

CleanAtlantic

Tackling marine litter in the Atlantic Area

Tools for monitoring Marine litter

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Bulgaria : river pollution blocking Vacha Dam, April 2009.
Source : AFP PHOTO / DIMITAR DILKOFF

World Oceans day 2018

Preventing [plastic pollution](#) and encouraging solutions for a healthy ocean.



WP3-Capitalisation: Making the most of the existent knowledge on marine litter

WP4-Marine litter in the Atlantic Area: Drawing a picture of the status of marine litter in the Atlantic area

WP5-Monitoring and data management Data gathering and management tools to seize marine litter

WP6-Mapping and modelling: Modelling marine litter transport to identify hotspots, trends, sources and pathways

WP7-Tackling marine litter: freeing up space in the Atlantic for more biodiversity with stakeholder involvement

WP8-Awareness-raising: Empowering Atlantic citizens to turn the tide on marine litter

<http://www.cleanatlantic.eu/>



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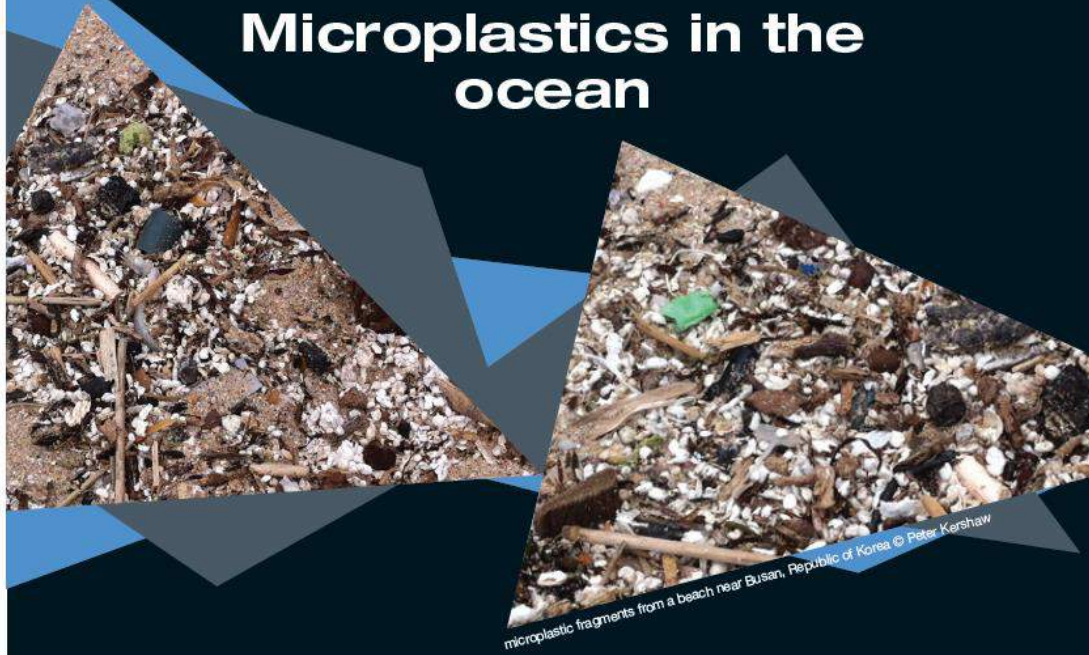


