

# ATLAS OF CETACEAN AND SEA TURTLE

## DISTRIBUTION IN THE ADRIATIC SEA



*Albus – Adriatic white bottlenose dolphin - Photo: Draško Holcer, Blue World Institute*

**Draško Holcer & Caterina Maria Fortuna**



*Blue World Institute, October 2015*

**Authors:**

Dr. Draško Holcer, Blue World Institute, Veli Lošinj, Croatia

Dr. Caterina Maria Fortuna, Italian National Institute for Environmental Protection and Research - ISPRA, Rome, Italy

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Blue World Institute of Marine Research and Conservation, Kaštel 24, HR-51551 Veli Lošinj, Croatia, [www.blue-world.org](http://www.blue-world.org), [info@blue-world.org](mailto:info@blue-world.org)

**Activities carried out within the framework of the project:**

Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic – NETCET



The project is co-funded by the European Union

Instrument for Pre-Accession Assistance

(IPA Adriatic Cross Border Cooperation Programme).

**Project partners:**

City of Venice (IT) - coordinator

Blue World Institute of Marine Research and Conservation (HR)

Italian National Institute for Environmental Protection and Research (IT)

University of Padua, Department of Comparative Biomedicine and Food Science (IT)

Cetacea Foundation (IT)

University of Primorska, Science and Research Centre (SI)

Institute for Marine Biology (MN)

WWF Italy (IT)

Marine Educational centre Pula (HR)

Association for Protection of Aquatic Wildlife of Albania (AL)

State Institute for Nature Protection (HR)

Herpetofauna Albanian Society (AL)

City of Pescara (IT)

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## The NETCET project

[www.netcet.eu](http://www.netcet.eu)

The Adriatic Sea is a home to several species of Cetaceans. Also, it is an important habitat and a key foraging and development area for young loggerhead sea turtles. Unfortunately, human activities, especially those related to fisheries, transport, construction and development, coastal tourism etc. present a threat to their survival. At the same time, Cetaceans and sea turtles are migratory animals or they use large areas as their home range and do not recognise borders. Therefore, as “no country is an island”, in development of their conservation strategies and activities cooperation between all countries sharing the Adriatic Sea is necessary. In 2013 thirteen partners from five Adriatic countries (Albania, Croatia, Italy, Montenegro and Slovenia) launched a joint initiative to develop common strategies with the aim of conservation and management of Cetacean and sea turtles in the Adriatic Sea - Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic – NETCET. During the project development the project partners identified a number of common issues related to Cetacean and sea turtle conservation, but also realised large differences in available data, experience and practices. Therefore project activities have been developed to allow for transfer of best practices between partners, standardisation of methodologies and data collection, development of rescue facilities and rapid response protocols and development of a common conservation plan. Also, one of the main pillars of the project is involvement of citizens and different interest groups in conservation through participation, public awareness activities and development of the Adriatic City network for the conservation of cetaceans and sea turtles.

Within the NETCET framework partners collected much needed data on the Cetacean and sea turtles distribution and abundance (through photo-identification studies of local Cetacean populations, basin-wide aerial survey, tagging of individual animals), migration patterns (through satellite tagging) and causes of mortality (through development of stranding monitoring network). This data are presented in this Atlas.

Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic - NETCET project is co-funded by the European Union IPA Adriatic Cross-Border Cooperation Programme.



**Bathymetry and jurisdictions in the Adriatic Sea**

Territorial jurisdictions


- IT\_territorial\_line
- MN\_territorial
- HR\_territorial
- AL\_territorial
- EEZ in the Adriatic


