

S1 File

Questionnaire: Conservation attitudes and perceived biodiversity among divers on the Spanish Mediterranean coast: insights from local ecological knowledge

[The following survey has been translated from an original version in Spanish through an online submission system]

Section 1. Demographic data and diving experience

1. How old are you?
2. What is the highest level of education you have completed?
 - ☐ Primary education
 - ☐ General Certificate of Secondary education (GCSE)
 - ☐ General Certificate of Education (GCE) or Vocational Education and Training (VET)
 - ☐ Certificate of Higher Education (HNC) or University Degree
 - ☐ Master's Degree (MSc)
 - ☐ Doctorate (PhD)
3. What is your current diving certification?
 - ☐ Open Water diver
 - ☐ Advanced Open Water diver
 - ☐ Rescue Diver
 - ☐ Divemaster
 - ☐ Assistant Instructor
 - ☐ Instructor
4. How long have you been diving for? Provide the response in years.
5. How many logged dives have you done approximately?
 - ☐ Less or equal to 10
 - ☐ 11 to 25
 - ☐ 26 to 50
 - ☐ 51 to 100
 - ☐ 101 to 200
 - ☐ More than 200
6. Have you ever dived in a marine protected area (MPA) in the Spanish Mediterranean?
 - ☐ Yes
 - ☐ No

Section 2. Perceptions on marine biodiversity of MPAs in the Spanish Mediterranean coastal waters

1. To which Spanish Mediterranean province does the MPA where you dive most frequently belong for the last 36 months?
 - ☐ Alicante
 - ☐ Almería
 - ☐ Cádiz
 - ☐ Castellón
 - ☐ Girona
 - ☐ Granada
 - ☐ Illes Balears
 - ☐ Málaga
 - ☐ Murcia
 - ☐ Tarragona
 - ☐ Valencia
2. Which Spanish Mediterranean MPAs have you dived in in the last 36 months?
 - ☐ Badia de Palma (Mallorca)

- ☐ Cabo de Gata – Níjar (Almería)
- ☐ Cabo de Palos – Islas Hormigas (Murcia)
- ☐ Cabo de San Antonio (Alicante)
- ☐ Cabo Tiñoso (Murcia)
- ☐ Cap de Creus (Girona)
- ☐ Freus d'Eivissa i Formentera (Ibiza and Formentera)
- ☐ Illes Medes (Girona)
- ☐ Isla de Alborán (Almería)
- ☐ Isla del Toro (Mallorca)
- ☐ Isla de Tabarca (Alicante)
- ☐ Islas Columbretes (Castellón)
- ☐ Islas Malgrats (Mallorca)
- ☐ Levante de Mallorca – Cala Rajada (Mallorca)
- ☐ Masía Blanca (Tarragona)
- ☐ Migjorn (Mallorca)
- ☐ Nord de Menorca
- ☐ Ses Negres (Girona)
- ☐ Other: please, specify.

According to the previous training, please try to respond to the following question regarding the MPAs where you have dived more frequently in the past 36 months:

Section 2.1. Seagrasses in MPAs

Posidonia oceanica:

1. In the MPAs where you have dived most frequently in the past 36 months, please estimate the abundance of *Posidonia oceanica*. You can select from the following categories.
 - ☐ Very abundant (covers most of the seabed in the area)
 - ☐ Abundant (covers a significant part of the seabed but not the majority)
 - ☐ Occasional (small patches scattered throughout)
 - ☐ Rare (few isolated patches)
 - ☐ Absent (not observed in the area)
2. Where have you observed it most frequently?
 - ☐ In sandy seabed
 - ☐ In rocky seabed
 - ☐ In mixed seabed
3. What are the most common characteristics of the *Posidonia oceanica* meadows you typically observe during your dives?
 - ☐ Large meadows
 - ☐ Isolated tufts
4. How would you globally rate the health of most *Posidonia oceanica* specimens based on the following signs: leaf discoloration (yellow or brown), leaf lesions or spots, reduced leaf density, shortened leaves, excessive algae growth on leaves, exposed roots or rhizomes, and loss of shoots?
 - ☐ Healthy
 - ☐ Sick
5. Have you observed any disturbances affecting them during your dives? If so, please select the most frequently observed disturbance from the options below:
 - ☐ No identifiable disturbances
 - ☐ Abundant dead zones (areas with no visible growth or life)
 - ☐ Direct human-caused disturbances (e.g., anchoring, propeller damage, trawling)
 - ☐ Presence of litter and human waste (plastic, bottles, cans, fishing gear, etc.)
 - ☐ Algae overgrowth covering the seagrasses or other benthic organisms

- ☐ Increased water turbidity (cloudiness or reduced visibility due to particles or pollutants)