Interreg
Atlantic Area
European Regional Development Fund



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1	H Hidrógeno 1,008																	2 He Helio 4,0026...
2	3 Li Litio 6,94	4 Be Berilio 9,0121...											5 B Boro 10,81	6 C Carbono 12,011	7 N Nitrógeno 14,007	8 O Oxígeno 15,999	9 F Flúor 18,998...	10 Ne Neón 20,1797
3	11 Na Sodio 22,989...	12 Mg Magnesio 24,305											13 Al Aluminio 26,981...	14 Si Silicio 28,085	15 P Fósforo 30,973...	16 S Azufre 32,06	17 Cl Cloro 35,45	18 Ar Argón 39,948
4	19 K Potasio 39,0983	20 Ca Calcio 40,078	21 Sc Escandio 44,955...	22 Ti Titanio 47,867	23 V Vanadio 50,9415	24 Cr Cromo 51,9961	25 Mn Manganeso 54,938...	26 Fe Hierro 55,845	27 Co Cobalto 58,933...	28 Ni Níquel 58,6934	29 Cu Cobre 63,546	30 Zn Zinc 65,38	31 Ga Galio 69,723	32 Ge Germanio 72,63	33 As Arsénico 74,921...	34 Se Selenio 78,971	35 Br Bromo 79,904	36 Kr Kriptón 83,798
5	37 Rb Rubidio 85,4678	38 Sr Estroncio 87,62	39 Y Itrio 88,905...	40 Zr Zirconio 91,224	41 Nb Niobio 92,906...	42 Mo Molibdeno 95,95	43 Tc Tecnecio (98)	44 Ru Rutenio 101,07	45 Rh Rodio 102,90...	46 Pd Paladio 106,42	47 Ag Plata 107,86...	48 Cd Cadmio 112,414	49 In Indio 114,818	50 Sn Estaño 118,710	51 Sb Antimonio 121,760	52 Te Telurio 127,60	53 I Yodo 126,90...	54 Xe Xenón 131,293
6	55 Cs Cesio 132,90...	56 Ba Bario 137,327	57-71	72 Hf Hafnio 178,49	73 Ta Tantalio 180,94...	74 W Wolframio 183,84	75 Re Renio 186,207	76 Os Osmio 190,23	77 Ir Iridio 192,217	78 Pt Platino 195,084	79 Au Oro 196,96...	80 Hg Mercurio 200,59	81 Tl Talio 204,38	82 Pb Plomo 207,2	83 Bi Bismuto 208,98...	84 Po Polonio (209)	85 At Astatido (210)	86 Rn Radón (222)
7	87 Fr Francio (223)	88 Ra Radio (226)	89-103	104 Rf Rutherfordio (261)	105 Db Dubnio (268)	106 Sg Seaborgio (271)	107 Bh Bohrio (272)	108 Hs Hassio (270)	109 Mt Meitnerio (276)	110 Ds Darmstadio (281)	111 Rg Roentgenio (280)	112 Cn Copernicio (285)	113 Nh Nihoniu (284)	114 Fl Flerovio (289)	115 Mc Moscovio (288)	116 Lv Livermorio (293)	117 Ts Tennessine (294)	118 Og Oganesson (294)
	57 La Lantano 138,90...	58 Ce Cerio 140,116	59 Pr Praseodimio 140,90...	60 Nd Neodimio 144,242	61 Pm Prometio (145)	62 Sm Samario 150,36	63 Eu Europio 151,964	64 Gd Gadolinio 157,25	65 Tb Terbio 158,92...	66 Dy Disprosio 162,500	67 Ho Holmio 164,93...	68 Er Erbio 167,259	69 Tm Tulio 168,93...	70 Yb Iterbio 173,054	71 Lu Lutecio 174,96...			
	89 Ac Actinio (227)	90 Th Torio 232,03...	91 Pa Protactinio 231,03...	92 U Uranio 238,02...	93 Np Neptunio (237)	94 Pu Plutonio (244)	95 Am Americio (243)	96 Cm Curio (247)	97 Bk Berkelio (247)	98 Cf Californio (251)	99 Es Einstenio (252)	100 Fm Fermio (257)	101 Md Mendelevio (258)	102 No Nobelio (259)	103 Lr Lawrencio (262)			

Microplastics in the ocean



microplastic fragments from a beach near Busan, Republic of Korea © Peter Kershaw



Small pieces of plastic, commonly referred to as microplastics, were first described in the early 1970s and are widespread in the ocean.

Sources, fate & effects

Larger items made of plastic, such as bags, rope and fishing nets, can have obvious direct impacts on marine life and society. But the effects of microplastics are more difficult to quantify.

Microplastic fragments from the western North Atlantic, collected using a towed plankton net © Giora Proskurowski, SEA



GESAMP
Joint Group of Experts on the
Scientific Aspects of Marine
Environmental Protection