Adriatic bathymetry

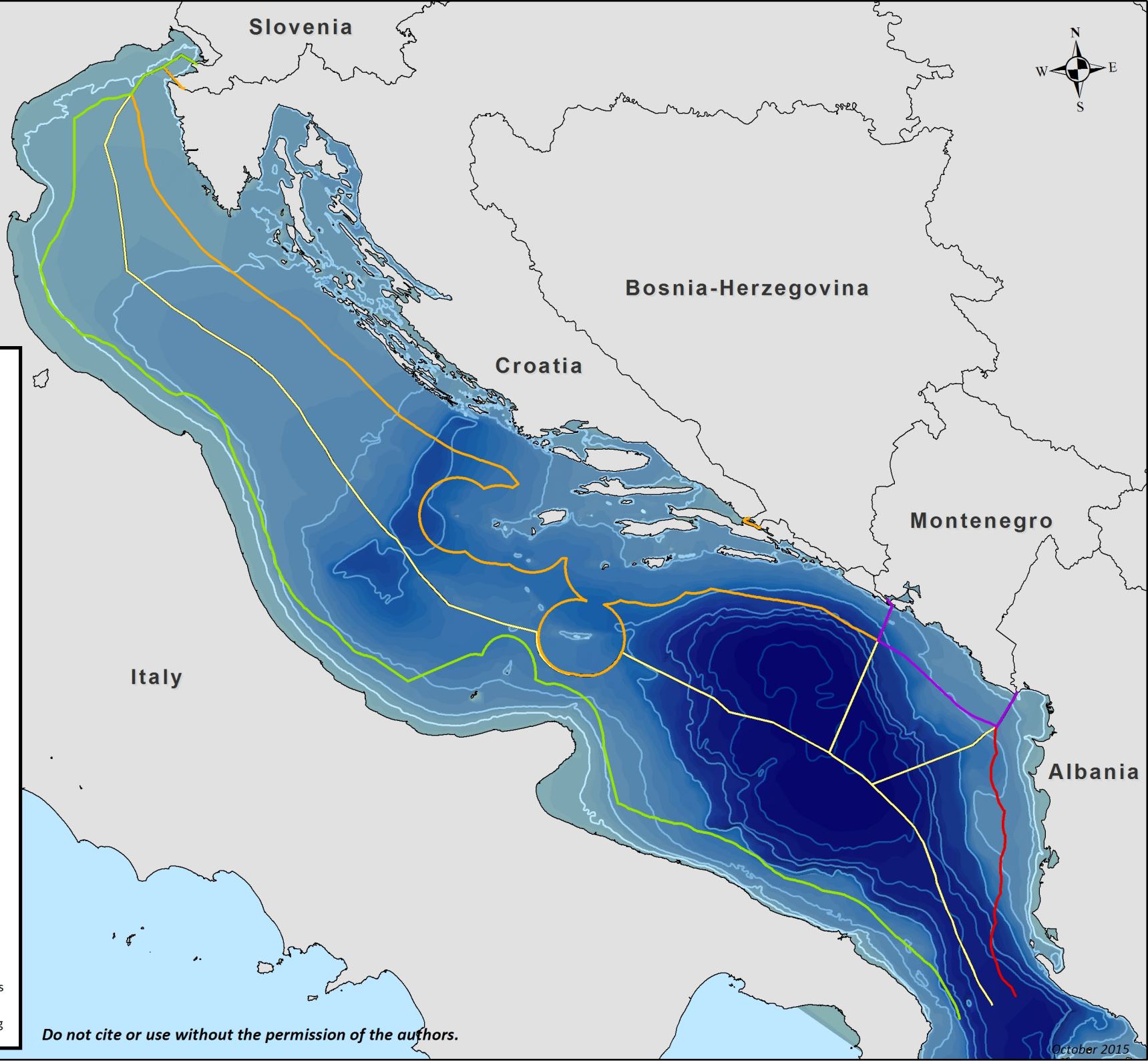
Depth (m)

- 20
- 50
- 100
- 200
- 600
- 800
- 1000
- 1200

0 37,5 75 150 Kilometers



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# Aerial survey

The survey design entailed 53 parallel transects spaced 15 km, from Venice to Otranto. The survey was carried out during summer of 2013. Over 14,000 km were covered in 100 hours of flight (including transfers) with different general conditions. A total of 1276 sightings were recorded for loggerhead sea turtles and Cetaceans (*Tursiops truncatus*, *Stenella coeruleoalba*, *Ziphius cavirostris* and *Grampus griseus*) and an additional 101 of giant devil rays (*Mobula mobular*) a species of great conservation concern. The distribution of Cetacean species reflects their general ecology, with bottlenose dolphins more abundant on the continental shelf and striped dolphins, Risso's dolphins and Cuvier's beaked whales present in the more pelagic southern Adriatic. Loggerhead sea turtles seem more abundant in the shallower northern Adriatic and in the deeper southern Adriatic. Data analyses results were used for development of two documents on the state-of-the-art conservation status of sea turtles and Cetaceans. Survey was developed and carried out by experts from The Institute for Environmental Protection and Research - ISPRA, Blue World Institute and International Whaling Commission. In addition, experts from University of Primorska and WWF Italy participated in data analysis.



