

Supplementary Material

Reliability of data collected by volunteers: a nine-year citizen science study in the Red Sea

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www.STEproject.org HOW YOU CAN HELP TO DEFEND CORAL REEFS

natural balance in the food chain.

slowly and being careful of how you

breathe: even the sound of the air bub

- If you should meet up with larger

animals, remain still on the sea bottom

animals are the ones that will become

Avoid being a typical amateur photog-

rapher or home video operator and be

rush towards them; go up to them slowly,

curious and come in for a closer look.

Taking pictures and videos

carefully aiming the camera.

bles often frightens them.

country.

Keep checking your buoyancy. Much damage is done to the coral reefs when divers go down too fast and "crash" into the reef. The right amount of weight and good buoyancy control are essential to safe diving and environmental protection. To find out more, take a course on not give them anything to eat as this neutral buoyancy diving techniques.

While swimming

Always maintain a distance of at least 2 meters from the sea bottom and sea walls

Maintain a gentle movement with your fins: the more fragile marine organisms may be damaged even without direct contact; sometimes stirring up the water around them is enough to harm them. When swimming on sandy bottoms, be careful not to stir up the sand - this could suffocate organisms.

What to, and what not to, hold on to

Do not hold on to live corals. If you are swimming against the current and are having a hard time moving forward, grab on massive dead corals only: they are easy to recognize, they are colorless and look like rocks (if you are not sure, ask your dive master to point them out to

Meeting up with corals and other life or wall: it is probable that the larger

Never touch corals: some may look tough but they are really very fragile and pieces break off easily even if you just touch them lightly, you could even damage the delicate polyps. careful not to frighten the animals. Don't

Do not collect corals, shells, or anything else: chances are you'll throw them away before leaving for home because they start to smell once they're out of the





behaviour increasing volunteer awareness.





water and if you should decide to take - If you need to lean on something to

enough to take pictures but please do - Once you've taken your pictures, don't use your fins to turn around, push off the changes their behaviour and upsets the rocks or dead corals with your hands so that you don't harm live corals with your

At the end of the dive

Once you are back on the surface and you are sure your boat has seen you, move away from the reef to avoid damaging the coral and so you can get back on to the boat more easily and safely.

Remember to take your garbage with you: trash is harmful to life. Many marine animals take plastic bags for prey and die from suffocation after they've

swallowed them. If possible, collect trash Marine animals are wary and distrustful, but also very curious: the best way you see during the dive and throw it to interact with them, without frightening away when you get to the surface. them, is to approach them very very



objects

Use as little water, detergent and soap as possible: the latter modify the ecosys-

Don't buy souvenir corals, shells, or dried fish: this only increases demand and the commerce of these animals and

BEHAVE RESPECTFULLY: OUR OCEANS' DWELLERS WILL THANK YOU FOR IT

MOJECT DEVELOPED BY Stefano Goffredo, Corrado Piccinetti, SUU

Francesco Zaccanti. Marine Science Group

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Once upon a time only a fortunate few had - Get informed by reading books the opportunity of exploring the wonders of a coral reef. Times have surely changed and magazines on scuba diving and tourism: read up on geography, culture, and, thanks to quick and efficient means and customs of the country you'll be of travel, many now have the chance visiting so you'll be more sensitive to of enjoying the beauty and pleasure of the local population; read up on the diving into and exploring these fascinating most important ecological features of the ecosystems. Corals and the life forms they place to heighten your awareness about host are extremely delicate. So, in order to the nature there. make sure that the impact and the potential Be prepared to be very careful when harm that could be done is reduced to a diving in coral reefs: a single coral is the minimum, please follow the instructions in

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HOW YOU CAN HELP TO DEFEND CORAL REEFS

result of the long and hard construction this pamphlet. Let them be of value to you in efforts of the "polyps", very small and making your dive even more exciting and in delicate animal organisms.

helping you to preserve the beauty of your Boats

tour leader, and/or dive master which is the best boat available and rent that one: avoid boats that pollute the waters Italian Ministry of the Environment and because they have engines that leak oil, diesel, or gasoline; remember that the Ministry of Tourism of the Arab Republic of Egypt Egyptian Tourist Authority cheapest package deal does not usually correspond to safety for you or for the environment.