Seabed Litter

List of Categories & items

A: Plastic	B: Metals	Related size category	
A1. Bottle	B1. Cans (food)	A: <5*5 cm= 25 cm ² B: <10*10 cm= 100 cm ² C: <20*20 cm= 400 cm ² D: <50*50 cm= 2500 cm ² E: <100*100 cm= 10000 cm ² = 1 m ² F: >100*100 cm = 10000 cm ² = 1 m ²	
A2. Sheet	B2. Cans (beverage)		
A3. Bag	B3. Fishing related		
A4. Caps/ lids	B4. Drums		
A5. Fishing line (monofilament)	B5. appliances	IBTS protocol 6 categories 39 sub categories	
A6. Fishing line (entangled)	B6. car parts		
A7. Synthetic rope	B7. cables		
A8. Fishing net	B8. other		
A9. Cable ties			
A10. Strapping band			
A11. crates and containers			
A12. diapers			
A13. sanitary towel/tampon			
A14. other			
C: Rubber	D: Glass/ Ceramics	E: Natural products	F: Miscellaneous
C1. Boots	D1. Jar	E1. Wood (processed)	F1. Clothing/ rags
C2. Balloons	D2. Bottle	E2. Rope	F2. Shoes
C3. bobbins (fishing)	D3. piece	E3. Paper/ cardboard	F3. other
C4. tyre	D4. other	E4. pallets	
C5. Glove		E5. other	
C6. other			

CRUISE/CAMPAIGN:	DATE:	HAUL:	RESPONSIBLE:
LITTER_CATEGORY	Number	Weight	OBSERVATIONS
L0 No litter			
L1a Plastic bags			
L1b Plastic bottles			
L1c Plastic food wrappers			
L1d Plastic sheets			
L1e Hard plastic objects			
L1f Fishing nets (polymers)			
L1g Fishing lines (polymers)			
L1h Other synthetic fishing related			
L1i Synthetic ropes/strapping bands			
L1j Others plastic			
L1 TOTAL PLASTIC			
L2a Tyres			
L2b Other rubber (gloves, floats, etc.)			
L2 TOTAL RUBBER			
L3a Beverage cans (metal)			
L3b Other food cans/wrappers			
L3c Middle size containers (paint, etc.)			
L3d Large metallic objects			
L3e Cables			
L3f Fishing related (hooks, spears, etc.)			
L3g remnant from the war			
L3 TOTAL METAL			
L4a Glass/ceramic bottles			
L4b Pieces of glass			
L4c Ceramic jars			
L4d Large objects			
L4 TOTAL GLASS/ CERAMIC			
L5a Clothing (other than polymers)			
L5b Large pieces (carpets, etc.)			
L5c Natural fishing ropes			
L5d Sanitaries (non polymers)			
L5 TOTAL TEXTILES / NATURAL FIBERS			
L6 TOTAL Wood processed			
L7 TOTAL Paper and cardboard			
L8 TOTAL Other			
L9 TOTAL UNSPECIFIED			
TOTAL LITTER			
TOTAL FISHING GEARS (L1 f to j; L3f, L5e)			
START POSITIONS :			
END POSITIONS			

MEDITS protocol
7 categories
27 sub categories

Adaptation of fisheries observer working protocol

- ESTADILLO BASURAS**

Colectores Mareros Nº Lanzas Fecha

Código Tipo Artículo Cantidad Tierras

Map 1. Spanish EEZ

C: <20*20 cm = 400 cm²
 D: <50*50 cm = 2500 cm²
 E: <100*100 cm = 10 000 cm² = 1 m²
 F: >100*100 cm = 10 000 cm² = 1 m²

Total hauls with observers on board during 2017.