Cymodocea nodosa

1. In the MPAs where you have dived most frequently in the past 36 months, please estimate the abundance of *Cymodocea nodosa*. You can select from the following categories.
 - ☐ Very abundant (covers most of the seabed in the area)
 - ☐ Abundant (covers a significant part of the seabed but not the majority)
 - ☐ Occasional (small patches scattered throughout)
 - ☐ Rare (few isolated patches)
2. Where have you observed it most frequently?
 - ☐ In sandy seabed
 - ☐ In rocky seabed
 - ☐ In mixed seabed
3. What are the most common characteristics of the *Cymodocea nodosa* meadows you typically observe during your dives?
 - ☐ Large meadows
 - ☐ Isolated tufts
4. How would you globally rate the health of most *Cymodocea nodosa* specimens based on the following signs: leaf discoloration (yellow or brown), presence of lesions or spots on leaves, reduced leaf density, shortened or damaged leaves, excessive algae growth on leaves, exposed roots or rhizomes, and decline in shoot density??
 - ☐ Healthy
 - ☐ Sick
5. Have you observed any disturbances affecting them during your dives? If so, please select the most frequently observed disturbance from the options below:
 - ☐ No identifiable disturbances
 - ☐ Abundant dead zones (areas with no visible growth or life)
 - ☐ Direct human-caused disturbances (e.g., anchoring, propeller damage, trawling)
 - ☐ Presence of litter and human waste (plastic, bottles, cans, fishing gear, etc.)
 - ☐ Algae overgrowth covering the seagrasses or other benthic organisms
 - ☐ Increased water turbidity (cloudiness or reduced visibility due to particles or pollutants)

Section 2.2. Octocorals

White gorgonian: *Eunicella singularis*

1. Based on your dives in the MPAs you have visited most frequently in the last 36 months, please estimate the abundance of the white gorgonian:
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In rocky bottoms
 - ☐ In vertical walls
 - ☐ In reef-like formations
3. What is the general appearance of the colonies you usually observe?
 - ☐ Healthy
 - ☐ Sick (> 10% bare skeleton or covered by algae and other organisms)

Yellow gorgonian: *Eunicella cavolini*

1. Based on your dives in the MPAs you have visited most frequently in the last 36 months, please estimate the abundance of the yellow gorgonian:
 - ☐ Absent
 - ☐ Rare

- ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In rocky bottoms
 - ☐ In vertical walls
 - ☐ In reef-like formations
 3. What is the general appearance of the colonies you usually observe?
 - ☐ Healthy
 - ☐ Sick (> 10% bare skeleton or covered by algae and other organisms)

Violascent sea-whip: *Paramuricea clavata*

1. Based on your dives in the MPAs you have visited most frequently in the last 36 months, please estimate the abundance of the violascent sea-whip.
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In rocky bottoms
 - ☐ In vertical walls
 - ☐ In reef-like formations
3. What is the general appearance of the colonies you usually observe?
 - ☐ Healthy
 - ☐ Sick (> 10% bare skeleton or covered by algae and other organisms)

Red coral: *Corallium rubrum*

1. Based on your dives in the MPAs you have visited most frequently in the last 36 months, please estimate the abundance of the red coral.
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In rocky bottoms
 - ☐ In vertical walls
 - ☐ In reef-like formations
3. What is the general appearance of the colonies you usually observe?
 - ☐ Healthy
 - ☐ Sick (> 10% bare skeleton or covered by algae and other organisms)

Section 2.3. Invasive algae

Caulerpa cylindracea

1. Please, estimate the abundance of *Caulerpa cylindracea* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In sandy seabed

- ☐ In rocky seabed
- ☐ Over marine phanerogams (*Posidonia* and *Cymodocea*)
- ☐ Over gorgonians, corals, or other organisms

Lophocladia lallemandii

1. Please, estimate the abundance of *Lophocladia lallemandii* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In sandy seabed
 - ☐ In rocky seabed
 - ☐ Over marine phanerogams (*Posidonia* and *Cymodocea*)
 - ☐ Over gorgonians, corals, or other organisms

Section 2.4. Herbivore-species

Dreamfish, salema porgy: *Sarpa salpa*

1. Please, estimate the abundance of *Sarpa salpa* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Violet sea urchin: *Paracentrotus lividus*

1. Please, estimate the abundance of *Paracentrotus lividus* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Black sea urchin: *Arbacia lixula*

1. Please, estimate the abundance of *Arbacia lixula* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Section 2.5. Non-herbivore species

Dusky grouper: *Epinephelus marginatus*

1. Please, estimate the abundance of *Epinephelus marginatus* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare

- ☐ Occasional
- ☐ Abundant
- ☐ Very abundant

Mediterranean barracuda: *Sphyraena sphyraena*

1. Please, estimate the abundance of *Sphyraena sphyraena* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Bluefish: *Pomatomus saltatrix*

