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## Espaces maritimes et interfaces

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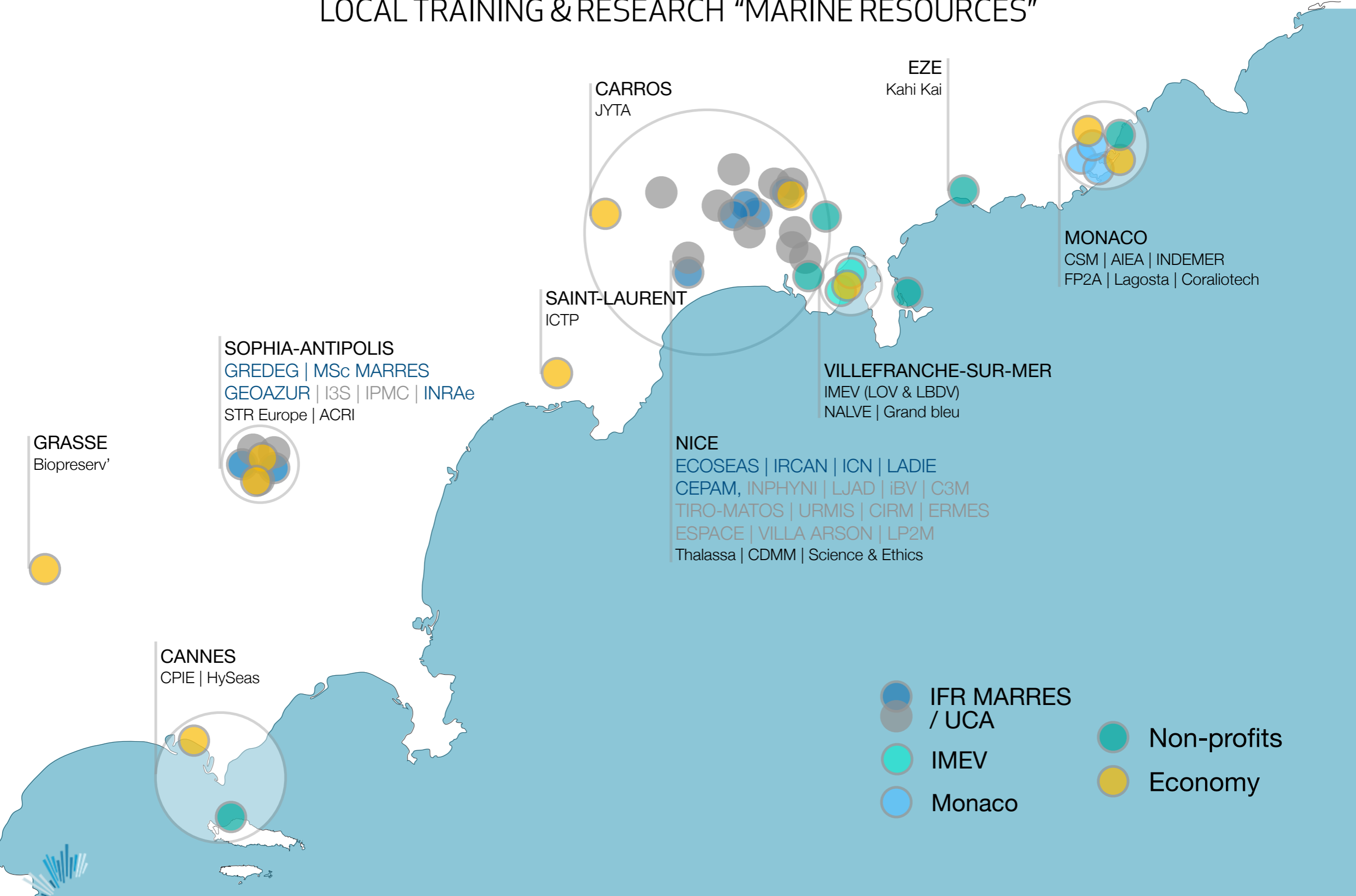
Training & Research to study, preserve and value  
marine resources for well-being and health



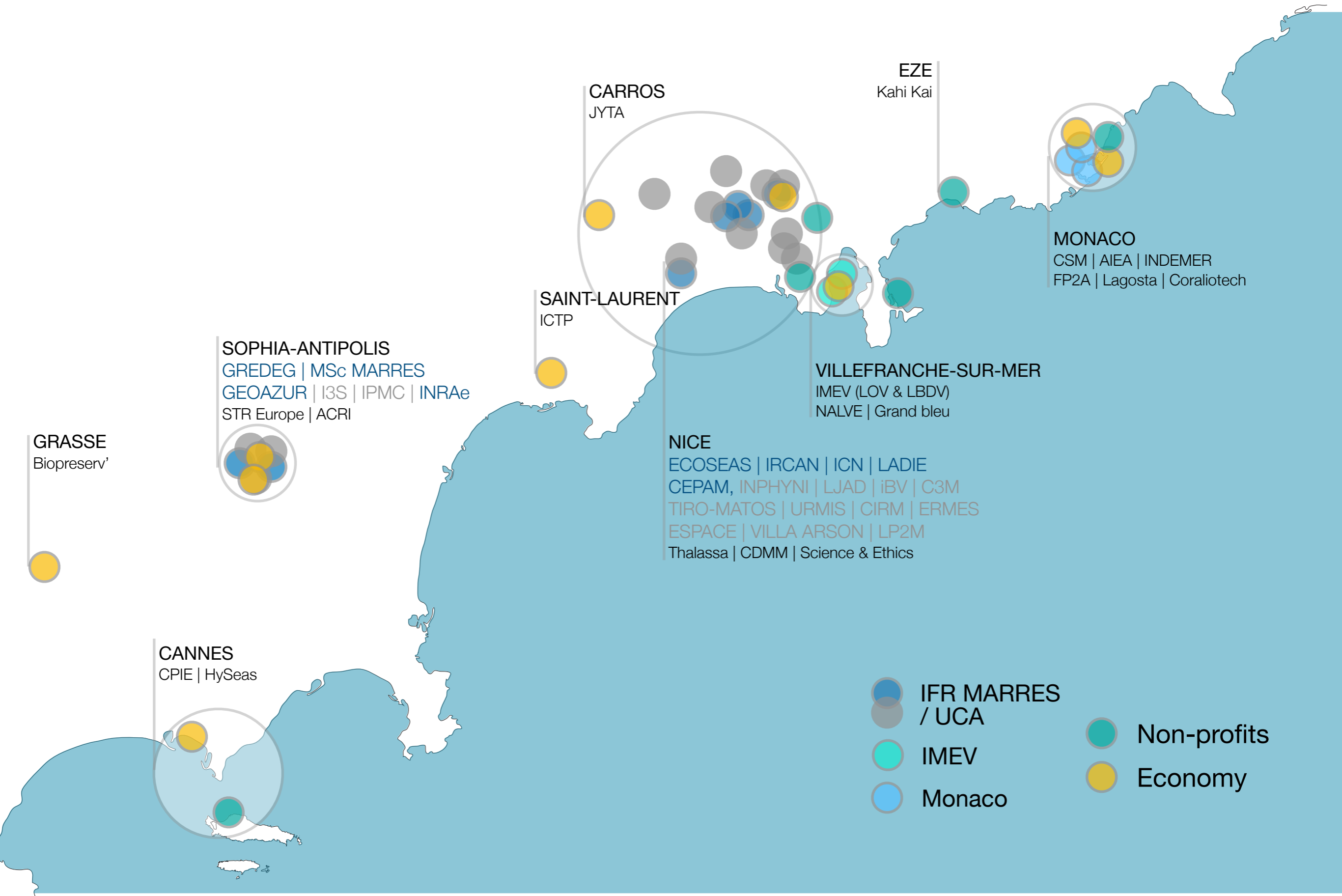
UNIVERSITÉ CÔTE D'AZUR



# LOCAL TRAINING & RESEARCH "MARINE RESOURCES"



- IFR MARRES / UCA
- IMEV
- Non-profits
- Monaco
- Economy



**GRASSE**  
Biopreserv'

**SOPHIA-ANTIPOLIS**  
GREDEG | MSc MARRES  
GEOAZUR | I3S | IPMC | INRAe  
STR Europe | ACRI

**CANNES**  
CPIE | HySeas

**CARROS**  
JYTA

**SAINT-LAURENT**  
ICTP

**NICE**  
ECOSEAS | IRCAN | ICN | LADIE  
CEPAM, INPHYNI | LJAD | iBV | C3M  
TIRO-MATOS | URMIS | CIRM | ERMES  
ESPACE | VILLA ARSON | LP2M  
Thalassa | CDMM | Science & Ethics

**EZE**  
Kahi Kai

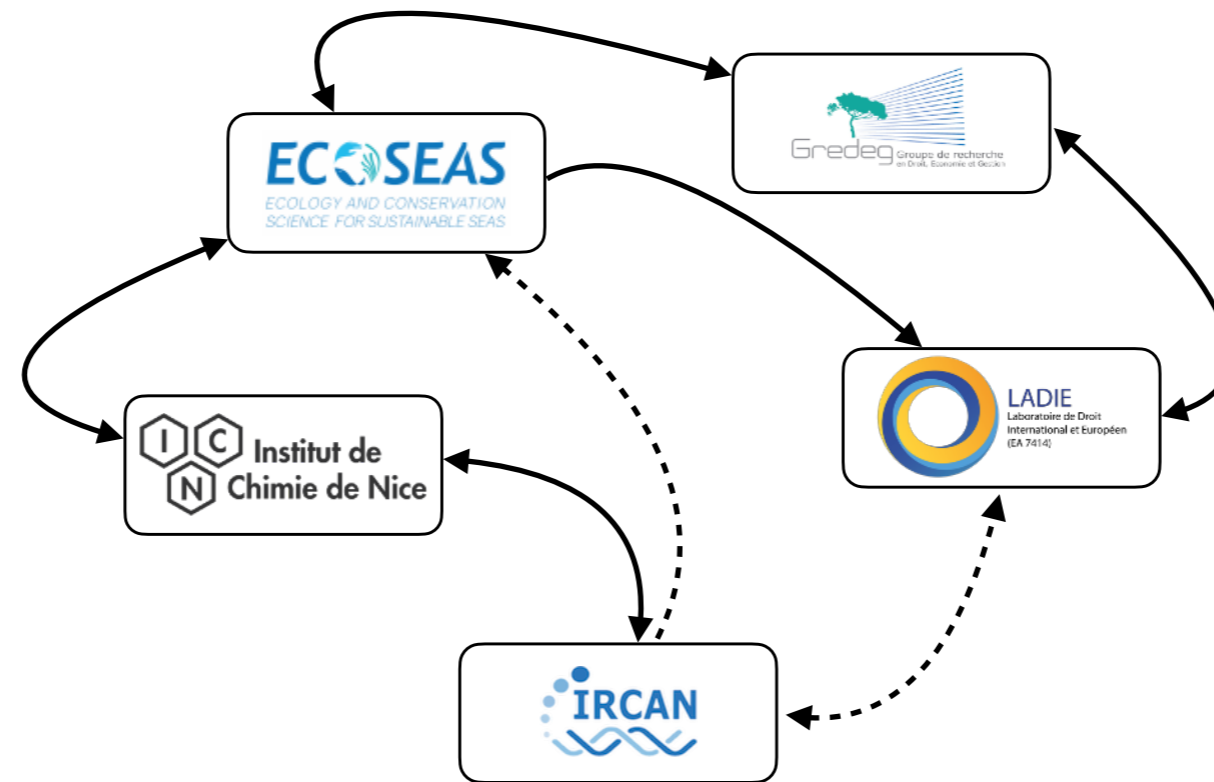
**VILLEFRANCHE-SUR-MER**  
IMEV (LOV & LBDV)  
NALVE | Grand bleu

**MONACO**  
CSM | AIEA | INDEMER  
FP2A | Lagosta | Coraliotech

IFR MARRES / UCA  
IMEV  
Monaco

Non-profits  
Economy

# UCA TRAINING & RESEARCH DYNAMICS IN "MARINE RESOURCES"



2018

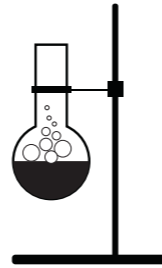
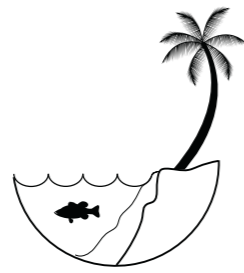


2020

# MISSION OF THE IFR MARRES



FROM ECOLOGY, BIOLOGY AND THE CONSERVATION OF MARINE RESOURCES,  
TO WELL-BEING AND HEALTH



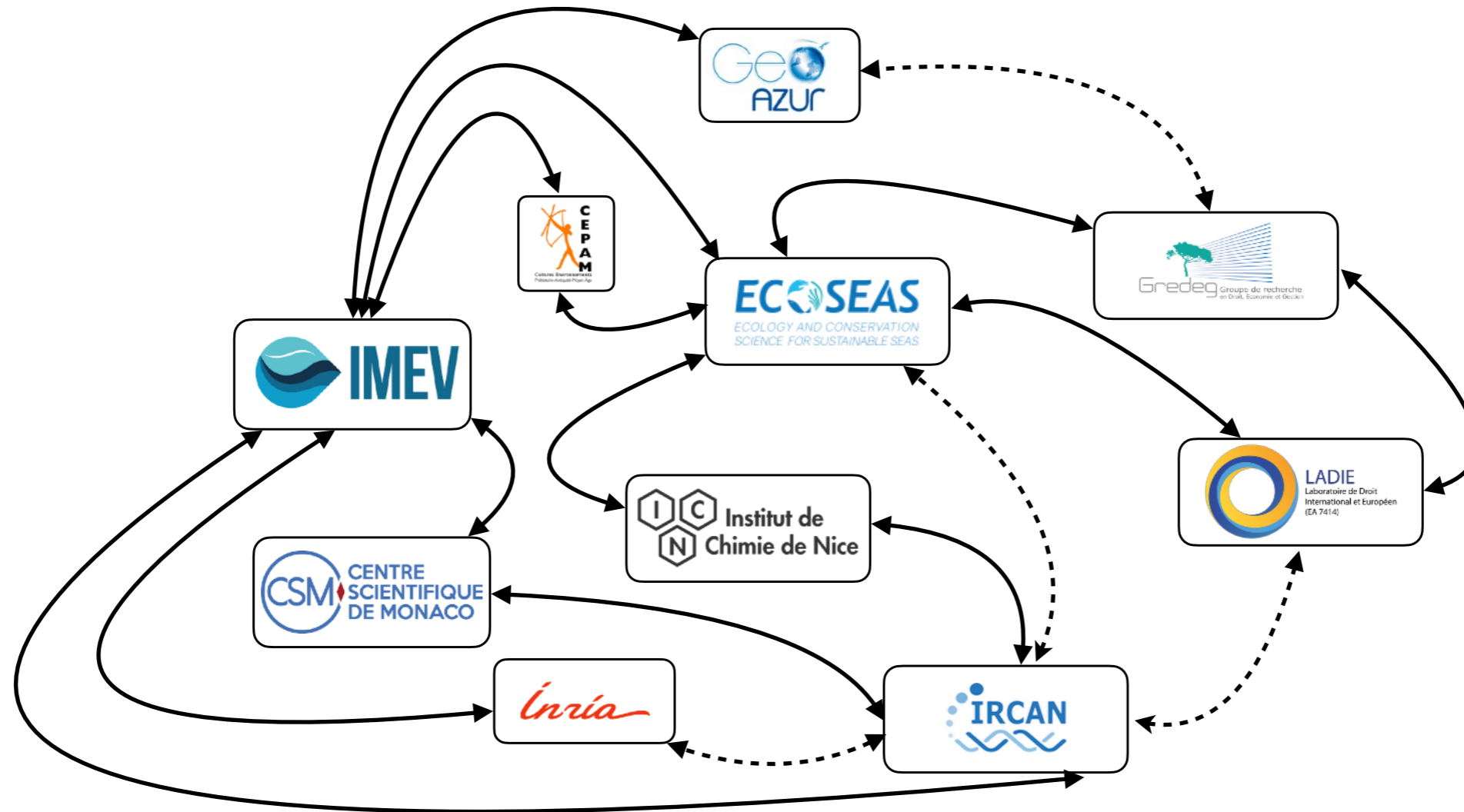
STRUCTURING "MARINE RESOURCES" RESEARCH WITHIN UCA & SITE

FOSTER TRANSVERSAL, INTERDISCIPLINARY & AMBITIOUS COLLECTIVE RESEARCH

VALUE THIS RESEARCH WITH SOCIO-ECONOMIC PARTNERS & LOCAL AUTHORITIES



# TRAINING & RESEARCH DYNAMICS IN "MARINE RESOURCES"

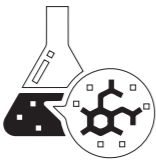




# INTERDISCIPLINARY EXPERTISE - LOCAL, NATIONAL & INTERNATIONAL



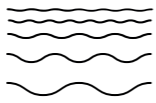
Biology



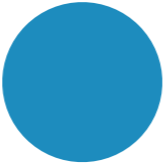
Chemistry



Health



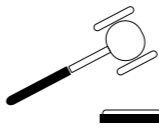
Environnement



Ecology



Conservation



Law



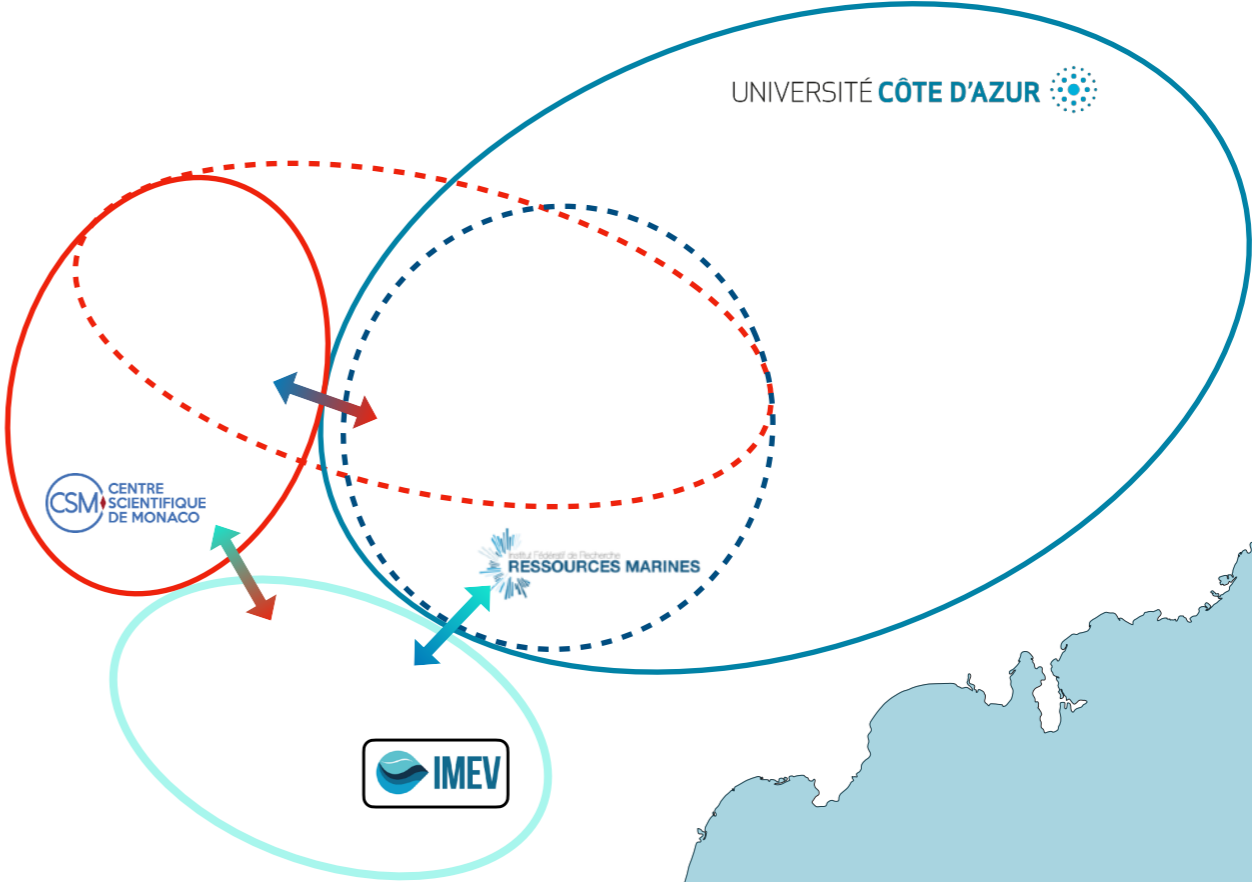
Economy



Geology



Archeology



# Integrated management and sustainable development of marine resources for health & well-being

## Axe 1 Ecology & integrated Management

**Aim 1** Environmental assessment

**Aim 2** Management / decision-making

**Aim 3** Innovation for conservation

## Axe 2 Sustainable valuation

Marine Natural Products **Aim 1**

Marine Bioinspiration **Aim 2**

Innovation for research / society **Aim 3**

**Axe transversal 1 - Facilities & Services (existing or to be developed)**

**Axe transversal 2 - Training by research**

**Axe transversal 3 - Economic impact & acceptability**

**Axe transversal 4 - Science and Society**

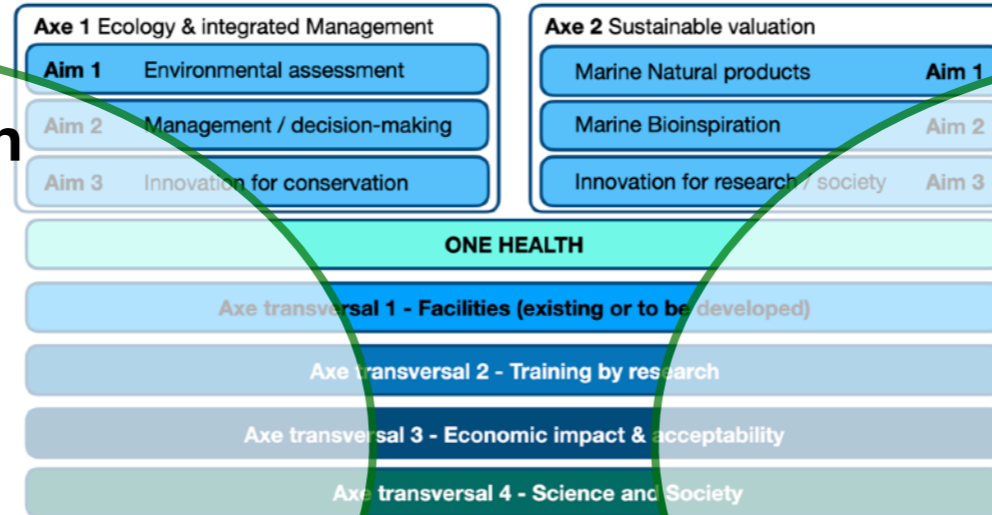
**ONE HEALTH**

# DEVELOPMENT OF AMBITIOUS RESEARCH PROJECTS



**Integrated management and sustainable development of marine resources for health & well-being**

**Conservation**  
**MPA Nice**



**Innovation**

**BlueLeaf (MSc MARRES)**  
**Viridis (2023)**  
**Blue (2024)**  
**UCA Cosmetics (2025)**

**INALVE**  
**Marem Biotech (2023?)**

**MÉTROPOLE**  
NICE CÔTE D'AZUR

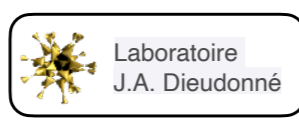
UNIVERSITÉ  
CÔTE D'AZUR  
FONDATION

**MÉTROPOLE**  
NICE CÔTE D'AZUR

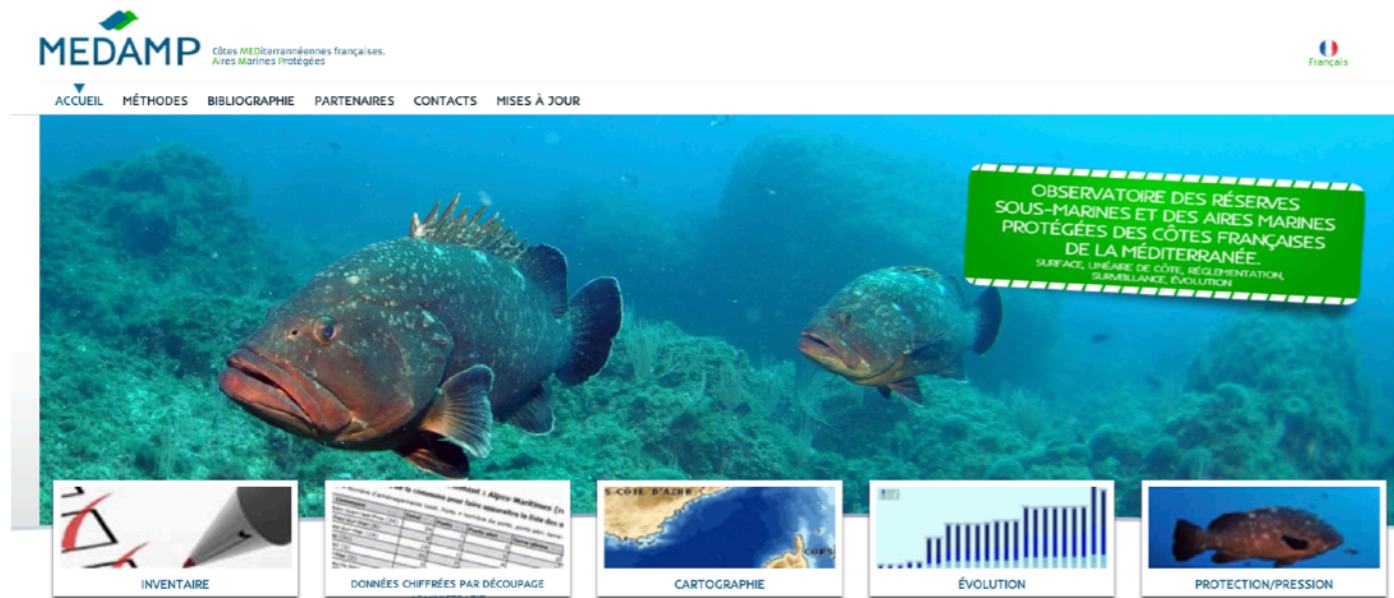
**MÉTROPOLE**  
NICE CÔTE D'AZUR



# GESTION INTÉGRÉE DES RESSOURCES MARINES (MARE)



PI: Cécile SABOURRAULT - ECOSEAS



Nouvelle AMP (Baie de Nice) - MNCA

AXE 1- Préservation/restauration de la biodiversité (ECOSEAS, ICN, LJAD/INRIA)

AXE 2 - Valorisation économique des ressources durables (GREDEG, ECOSEAS, ITCA, ICN)

AXE3 - Gestion durable, indicateurs juridiques et économiques (LADIE, GREDEG, ECOSEAS)



# TARA PACIFIC EXPEDITION



## TARA Consortium

80 scientists  
18 laboratories, 8 countries



## Sampling

40 sites: 3 coral species  
10 samples/species/site  
+ fish, plankton, water...

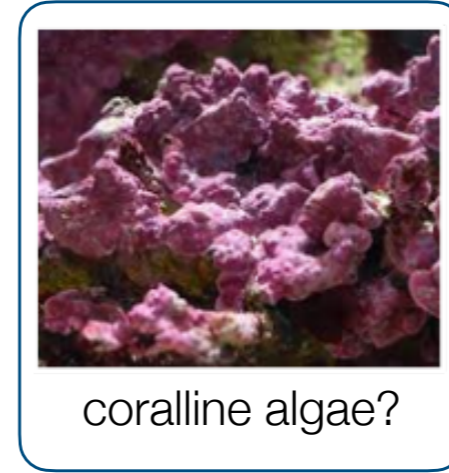
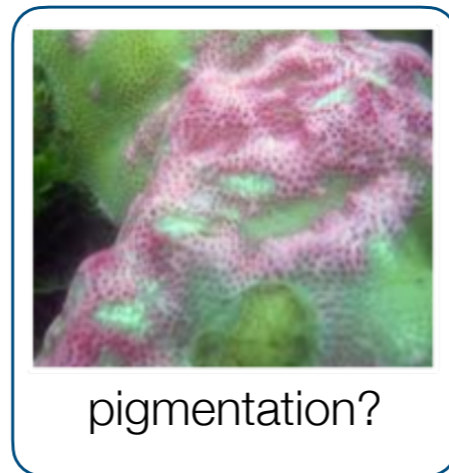
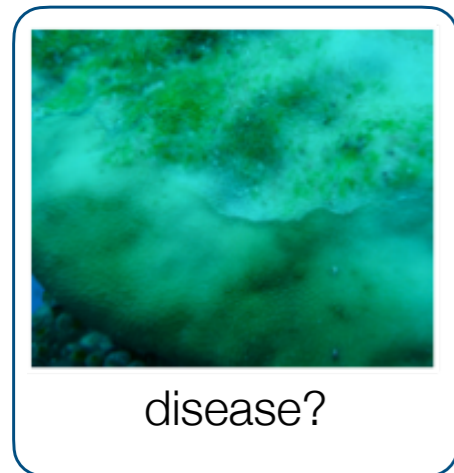
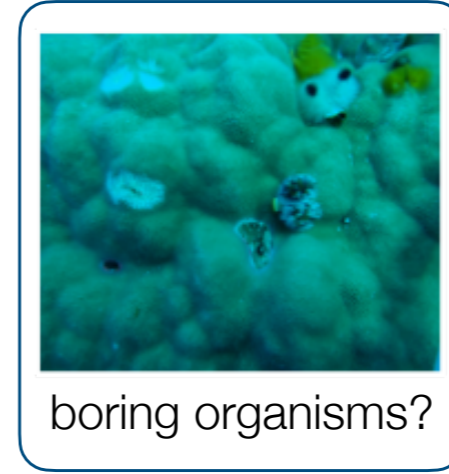
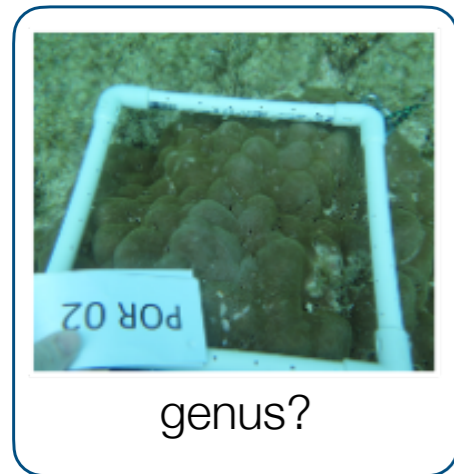
Multi-omics, physiological,  
contextual & historical data



57 000 samples; incl. 900 coral (meta)genomes and associated data (past & present)

- Evaluate the state of coral reefs through an integrative approach
- New predictive tools for reef health
- Evolution of stress-response / longevity mechanisms

# IMAGE ANNOTATION TO DEVELOP ADDITIONAL DATASETS



## Manual annotation

11 420 images ~ 4 months



## AI annotation

11 420 images ~ few seconds



PhD : Megan CLAMPITT

# STRONG CONNECTION TRAINING & RESEARCH



Megan CLAMPITT (2020) - CORALS & AI  
IRCAN / MSI



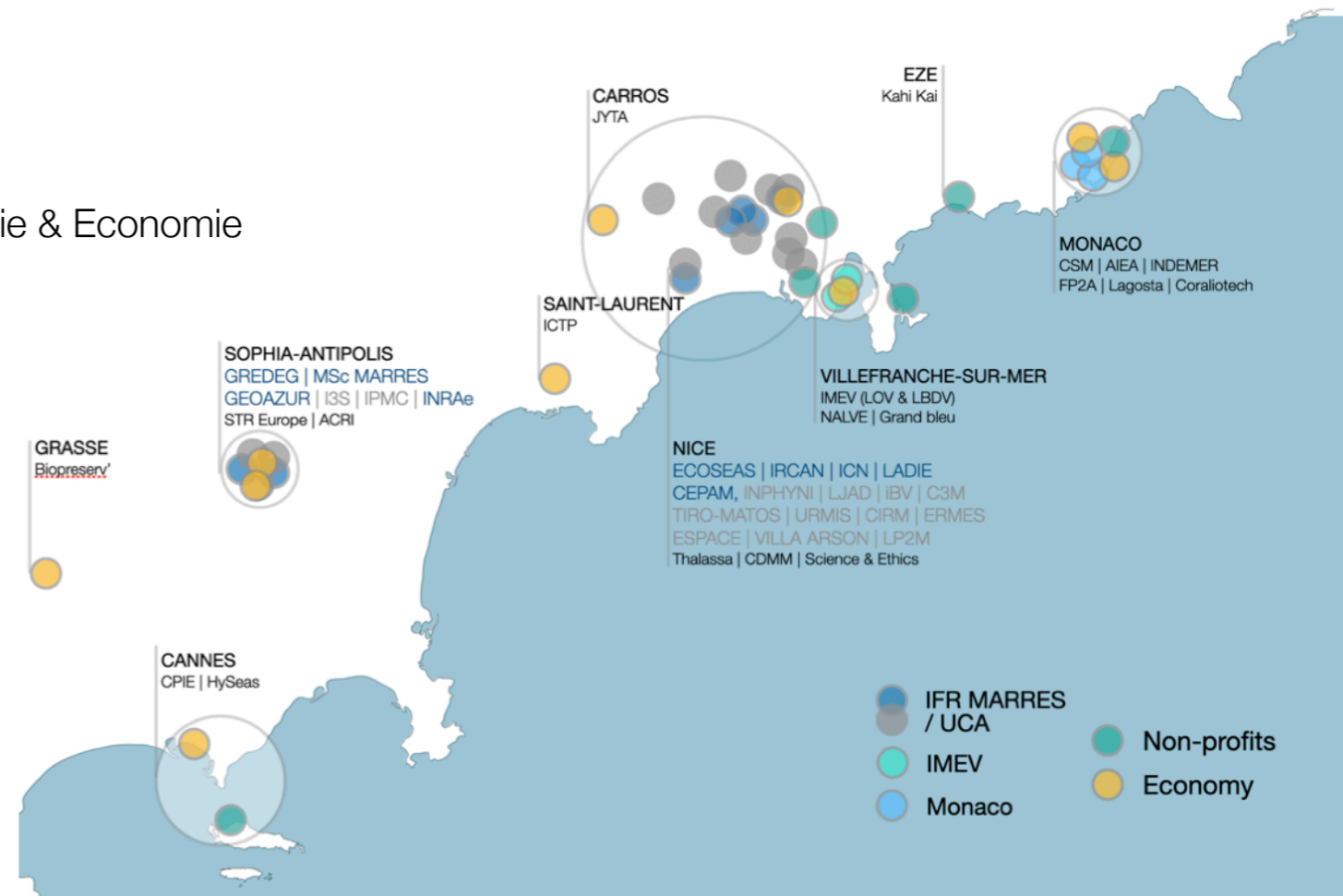
Kylian BURGI - AI & Species Detection  
ECOSEAS / INRIA



Julie MARTY-GASTALDI - MPA Ecologie & Economie  
ECOSEAS / GREDEG



Keyla PLICHON - CORALS & Health  
IRCAN





Institut Fédératif de Recherche

**RESSOURCES MARINES**

**Thank you for your attention**



# Espace maritime et interfaces **combiner protection des océans et développement durable**



## **Séminaire Hydrosphère**

Académie 3 – Université Côte d'Azur  
30 janvier 2023 - Nice

## **Christophe Mocquet**

[christophe.mocquet@univ-cotedazur.fr](mailto:christophe.mocquet@univ-cotedazur.fr)  
[app.univ-cotedazur.fr/marres](http://app.univ-cotedazur.fr/marres)

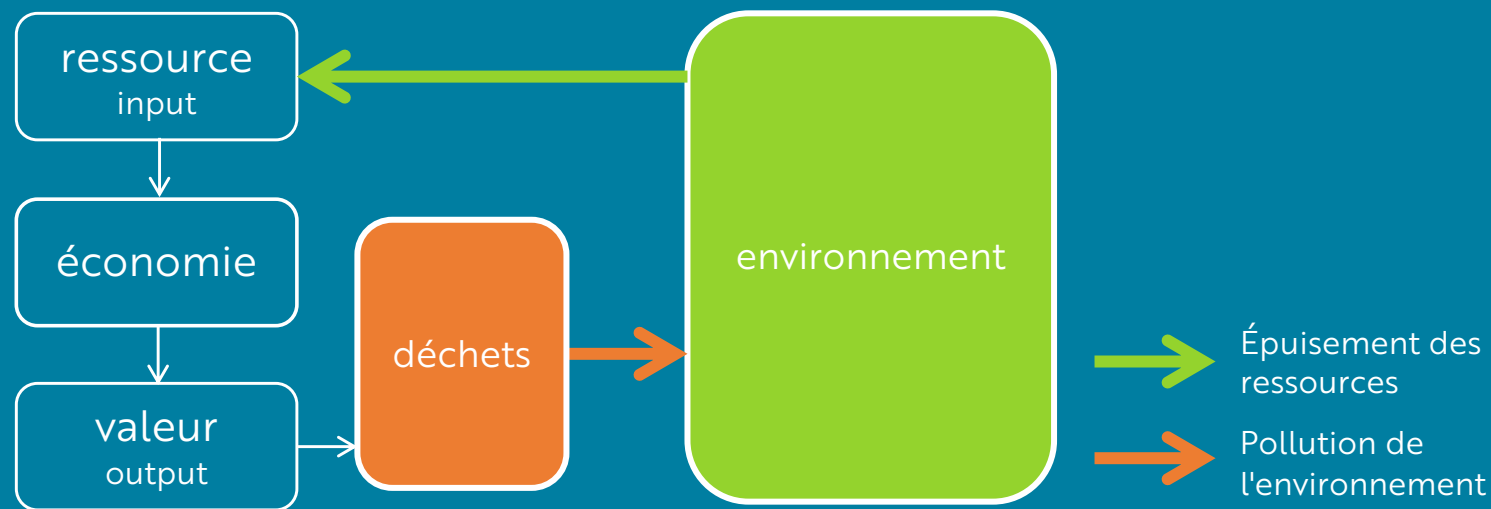
# Espace maritime et interfaces

## Combiner protection des océans et développement durable

### Une longue histoire



adapté de Boulding 1966

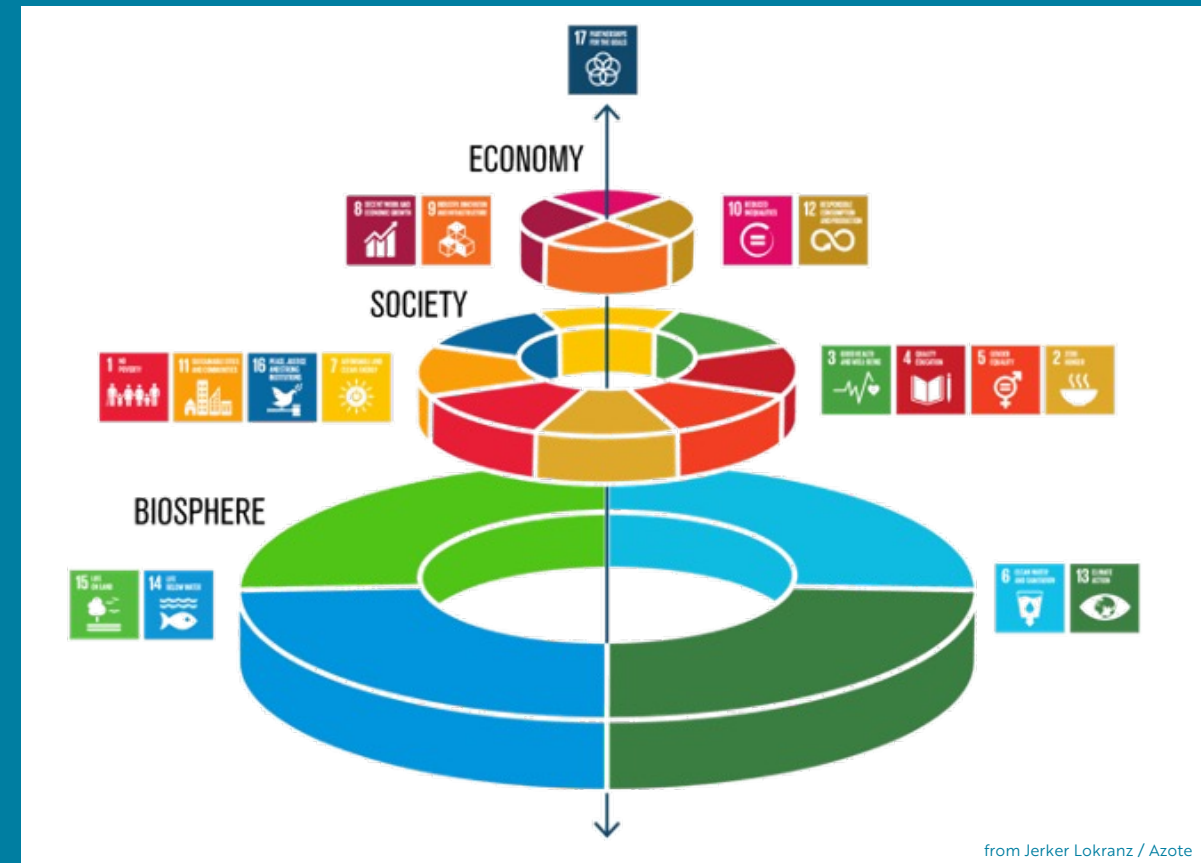


Christophe Mocquet [christophe.mocquet@univ-cotedazur.fr](mailto:christophe.mocquet@univ-cotedazur.fr)

# Espace maritime et interfaces

## Combiner protection des océans et développement durable

### UN SDGs: les objectifs de développement durable de l'ONU



from Jerker Lokranz / Azote

Christophe Mocquet [christophe.mocquet@univ-cotedazur.fr](mailto:christophe.mocquet@univ-cotedazur.fr)

# Espace maritime et interfaces

## Combiner protection des océans et développement durable

### L'interdisciplinarité de la conservation marine



Christophe Mocquet [christophe.mocquet@univ-cotedazur.fr](mailto:christophe.mocquet@univ-cotedazur.fr)

# Espace maritime et interfaces

## Combiner protection des océans et développement durable

### Succès



BLUE  
SEEDS

Blue finance



coral  
GUARDIAN

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# Espace maritime et interfaces

## Combiner protection des océans et développement durable

### Cas d'étude: les herbiers marins



Urquart 1824, Weycott et al. 2009, Terrados & Bodrum 2014, Nordlund et al. 2018

### Services d'approvisionnement

2

### Services de régulation



### Services culturels

.3

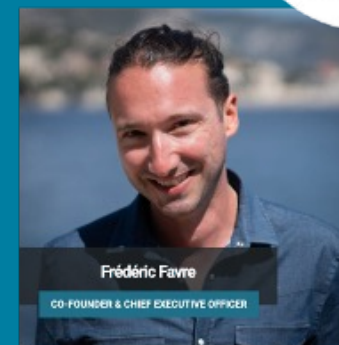
Campagne et al. 2015

Christophe Mocquet

Espace maritime et interfaces

# Combiner protection des océans et développement durable

## Cas d'étude: les herbiers marins



Christophe Mocquet [christophe.mocquet@univ-cotedazur.fr](mailto:christophe.mocquet@univ-cotedazur.fr)

## Besoins



### Evaluation des SE

- ▶ quantifier séquestration carbone



### améliorer la gestion des SE et de la biodiversité

- ▶ protection et restauration



### promouvoir un cadre institutionnel, générer des incitations

- ▶ marché carbone

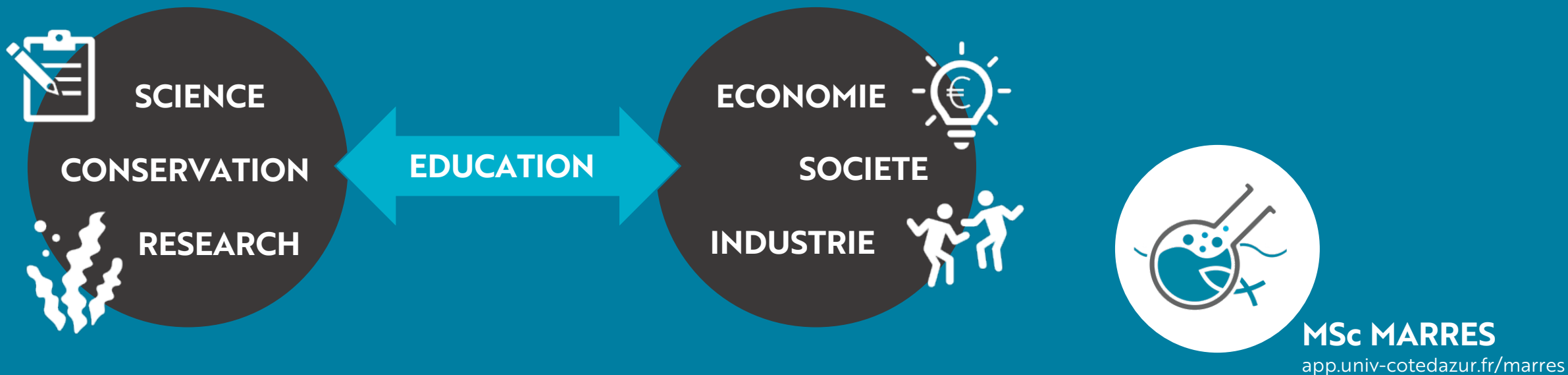
Christophe Mocquet [christophe.mocquet@univ-cotedazur.fr](mailto:christophe.mocquet@univ-cotedazur.fr)



# Espace maritime et interfaces

## Combiner protection des océans et développement durable

### L'Enseignement Supérieur comme passerelle



Christophe Mocquet [christophe.mocquet@univ-cotedazur.fr](mailto:christophe.mocquet@univ-cotedazur.fr)