Top Predator Floating litter sampling protocol improvement

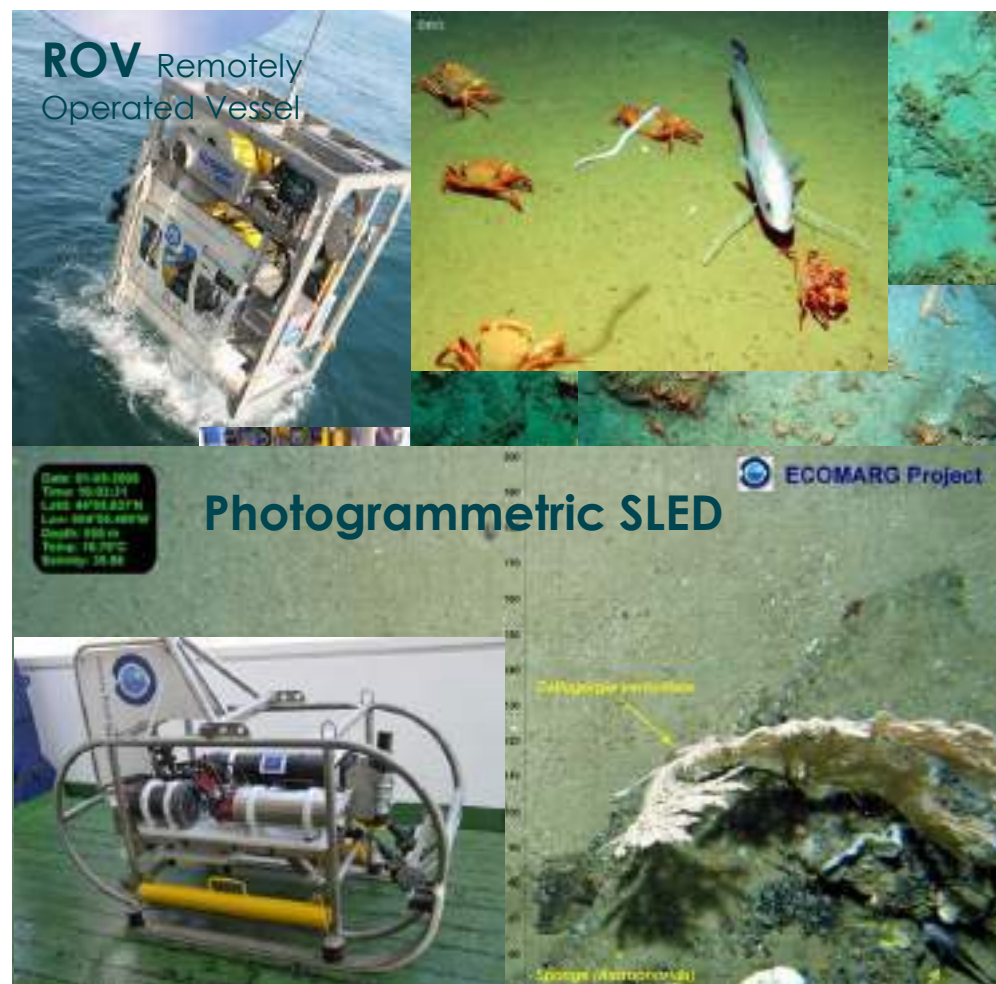
- Adaptation of the sampling protocol to make easy data comparison with other sampling methods.



Improving actual methods for the monitoring of floating and seabed litter

ROV and Photogrammetric SLED

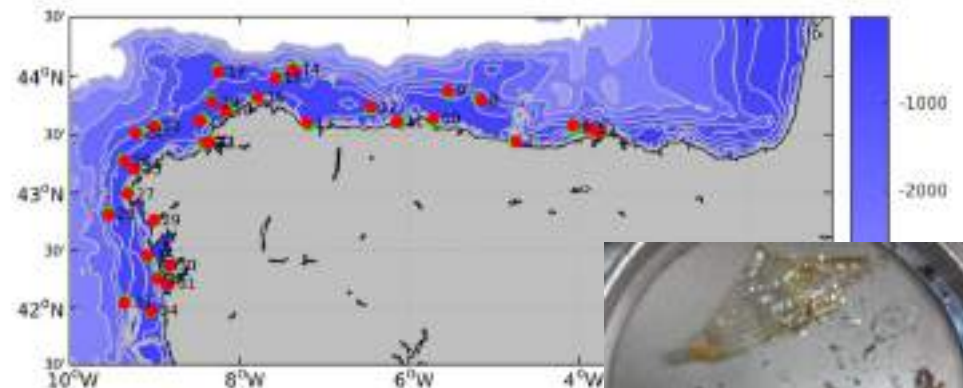
- To revisit the databases to monitoring sea bed litter.
- Data processing and analysis.
- Comparison with other sea bed litter sampling methods.



5.2.1. Improving actual methods for the monitoring of floating and seabed litter.

Manta Trawl

- Use the manta trawl during PELACUS 2018 cruise to monitoring mesoplastics floating litter.
- Samples processing and data analysis.
- Comparison with Top predator observers litter data.