**Aerial survey of Cetaceans and sea turtles abundance in the Adriatic sea, 2013**  
**Planned coverage and survey tracks**

- End points
- Start points
- Survey tracks



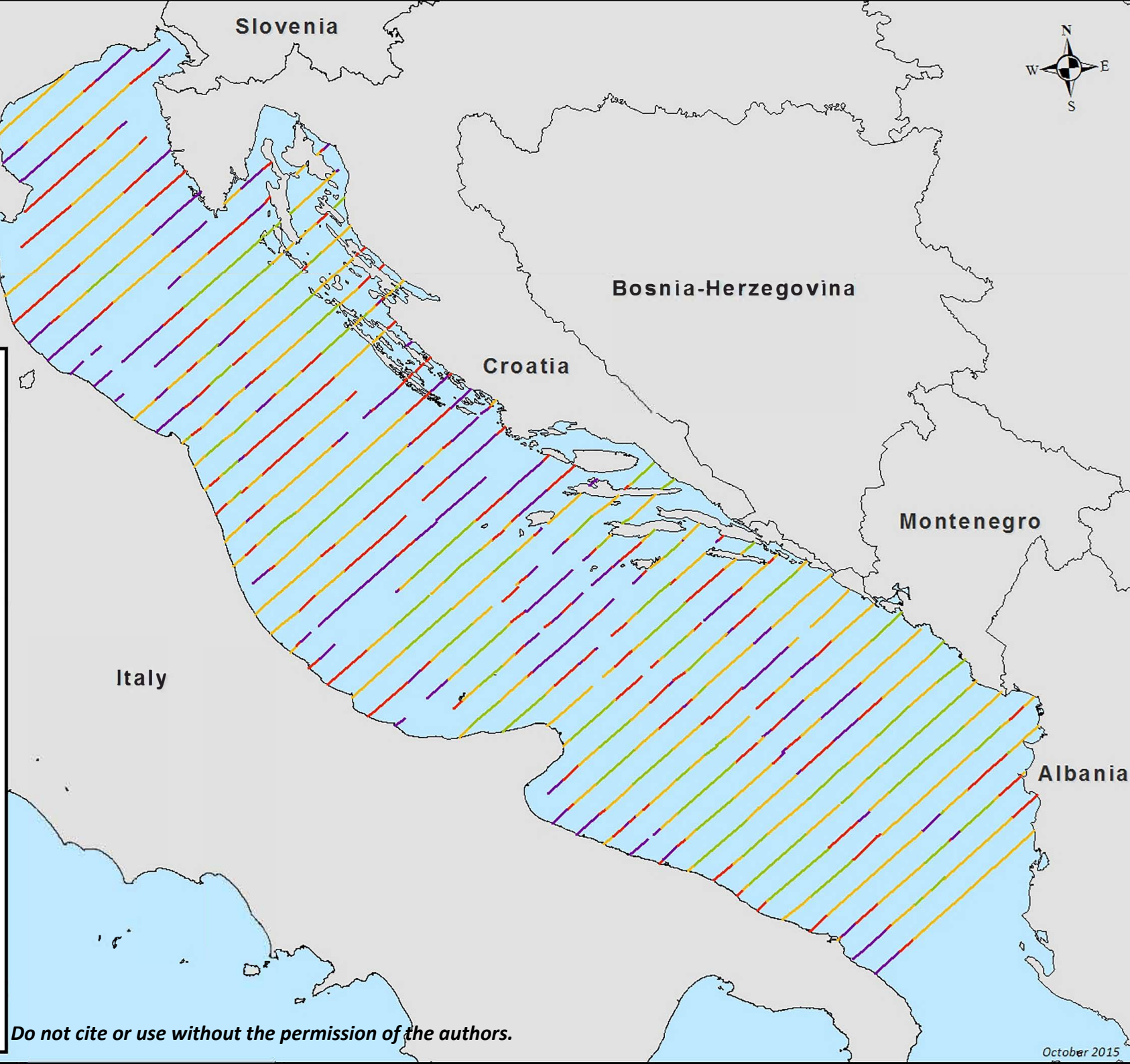
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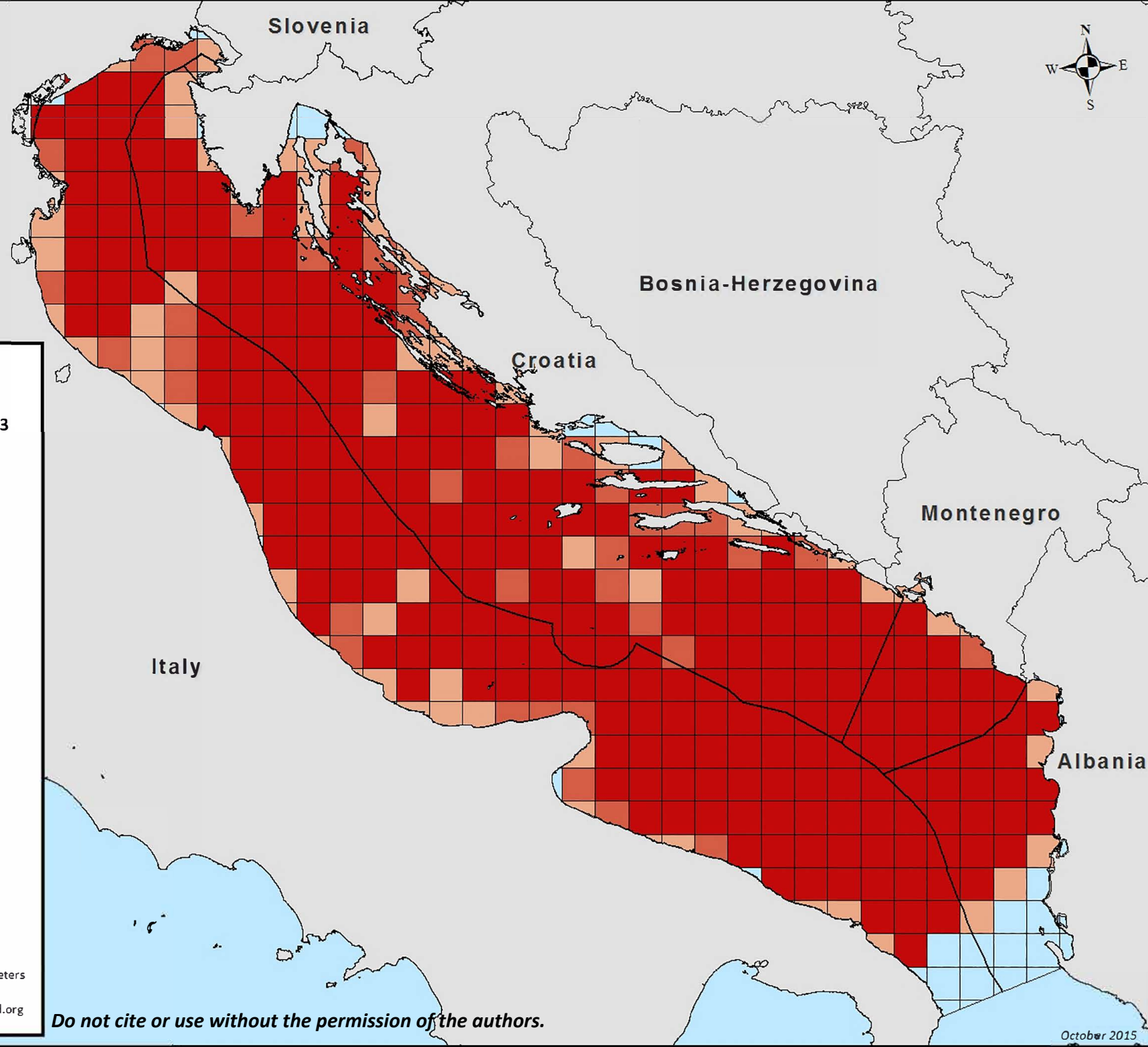
**Aerial survey of Cetaceans and sea turtles abundance in the Adriatic sea, 2013**  
**Coverage and sea state conditions**

- Sea state (Beaufort scale)**
- 0
  - 1
  - 2
  - 3



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**Research effort, aerial survey of Cetaceans and sea turtles abundance in the Adriatic sea, 2013**