1. Please, estimate the abundance of *Pomatomus saltatrix* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Ornate wrasse: *Thalassoma pavo*

1. Please, estimate the abundance of *Thalassoma pavo* in the MPAs you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Section 3. Perceptions on marine biodiversity of non-protected areas in the Spanish Mediterranean coastal waters

Section 3.1. Seagrasses in MPAs

Posidonia oceanica:

1. In the non-protected areas where you have dived most frequently in the past 36 months, please estimate the abundance of *Posidonia oceanica*. You can select from the following categories.
 - ☐ Very abundant (covers most of the seabed in the area)
 - ☐ Abundant (covers a significant part of the seabed but not the majority)
 - ☐ Occasional (small patches scattered throughout)
 - ☐ Rare (few isolated patches)
 - ☐ Absent (not observed in the area)
2. Where have you observed it most frequently?
 - ☐ In sandy seabed
 - ☐ In rocky seabed
 - ☐ In mixed seabed
3. What are the most common characteristics of the *Posidonia oceanica* meadows you typically observe during your dives?
 - ☐ Large meadows
 - ☐ Isolated tufts

4. How would you globally rate the health of most *Posidonia oceanica* specimens based on the following signs: leaf discoloration (yellow or brown), leaf lesions or spots, reduced leaf density, shortened leaves, excessive algae growth on leaves, exposed roots or rhizomes, and loss of shoots?
 - ☐ Healthy
 - ☐ Sick
5. Have you observed any disturbances affecting them during your dives? If so, please select the most frequently observed disturbance from the options below:
 - ☐ No identifiable disturbances
 - ☐ Abundant dead zones (areas with no visible growth or life)
 - ☐ Direct human-caused disturbances (e.g., anchoring, propeller damage, trawling)
 - ☐ Presence of litter and human waste (plastic, bottles, cans, fishing gear, etc.)
 - ☐ Algae overgrowth covering the seagrasses or other benthic organisms
 - ☐ Increased water turbidity (cloudiness or reduced visibility due to particles or pollutants)

Cymodocea nodosa

1. In the non-protected areas where you have dived most frequently in the past 36 months, please estimate the abundance of *Cymodocea nodosa*. You can select from the following categories.
 - ☐ Very abundant (covers most of the seabed in the area)
 - ☐ Abundant (covers a significant part of the seabed but not the majority)
 - ☐ Occasional (small patches scattered throughout)
 - ☐ Rare (few isolated patches)
2. Where have you observed it most frequently?
 - ☐ In sandy seabed
 - ☐ In rocky seabed
 - ☐ In mixed seabed
3. What are the most common characteristics of the *Cymodocea nodosa* meadows you typically observe during your dives?
 - ☐ Large meadows
 - ☐ Isolated tufts
4. How would you globally rate the health of most *Cymodocea nodosa* specimens based on the following signs: leaf discoloration (yellow or brown), presence of lesions or spots on leaves, reduced leaf density, shortened or damaged leaves, excessive algae growth on leaves, exposed roots or rhizomes, and decline in shoot density??
 - ☐ Healthy
 - ☐ Sick
5. Have you observed any disturbances affecting them during your dives? If so, please select the most frequently observed disturbance from the options below:
 - ☐ No identifiable disturbances
 - ☐ Abundant dead zones (areas with no visible growth or life)
 - ☐ Direct human-caused disturbances (e.g., anchoring, propeller damage, trawling)
 - ☐ Presence of litter and human waste (plastic, bottles, cans, fishing gear, etc.)
 - ☐ Algae overgrowth covering the seagrasses or other benthic organisms
 - ☐ Increased water turbidity (cloudiness or reduced visibility due to particles or pollutants)

Section 3.2. Octocorals

White gorgonian: *Eunicella singularis*

2. Based on your dives in the non-protected areas you have visited most frequently in the last 36 months, please estimate the abundance of the white gorgonian:
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
4. Where have you observed it most frequently?