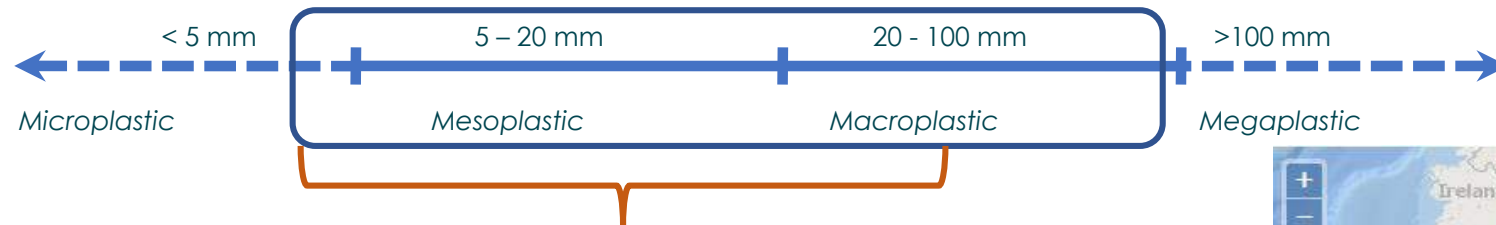
Meso & micro plastic floating litter monitoring during french fisheries surveys

Protocol



- Manta trawl net, mesh size = 300µm, width size = 60 cm
- 2 samples / day
- Speed boat = 3 knots ; duration : 20 mn ; sea conditions < 4

Expected outcome



Sizes target during **EVHOE** survey **2018**
16/10 – 30/11

Sample Analyzes : **February 2019**



5.2 Monitoring the presence of marine litter in the Atlantic Area

Objective: To improve monitoring methods for coastal litter and to locate hotspots

INTECMAR Main tasks:

- Develop the methodologies for mapping where marine litter piles up in order to define litter catcher areas for WP6
- Digitizing the methodology (Tablets, Smartphone)
- Test the usability of drones as a support tool for monitoring
- Test the use of HF Radar data to support monitoring

Develop a methodology to locate hotspots in the c

- ## Methodology:

- [illegible]

5.2 Monitoring the presence of marine litter in the Atlantic Area

Pilot area 1: Illa de Arousa

Citizen science: High School “IES A ILLA de AROUSA”

49 students monitoring 39 beaches weekly



Advantages:

- Temporal evolution of hotspots
- Temporal evolution of ML distribution
- Weekly collection of data, pictures and mussel pegs
- Awareness action using Instagram (cWP8)

Hashtags:

#CLEANATLANTICWP5, #INTECMAR,
#IESAAROUSA



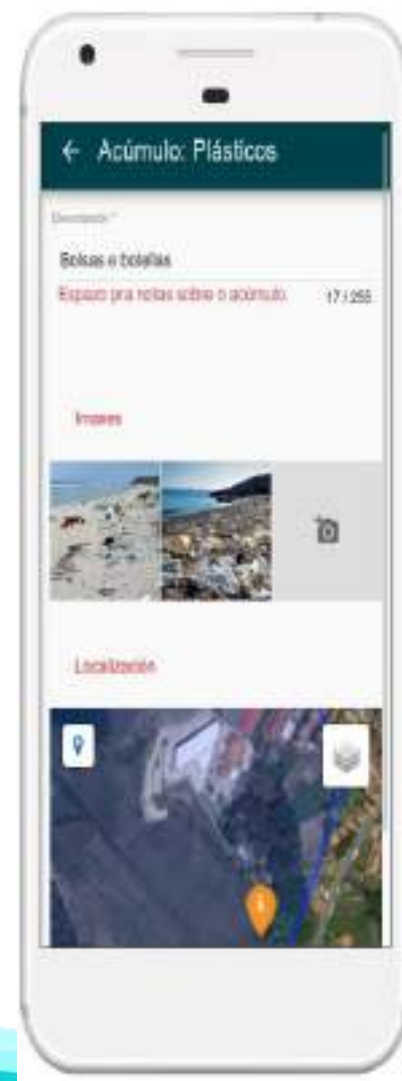
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5.2 Monitoring the presence of marine litter in the Atlantic Area

APP Mobile:

The app allows the survey of hotspots along the coastline

- To be used by restricted users (password)
- Flexible in its scale of surveys (Segments of the shoreline predefined)
- Geolocated information
- Collected data stored in a postGIS DB
- Possibility of adding photos and comments
- Compatible with Android 5.x devices or higher
- First version implemented in Intecmar before January 2019



New tools for monitoring litter

Satellites (commercial satellite DigitalGlobe)

