Kilen ekkāālel site

- Kāālōti site ko repaake eok me wūjooj-in-lọjet eo ej eddek ie (ren jab ijeko wōt me rewūjooji ak bar ijeko rejjab)
- Kāālōti site ko repidodo tōpari ñe ej bōkā in pāāt im ibwij

Method

- Carry out monitoring once every 6–12 months, or after an impact
- Seagrass surveys can be carried out at the same time as other monitoring, such as intertidal invertebrates or reef surveys

Kilen aṃ kōṃṃane ekkatak eo

- Kōṃṃani ekkatak ko aṃ aolep ļak in 6 ñan 12 allōñ, ñe jaab ekwe ālikin an kar waļọk juon ļañ ak ibwij ak det ak wāween ko āierļakwōt
- Ekkatak ko im kajjitōk kein remaroñ kōṃṃan ippān ekkatak ko jet, āinwōt ekkatak ko kōn libbukwe ko, kapwōr ko, mejānwōd ko ak kōn wōd ko

- At least 2 people should monitor together, but more people can do the survey at the same time

- Ej aikuj wōr 2 armej ñan aer kōṃṃane jerbal in ekkatak kein, akō ñe eṃṃan ñe elōñ ļọk

- Choose a random site for each survey, with 3 replicate 3 ft x 3 ft (1 m x 1 m) squares at least 30 ft (9 m) apart, if the area is large enough
- You can monitor as many sites as you have time for

- Kāālōt jet site ko ren jabdetakwōt ilo tōre kaṇe kwōj ilen kōṃṃan ekkatak, akō lale bwe aolep site ko 3 ren 3 ne depakpakier kōn 3 ne aitokaer (1 m x 1 m) im bareinwōt lale bwe ren 30 ne (9 m) kōtaan aer ettoļọk jān doon
- Komaroñ etale im lale elōñ lok site

- Place the first 3ft x 3ft (1m x 1m) square (using rope) and record information on the 3 seagrass indicators
- Once you finish the first square (replicate), move at least 30 ft away and repeat for the second replicate, and then again for third replicate
- Record what you see in each square as 1, 2 or 3 on the same survey sheet

- Kōjerbale to eo aṃ im ļoor joñan depakpak (3 ne) kab aitokan (3 ne) in ijo jinoin tata kwōj pojak in jerbal ie innām jei waj jabdewōt meļeļe ko jān ta ko kwōloi ikijien wāween ko 3 ilo peba eo
- Ñe ededeļọk, etal wōt im jerbale ijeṇe waj juon akō lale bwe en 30 ne ettoļọkin im ļoori ejja buñtōn ko ñan aṃ joñe, im naaj āindein aṃ ļoori aolep buñtōn kein ñan ijo āliktata
- Je jabdewōt meļeļe ko kwaar loi im ekkatak jān ijekaṇe aolep 3 ilo juon wōt survey sheet

Reporting

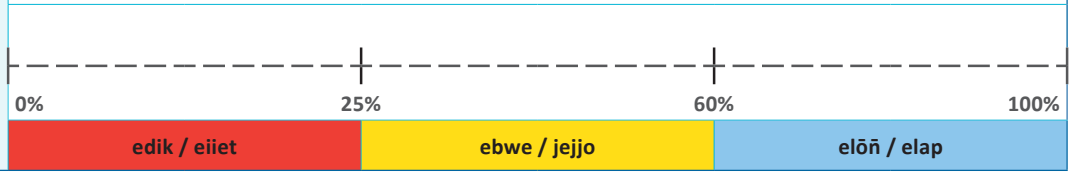
- Discuss what you observed with the other monitors and reach consensus to fill in a **single** survey sheet and mark the average of all quadrats using an 'X'
- Transfer the survey results onto (i) **one** seagrass health reporting sheet, and (ii) **one** seagrass impacts reporting sheet

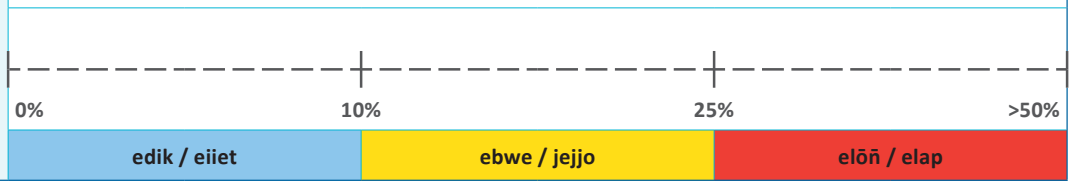
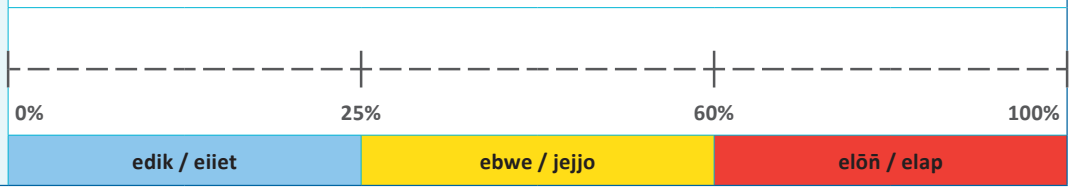
Kilen aṃ ripooti tōprak in ekkatak ko aṃ

- Kōnono ippān ri-jerbal ro jet ṃōttaṃ im lale bwe koṃin errā ilo juon wōt nōṃba bwe koṃin kanne juon wōt survey sheet innām kōṃṃani bōnbōn eo ñan aolepān ijeko (quadrat ko) koṃ ar jerbali
- Būki aolep meļeļe ko im likūti ilo (i) **juon** health reporting sheet ñan wūjooj-in-lọjet ko, im (ii) **juon** impact reporting sheet ejja ñan wujooj-in-lọjet ko

SURVEY SHEET ÑAN AṂ KANNE ILO IIEN ṆE KWŌJ KŌṂṂANE EKKATAK EO AṂ KŌN WŪJOOJ-IN-LṆJET KO

MEḶEḶE KO KIJJIEN SITE EO		
Wōn eo/ro	Etan ri-monitor eo/ro:	
Ia eo	Aelōñ eo:	Etan site eo:
Ñāāt eo	Raan eo:	Awa eo:
Katu ko	Katu eo an raan eo:	Bōkā eo:
Kar elmen kāālōt site eo	Jabdewtakwōt	Eṃōj kōkkaḷḷeik ijo

TA KO KWAAR LOI...	
1. Live Seagrass Cover **Oran wūjooj-in-lṇjet**	Meḷeḷe ko jet: 

JORRĀĀN KO ÑAN WŪJOOJ-IN-LṆJET KO	
2. Algae Cover **Oran algae ko**	Meḷeḷe ko jet: 
3. Damaged or 'burnt' seagrass **Rejorrāān ak reor kōn aer kōjeje**	Meḷeḷe ko jet: 

Kwaar ke ellolo kwōpej?	Bwijin	Jet	Ejjeḷọk
Kwaar ke ebbōk pija?	Aaet	Jaab	
Kakkobaba ko jet:			

FURTHER READING AND RESOURCES

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Johnson, J.E., Welch, D.J., Kabua-Tibon, E., Yamamura, B. (2021) *Marshall Islands Community Marine Monitoring Toolkit: A Facilitators Guide.* C_2O Pacific and Marshall Islands Marine Resources Authority, Majuro, Marshall Islands (57pp).

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