ASTOI (Association of Italian Tour Operators) PROJECT AWARE FOUNDATION SNSI (Scuba Nitrox Safety International) SSI (Scuba Schools International Italy) ULP (Underwater Life Project) EULF (Egyptian Underwater & Lifesaving Federation

TUTTOTURISMO MSG (Marine Science Group Association)

diving experience for future generations.

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Land and Sea Protection

We wish you an enjoyable vacation.

- Choose tour operators and diving schools that honor the environment and that teach respect and safety for human life and nature: refer to associations and agencies that vouch for their affiliated members (www.astoi.com, www.projectaware.org, www.snsi.it, www.ssi-italy.org, www.under waterlifeproject.it, www.msgassociation.net).







your belt, extra pounds require more ex ertion and this increases air consumption Ask your tour operator, diving school, during the dive, thus reducing safety levels and causing more harm to the environment when they are on the sea bottom, overly weighted divers ten

to fall onto the corals causing breakages Attach all extra equipment (manom eter, alternative air



ages. - Always begin - Ludive with a check-dive to get familiar with the equipment and with the area.

Land Access

If your dive starts on land, it is best to en-Do not cast anchors - stop this destructive ter the water from a platform or gangway habit that causes harm to coral reefs by the better hotels and diving centers pro mooring the boat to buoys. these platforms so that tourists and divers Give your support locally to having buoys do not step on and harm the coral reefs. placed in diving areas: it is a custom that Support this and do not enter the water defends nature and supports ecological directly from the shore trampling on coral sustainability and that is not practiced

but use gangways. nearly enough in tourist localities The Weather

Find out about the local weather conditions, currents and underwater visibility where you are planning your dive: for your own safety, seek advice from local certified diving instructors. Do not go out to sea until you have become acquainted with the safety precautions specifically related to where

you are planning to dive.

Supplementary Figure 1. Section one of the STE project questionnaire with some suggestions for volunteers to reduce human impact on the environment and to promote a more sustainable



PROJECT DEVELOPED BY Stefano Goffredo, Corrado Piccinetti,



Never dive

Supplementary Material

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Supplementary Figure 2. Section two of the project questionnaire with photos to be used by non-professional volunteers in taxa identification.