- ☐ In rocky bottoms
 - ☐ In vertical walls
 - ☐ In reef-like formations
5. What is the general appearance of the colonies you usually observe?
- ☐ Healthy
 - ☐ Sick (> 10% bare skeleton or covered by algae and other organisms)

Yellow gorgonian: *Eunicella cavolini*

1. Based on your dives in the non-protected areas you have visited most frequently in the last 36 months, please estimate the abundance of the yellow gorgonian:
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In rocky bottoms
 - ☐ In vertical walls
 - ☐ In reef-like formations
3. What is the general appearance of the colonies you usually observe?
 - ☐ Healthy
 - ☐ Sick (> 10% bare skeleton or covered by algae and other organisms)

Violescent sea-whip: *Paramuricea clavata*

1. Based on your dives in the non-protected areas you have visited most frequently in the last 36 months, please estimate the abundance of the violescent sea-whip.
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In rocky bottoms
 - ☐ In vertical walls
 - ☐ In reef-like formations
3. What is the general appearance of the colonies you usually observe?
 - ☐ Healthy
 - ☐ Sick (> 10% bare skeleton or covered by algae and other organisms)

Red coral: *Corallium rubrum*

1. Based on your dives in the non-protected areas you have visited most frequently in the last 36 months, please estimate the abundance of red coral.
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In rocky bottoms
 - ☐ In vertical walls
 - ☐ In reef-like formations
3. What is the general appearance of the colonies you usually observe?
 - ☐ Healthy
 - ☐ Sick (> 10% bare skeleton or covered by algae and other organisms)

Section 3.3. Invasive algae

Caulerpa cylindracea

1. Please, estimate the abundance of *Caulerpa cylindracea* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In sandy seabed
 - ☐ In rocky seabed
 - ☐ Over marine phanerogams (*Posidonia* and *Cymodocea*)
 - ☐ Over gorgonians, corals, or other organisms

Lophocladia lallemandii

1. Please, estimate the abundance of *Lophocladia lallemandii* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant
2. Where have you observed it most frequently?
 - ☐ In sandy seabed
 - ☐ In rocky seabed
 - ☐ Over marine phanerogams (*Posidonia* and *Cymodocea*)
 - ☐ Over gorgonians, corals, or other organisms

Section 3.4. Herbivore-species

Dreamfish, salema porgy: *Sarpa salpa*

1. Please, estimate the abundance of *Sarpa salpa* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Violet sea urchin: *Paracentrotus lividus*

1. Please, estimate the abundance of *Paracentrotus lividus* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Black sea urchin: *Arbacia lixula*

1. Please, estimate the abundance of *Arbacia lixula* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent

- ☐ Rare
- ☐ Occasional
- ☐ Abundant
- ☐ Very abundant

Section 3.5. Non-herbivore species

Dusky grouper: *Epinephelus marginatus*

1. Please, estimate the abundance of *Epinephelus marginatus* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Mediterranean barracuda: *Sphyraena sphyraena*

1. Please, estimate the abundance of *Sphyraena sphyraena* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Bluefish: *Pomatomus saltatrix*

1. Please, estimate the abundance of *Pomatomus saltatrix* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Ornate wrasse: *Thalassoma pavo*

1. Please, estimate the abundance of *Thalassoma pavo* in the non-protected areas you have dived in most frequently in the last 36 months
 - ☐ Absent
 - ☐ Rare
 - ☐ Occasional
 - ☐ Abundant
 - ☐ Very abundant

Section 4. Divers' opinions on the health status of the Mediterranean Sea and the importance of MPAs and educational campaigns for the conservation of the Mediterranean marine biodiversity

1. To what extent do you agree with the statement: "The biodiversity of the Mediterranean Sea is threatened by human activities"?
 1. Strongly disagree
 2. Disagree
 3. Neutral
 4. Agree
 5. Strongly agree
2. Based on your personal perception, how would you rate the overall ecological health of the Mediterranean Sea? 1

1. Totally unhealthy
 2. Somewhat unhealthy
 3. Neutral/Neither healthy nor unhealthy
 4. Somewhat healthy
 5. Totally healthy
3. In your opinion, what is the most significant threat to the biodiversity of the Mediterranean Sea?
 - a. Habitat loss and degradation
 - b. Overexploitation and overfishing
 - c. Climate change
 - d. Pollution (including chemical and plastic waste)
 - e. Introduction of invasive species
 4. How important do you believe the creation of MPAs is for the conservation of Mediterranean biodiversity?
 1. Not important at all
 2. Slightly important
 3. Moderately important
 4. Important
 5. Very important
 5. Are there enough MPAs in the Mediterranean Sea?
 1. Far less than necessary
 2. Slightly less than necessary
 3. Adequate
 4. Slightly more than necessary
 5. Far more than necessary
 6. Do you think divers also pose a threat to marine biodiversity?
 1. Strongly disagree
 2. Disagree
 3. Neutral
 4. Agree
 5. Strongly agree
 7. Do you believe developing environmental education programs and awareness campaigns for divers would be beneficial?
 1. Strongly disagree
 2. Disagree
 3. Neutral
 4. Agree
 5. Strongly agree

Section 5: Additional Comments

1. Is there anything else you would like to share about your experiences, perceptions, or opinions regarding marine biodiversity, conservation efforts, or your diving activities in the Mediterranean Sea?

Please use the space below to provide any additional comments, observations, or suggestions that you believe are important for this study: