The Benefits and Challenges of ecological networks: the case of the Sardinian network for the conservation of marine turtles

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Part A: The Network system for habitat and species conservation

Part B: Biology, threats and protection of sea turtles

Part C: The case study of the “Sardinian Network for the conservation of marine turtles and mammals”

• Institutional agreements
• Organization
• Benefits and Challenges
Main threats to the Marine Environment:

* Many marine species are protected because they are at Extinction risk
* Overfishing and habitat loss/degradation are two of the most important variables negatively affecting the marine environment
* The Mediterranean sea is at high pollution risk (Lloret, 2010)
International Conventions and Directives

- **Washington, 1973** → Convention on International trade in Endangered species of wild fauna and flora
- **Barcelona, 1976** → Convention for protection of the Mediterranean sea from pollution
- **Bonn, 1979** → Convention on migratory species
- **Bern, 1979** → Convention for wildlife protection
- **Rio de Janeiro, 1992** → Convention on biological diversity (CBD)
- **Habitats, 1992** → Directive for habitats conservation

* **Biodiversity**
* **Habitats**
* **Species**
* **Populations**

- Mediterranean level (large spatial scale)
- Regional level (medium spatial scale)
- Local level (small spatial scale)

Agreements and conventions provide for a cooperation strategy between member states
The concept of Ecological Networks (EN) developed from a synthesis of ideas from the theory of island biogeography (MacArthur and Wilson, 1967) and metapopulation theory (Levis, 1969) that were integrated within the landscape ecology discipline.

**Aim:** to contribute to Marine Environmental Conservation at global level (Theau et al., 2015)

ENs are designated to maintain biodiversity and ecological processes by protecting habitats and their linkages.

The approaches are based on single-species, multi-species, and landscape modelling categories.

ENs are evaluated using ecological, economic, and social spatial thematic indicators (TI) relevant to sustainable landscape management (Theau et al., 2015).
* Natura 2000
  * “Habitats” directive
    * SCIs – Sites of Community Importance
  * “Birds” directive
    * SPAs-Special Protection Areas
SPAMI Network

Specially Protected Areas of Mediterranean Importance (SPAMIs) … Regional Cooperation Tools for the Conservation of the Mediterranean Heritage…

Date of inclusion in the SPAMI List

2001
- Almeria Island
- Cala de Gata Nijar Natural Park
- Cabo de Gata Nijar Natural Park
- Cabo de Palos Natural Park

2003
- Natural Park of Cabras in Oristano
- Monte Cofano Natural Park

2005
- Sos del Calancare National Park
- Monte Cofano Natural Park

2008
- Son Roca Marine Protected Area
- Cala Morlais Park

2009
- Natural Reserve of Tropea in Ischia
- Marine Protected Area of Porto-Camposanto

2012
- Natural Reserve of the Ebusetani in Sardinia
- Marine Protected Area of Porto-Camposanto

2013
- The Lago – Tenebrise Trafalgar Reserve

The SPAMI List may include site which:

- Area of special interest in the scientific study of marine ecosystems
- Area of importance for conserving the components of biological diversity in the Mediterranean
- Certain ecosystems specific to the Mediterranean Sea or habitats of endangered species

The SPAMI List includes 33 sites:
- Last update 18th Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Provisions (COP 18 - Istanbul, Turkey, Oct. 2013)
Protection and management methods vary depending on the species considered.

Applying an **holistic approach** to the organization of ENs makes it possible to protect many species at the same time and in different geographic locations across jurisdictions. Sea turtle populations decline is difficult to stop if the cooperation and standardization of procedures differ and the legal and policy frameworks are not properly implemented.
Part B: Sea turtles

- Migratory species
- 3 species in the Mediterranean Sea
- Frequent on both marine coastal zones and beaches → Threatened by human impacts (Lutcavage et al., 1977; IUCN, 2013)

*Caretta caretta*
Movements of Loggerhead and Green sea turtles in the Mediterranean
## International Conventions on Sea Turtles

<table>
<thead>
<tr>
<th>Species</th>
<th>Inclusion in Directives, EU agreements, International Conventions</th>
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<tbody>
<tr>
<td></td>
<td>Be 2</td>
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<tr>
<td>Caretta caretta</td>
<td>*</td>
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<tr>
<td>Chelonia mydas</td>
<td>*</td>
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<tr>
<td>Dermochelys coriacea</td>
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In 1975, 16 Mediterranean countries and the European Community adopted the Mediterranean Action Plan (MAP)

The main objectives of the MAP were to assist the Mediterranean countries to:
- assess and control marine pollution
- formulate their national environmental policies
- improve the ability of governments to identify better options for alternative patterns of development
- optimize the choices for allocation of resources
Network of Rescue and emergency centres of the Mediterranean area coordinated by RAC/SPA

UNEP (United Nations Environmental Programme) developed the Action Plan for the conservation of sea turtles in Mediterranean (UNEP/OCA, 1999)

UNEP-MAP, RAC/SPA, 2004)
Part C: Roles of the Sardinian Regional Network on the conservation of sea turtles

Mediterranean sea
2004, constitution of the “Sardinian Regional Network”

The first institutional and operative Network organization in Italy

Framework Agreement between Sardinian Regional Body (RAS) and:

* MPAs
* NPs
* Vigilance bodies
* Stazione Zoologica “Anton Dohrn”, Naples

Organisational aim: have specific roles and act according to a methodical, coordinated and synergistic organization
2010, Sinis MPA and IAMC-CNR: Official institution of the Sinis Rescue Centre (CReS)

Rescue and rehabilitation centre for about 50 injured sea turtles per year

- Memorandum of Understanding:
  - Cabras Municipality and IAMC-CNR of Oristano (deliberazione del Consiglio Comunale N. 21 del 21.04.2010)

- Scientific collaboration agreement
Areas of competence – nodes of the Network

Network Organization
- Rescue Centres
- Emergency Centres
Involvement of Institutional Bodies, Vigilance Bodies, Local recreational Associations
GIONHA Project 2009-2012
Protection of “Pelagos” Sanctuary and Sardinian coastline habitat

Partner:
• ARPAT (Tuscany)
• Liguria
• Prov. Livorno (Tuscany)
• Sardinia
• OEC (Corse)
• Principato di Monaco (France)

Benefits:
• Rescue procedures *standardization*
• Regional Guidelines processing and *publishing*
• Improvement of the Sardinian Network with economic resources to:
  • Rescue centre equipment
  • Activities
  • Collaborations start-up

We need new projects to improve the conservation activities and Network implementation
Technical committee

* Involvement of experts for each topic discussed:

* Researchers
* Vets
* Administrations
* Technics
* Volunteers
* Associations
* Citizens
Discussion on the suitability of the document

Meeting among the nodes

Consideration of the proposed amendments

Making of the new document

Drafting new document

Proposal of new changes

Meeting for further comments

No new comments

Final document

Shared with all nodes
Regional guidelines

- Rescue and Emergency Centres classification
- First Aid Procedure
- Data collection
- Scientific monitoring
- Environmental education

(MATTM, 2013)
**Intervention procedure**

1. **Alert call**
2. **First aid**
3. **Rescue and transport**
4. **Hospitalization**
5. **Rehabilitation and maintenance**
6. **Tagging**
7. **Release**
8. **Dead**
   - **Necropsy**
     - (ASL, Universities, Zooprofphilattic Institutes)
   - **Removal, samples collection, musealization**
9. **All data and info**
   - Schede Dati
   - National database (E.M.)
   - CITES regional office

**Alert call**

**First aid**

**Rescue and transport**

**Hospitalization**

**Rehabilitation and maintenance**

**Tagging**

**Release**
Standardization at regional level

Immediately rescued and transported in standardized tanks

X Ray is the first medical examination in all cases
Monitoring Network of released turtles

* It is possible only in a Network system
  * Capture – release – recapture
    (Not limited to the Mediterranean as sea turtles are a migratory species which moves also out of the basin)

* Tags standard models
  * Typology, material, univocal serial number

Archie Carr Sea Turtle Tag Inventory: http://accstr.ufl.edu/resources/tag-inventory/
“Monitoring – Rescue” data sheet

- Standardized for the entire Network
- Small format for field use
GIS shared database in a transboundary network to promote cooperation between researches employed for sea turtles and cetaceans monitoring.
Operative office
Oristano section of IAMC-CNR
Actual CReS network collaboration
Network system analysis

* **Benefits:**
  * Procedures standardization → Efficiency
  * Optimization of resources

* **Challenges:**
  * Strengthening the Mediterranean cooperation group
  * Conservation of the Mediterranean sea turtles populations
Thanks for your attention!

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