Task
Identify suitable area to monitor plastic litter. Dependant on: <ul style="list-style-type: none">• Availability of ground-truthing data (e.g. areas where the extent of marine litter was already mapped)• Existing data in DigitalGlobe's Database
Analysis <ul style="list-style-type: none">• Multispectral• RGB
Applying the tested method of identifying plastic litter on different sections (e.g. open sea, beaches etc)

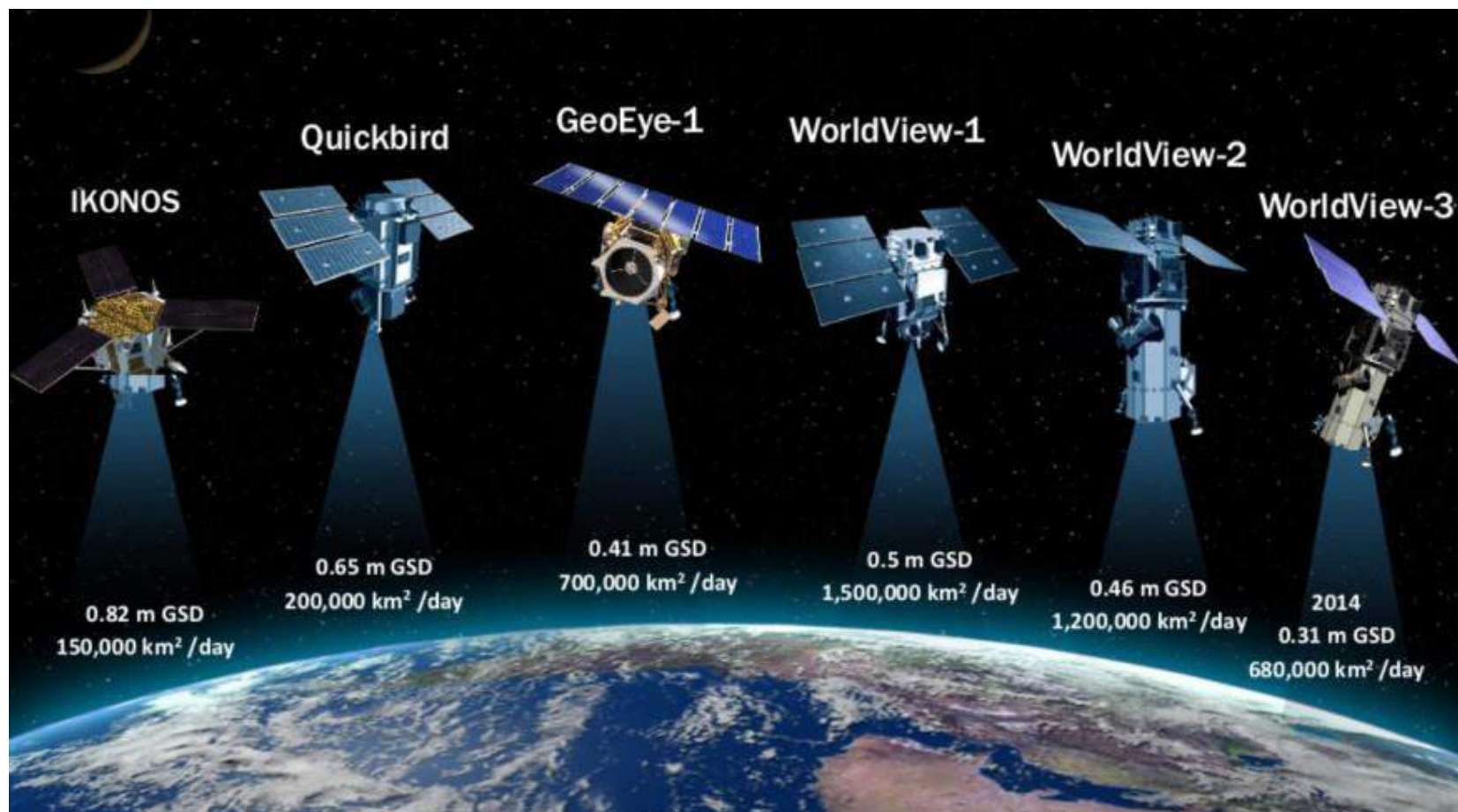


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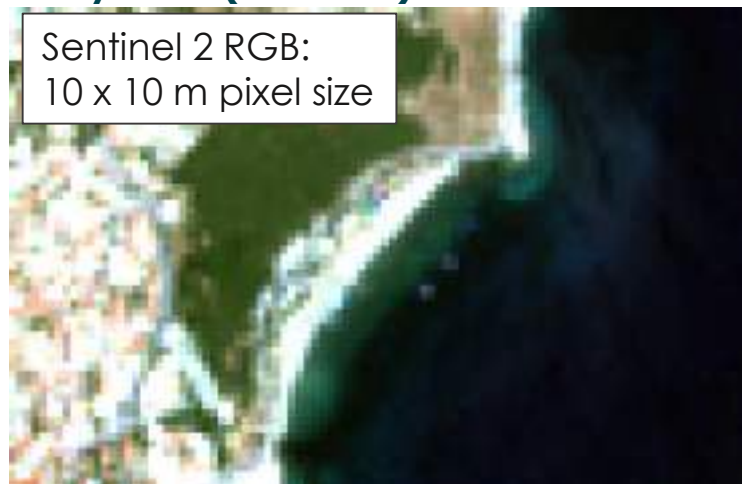




5.2.2 New tools for monitoring litter

Assessing feasibility of satellites in monitoring plastic litter- Currently tested sites:

1. Mytiline (Greece) 20180607



VS

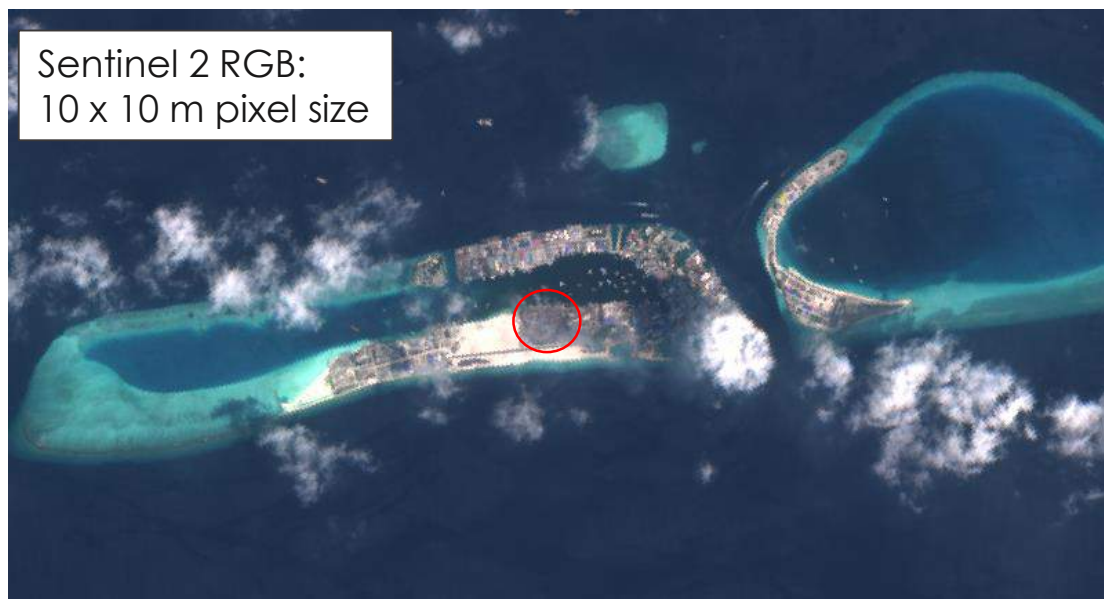


Bottom picture adapted from:
<https://mrsg.aegean.gr/?content=&nav=55>

5.2.2 New tools for monitoring litter

Assessing feasibility of satellites in monitoring plastic litter- Currently tested sites:

2. Thilafushi landfill (Maldives)



5.2 - Monitoring the presence of ML in the Marine Environment

i. New tools for the monitoring of floating and seabed litter

i. Seabed:

- i. Preliminary assessment of stakeholder engagement to collect data during underwater clean-ups
- ii. Evaluation of small ROV acquisition to assess seafloor ML in the near-shore areas (<20m)

ii. Floating:

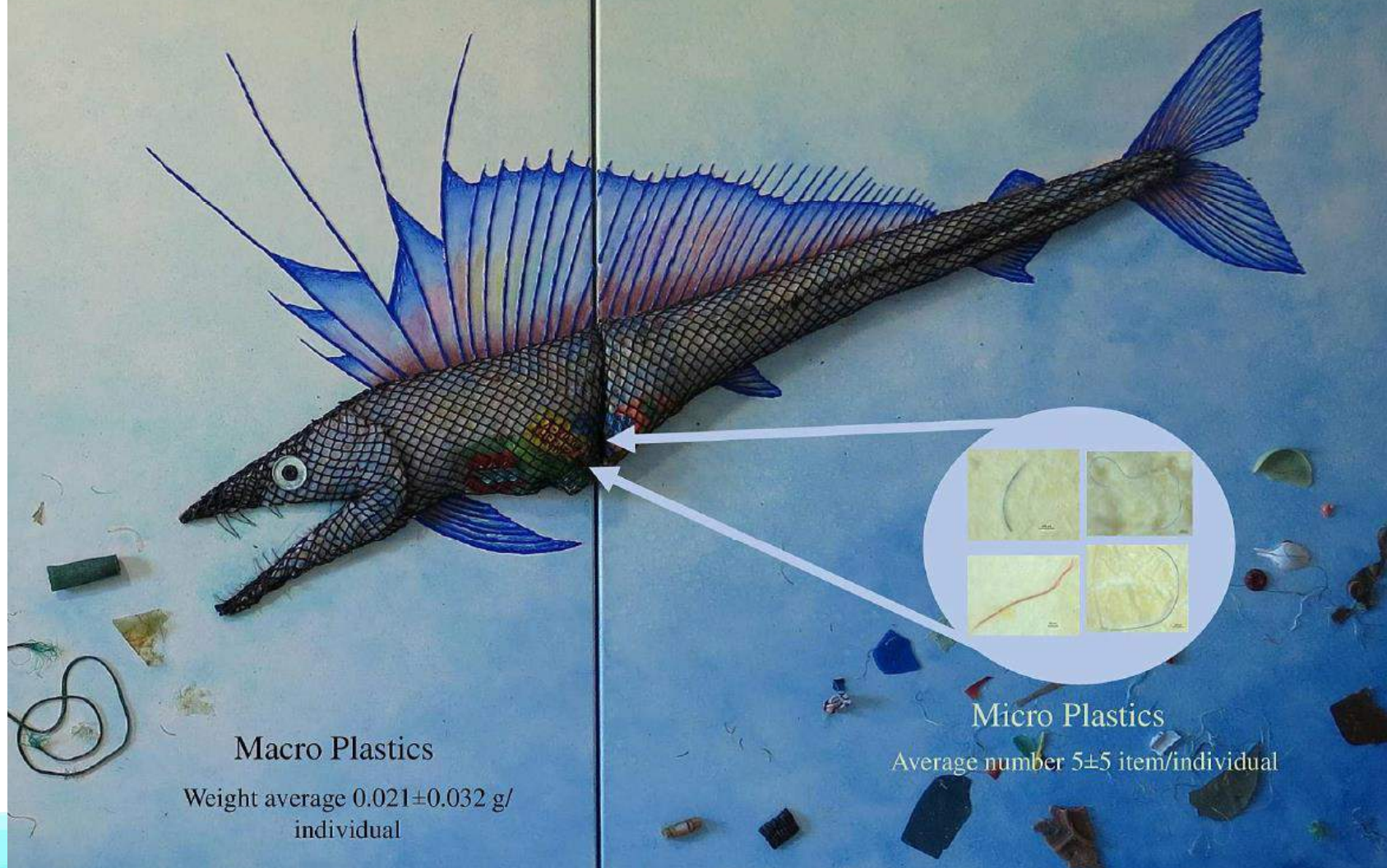
- i. Aerial Surveys: Hardware acquired, UAV Bench tests to proceed over the next month; Protocol development and optimization over the next 6 months
- ii. Manta Trawl: hardware acquired (1x manta trawl 70x40cm w/ 500um), preliminary testing and protocol optimization over the next 4 months

iii. Beached:

- i. Aerial Surveys: UAV flight and imagery analysis optimization in progress; Protocol development over the next 8 months.
- ii. Collaboration with stakeholder and cleanups to enhance ML detection.



Plastic Pollution in *Alepisaurus ferox* (N. Atlantic Ocean)



Macro Plastics

Weight average 0.021 ± 0.032 g/
individual



Micro Plastics

Average number 5 ± 5 item/individual



Grazas.