Supplementary Material

Please, send this questionnaire to: STE project, Marine Science Group - Department of	Evolutionary and Experimental Bia	loav. University of Boloana. Via E S	elmi 3. I-40126 Boloana Italy		RARE	FREQUENT	VERY FREQUENT
	ww.STEproject.org	agy, annound a congra, na r. s.		ECHINODERMS, CRINOIDS (SEA LILIES)			
Surname	Name			26 - sea lilies (Crinoidea)	1-5	G 6-15	D more than 15
				ECHINODERMS, HOLOTHURIANS (SEA CUCUMBERS)		-	
Complete address				27 - sea cucumbers (Holothuroidea)	□ 1-2	3-10	more than 10
E-mail	Dive Certification (leve	and training organization)	ECHINODERMS, ASTEROIDS (STARFISHES)	01	2-3	
Dive site	Nearest town			28 - pearl red star (Fromia sp.) 29 - spiny starfish (Acanthaster planci)	0 1-2	3-6	more than 3 more than 6
Dive site	Nearest town			29 - spiny startish (Acantaster planci) Other startishes	0 1-2	3-5	more than 5
Diving Center				ECHINODERMS, ECHINOIDS (SEA URCHINS)	011	0.00	1 co more mano
Dive date Maximum depth (m)				30 - fire urchin (Asthenosoma sp.)	1-2	3 -4	more than 4
				31 - pencil urchin (Phyllacanthus sp.)	🗖 1-3	4-10	more than 10
Depth where yuo spent most of your dive (m) Water temperature (°C)				Other sea urchins	1-3	4-7	more than 7
Actual bottom time (minutes) Dive starting time (0-24)				VERTEBRATES, BONY FISHES			
Environment where yuo spent most of your dive (choose on	a) 🗖 correl react (sandy bottom 🗇 othe	-	32 - giant moray (Cymnothorax Javanicus, Anguilliformes)	0 1 0 1-2	2-3 3-4	more than 3 more than 4
				33 - needlefishes (Syngnathidae, Syngnathiformes) 34 - squirrelfish (Sangocentron sp., Beryciformes)	D 1-2	G 6-15	more than 4
Please select the organisms you have seen in the checklist below esti	mating the frequency of the	eir occurrence. Your instructo	r can help you!	35 - groupers (Epinephelinae, Perciformes)	0 1-5	G 6-15	more than 15
	RARE	FREQUENT	VERY FREQUENT	36 - blackspotted rubberlip (Plectorhinchus gaterinus, Perciformes)	0 1-3	4-10	more than 10
SPONGES				37 - humpback batfish (Platax sp., Perciformes)	1-10	11-100	D more than 100
1 - tube sponge (Siphonochalina sp., Demospongiae)	1-2	3-10	D more than 10	38 - red bass (Lutjanus bohar, Perciformes)	1-10	11-100	D more than 100
Other sponges	1-2	3-10	D more than 10	39 - glassfishes (Pempheridae, Perciformes)	1-100	1 01-1000	more than 1000
COELENTERATES, CORALS				40 - goatfishes (Mullidae, Perciformes)	0 1-10	11-100	more than 100
2 - fire coral (Millepora sp., Milleporina, Hydrozoa)	1-10	11-100	D more than 100	41 - map angel (Pomacanthus maculosus, Perciformes)	01	2-3	more than 3
3 - leather coral (Sarcophyton sp., Alcyonacea, Anthozoa)	0 1-5	6 -15	more than 15	42 - butterflyfishes (Chaetodontidae, Perciformes)	0 1-5	6-15 2-3	more than 15
4 - soft tree coral (Dendronephthya sp., Alcyonacea, Anthozoa)	1 1-10	1 1-100	D more than 100	43 - longnose hawkfish (Oxycirrhites typus, Perciformes)	□ 1 □ 1-3	□ 2-3 □ 4-15	more than 3
5 - sea fan (Subergorgia hicksoni, Gorgonacea, Anthozoa)	1 -3	4 -10	D more than 10	 Red Sea clownfish (Amphiprion bicinctus, Perciformes) humphead wrasse - Napoleon fish (Cheilinus undulatus, Perciformes) 		2-3	more than 15
6 - red sea fans (Melithaeidae, Gorgonacea, Anthozoa)	0 1-5	G 6-15	D more than 15	45 - numpriead wrasse - Napoleon Tish (Creatinus andulatus, Perchomes) 46 - parrotfishes (Scaridae, Perciformes)	0 1-5	G 6-25	more than 25
7 - sea whips (Ellisellidae, Gorgonacea, Anthozoa)	1-2	3 -6	more than 6	40 - parrotusnes (scandae, Perciormes) 47 - barracuda (Sphyraena sp., Perciformes)	0 1-5	G 6-25	more than 25
8 - sea carpet host anemones (Stichodactylidae, Actiniaria, Anthozoa)	0 1-3	4 -10	D more than 10	48 - Sohal surgeonfish (Acanthurus sohal, Perciformes)	0 1-5	G 6-15	more than 15
9 - plating acropora (Acropora sp., Scleractinia, Anthozoa)	1-2	3-6	more than 6	49 - caranxes (Carangidae, Perciformes)	0 1-5	0 6-15	more than 15
10 - porcupine coral (Seriatopora hystrix, Scleractinia, Anthozoa)	0 1-5	G 6-15	D more than 15	50 - lionfish (Pterois sp., Scorpaeniformes)	0 1-5	6 -15	more than 15
11 - bubble coral (Plerogyra sp., Scleractinia, Anthozoa)	1 -5	D 6-15	D more than 15	51 - spotted flatheads (Platycephalidae, Scorpaeniformes)	1 -2	3-4	more than 4
12 - mushroom corals (Fungiidae, Scleractinia, Anthozoa)	1 -5	G 6-15	D more than 15	52 - titan triggerfish (Balistoides viridescens, Tetraodontiformes)	D 1-2	3 -4	D more than 4
13 - lettuce coral (Turbinaria sp., Scleractinia, Anthozoa)	1 -5	D 6-15	D more than 15	53 - boxfishes (Ostraciidae, Tetraodontiformes)	🗖 1-2	🗖 3-4	D more than 4
14 - pineapple corals (Faviidae, Scleractinia, Anthozoa)	1-2	3 -6	more than 6	54 - blowfishes (Tetraodontidae, Tetraodontiformes)	🗖 1-3	4-10	D more than 10
15 - black coral (Antipathes sp., Antipatharia, Anthozoa)	1 -2	3-6	D more than 6	55 - porcupinefishes (Diodontidae, Tetraodontiformes)	0 1	2-3	D more than 3
Other corals	1 -5	6 -25	more than 25	Other bony fishes	1-10	11-65	D more than 65
ANELLIDA, SEDENTARY WORMS				VERTEBRATES, CARTILAGE FISHES, SHARKS		_	
16 - Christmas tree worm (Spirobranchus sp., Polychaeta)	1-5	6 -15	more than 15	56 - sharks (Squaliformes)	01	2-3	D more than 3
Other sedentary worms	1 -5	6 -15	more than 15	VERTEBRATES, CARTILAGE FISHES, RAYS AND TORPEDOS	-	-	-
MOLLUSCS, GASTROPODS (SEA SLUGS)	_	-	_	57 - blue-spotted stingray (Taeniura lymma)	1-2	3-6	more than 6
17 - Cowries (Cypraeidae, Prosobranchia)		2-3	more than 3	58 - manta (Manta sp.)		2-3	more than 3 more than 2
18 - spanish dancer (Hexabranchus sanguineus, Opisthobranchia)		2-3	more than 3	59 - torpedo (Torpedo sp.) Other rays and torpedos		2 2-4	more than 2
19 - coriacea (Chromodoris quadricolor, Opisthobranchia)	1-2	D 3-4	more than 4	VERTEBRATES, REPTILES, TURTLES		LJ 2-4	D more than 4
Other sea slugs	01	2-3	D more than 3	60 - turtles (Cheloniidae)		2-3	more than 3
MOLLUSCS, BIVALVES	_	-	-	VERTEBRATES, MAMMALS, CETACEANS		L 2-3	D more than 3
20 - tridacnae (Tridacna sp.)	1-2	3-6	more than 6	61 - dolphins (Delphinidae)	1-2	3-6	more than 6
21 - wing oyster (Pteria sp.)	1-5	G 6-15	more than 15		ssible presence of the following negati		D more than 6
Other bivalves I 1-4 I 5-10 I more than 10					1-10	11-100	
MOLLUSCS, CEPHALOPODS	-		-	62 - PARTIALLY OR TOTALLY DEAD CORALS 63 - BLEACHED CORALS	1-10	11-100	more than 100
22 - squids (Sepiidae)	1 -2	3 -4	more than 4	BROKEN CORALS BROKEN CORALS	1-10	11-100	more than 100
23 - bigfin reef squid (Sepioteuthis sp.)		2-3	more than 3	- BROKEN COKALS - SEDIMENT COVERED CORALS	1-10	11-100	more than 100
Other cephalopods	1 -2	3-4	more than 4	- SEDIMENT COVERED CORALS - LITTER	1 1	2-10	more than 100
ARTHROPODS, CRUSTACEANS, DECAPODS	-		-		tion about snorkelers and scuba divers		more than 10
24 - banded boxer shrimp (Stenopus hispidus)			more than 3		Disease in the second sec	26-50	more than 50
25 - hermit crabs (Diogenidae)	01		more than 3	How many snorkelers and scuba divers were present on the dive site? How many snorkelers and scuba divers contacts with the reef did you	LJ 1-25		more than 50
Other decapods	01	1 2-3	more than 3	see during your dive? (both voluntary or involuntary contacts)	D 1-5	6 -10	more than 10

Supplementary Figure 3. Section three of the project questionnaire with the form for data collection.