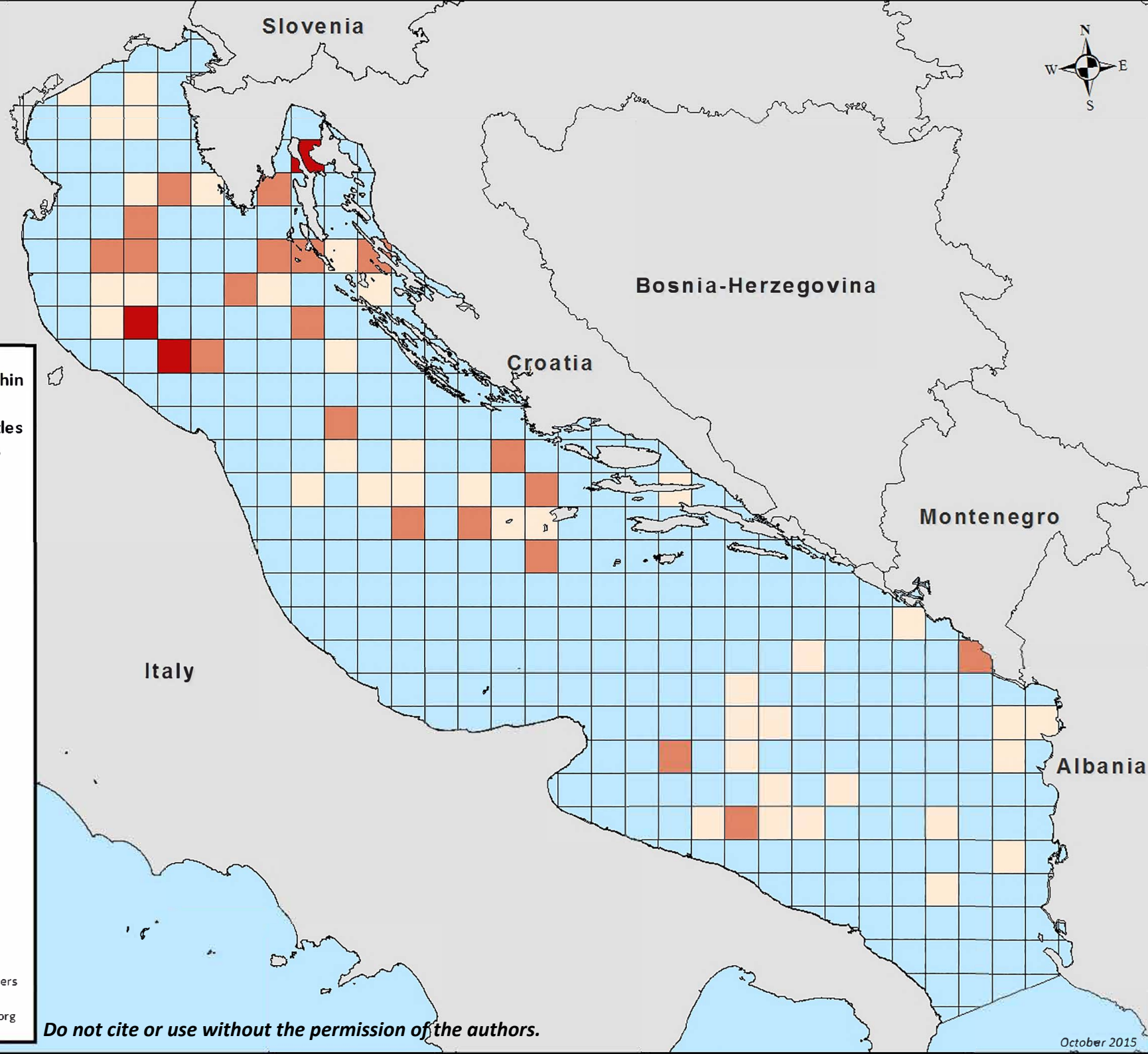
EEA reference grid 20x20 km

Km on-effort per grid cell





-  0,00
-  0,01 - 15,00
-  15,01 - 20,00
-  20,01 - 28,49



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**Encounter rate (ER) of bottlenose dolphin (*Tursiops truncatus*)**  
**Aerial survey of Cetaceans and sea turtles abundance in the Adriatic sea, 2013**

-  EEA reference grid 20x20 km
- ER (sightings/km on-effort)**
-  0,04 - 0,05
-  0,06 - 0,15
-  0,16 - 0,30







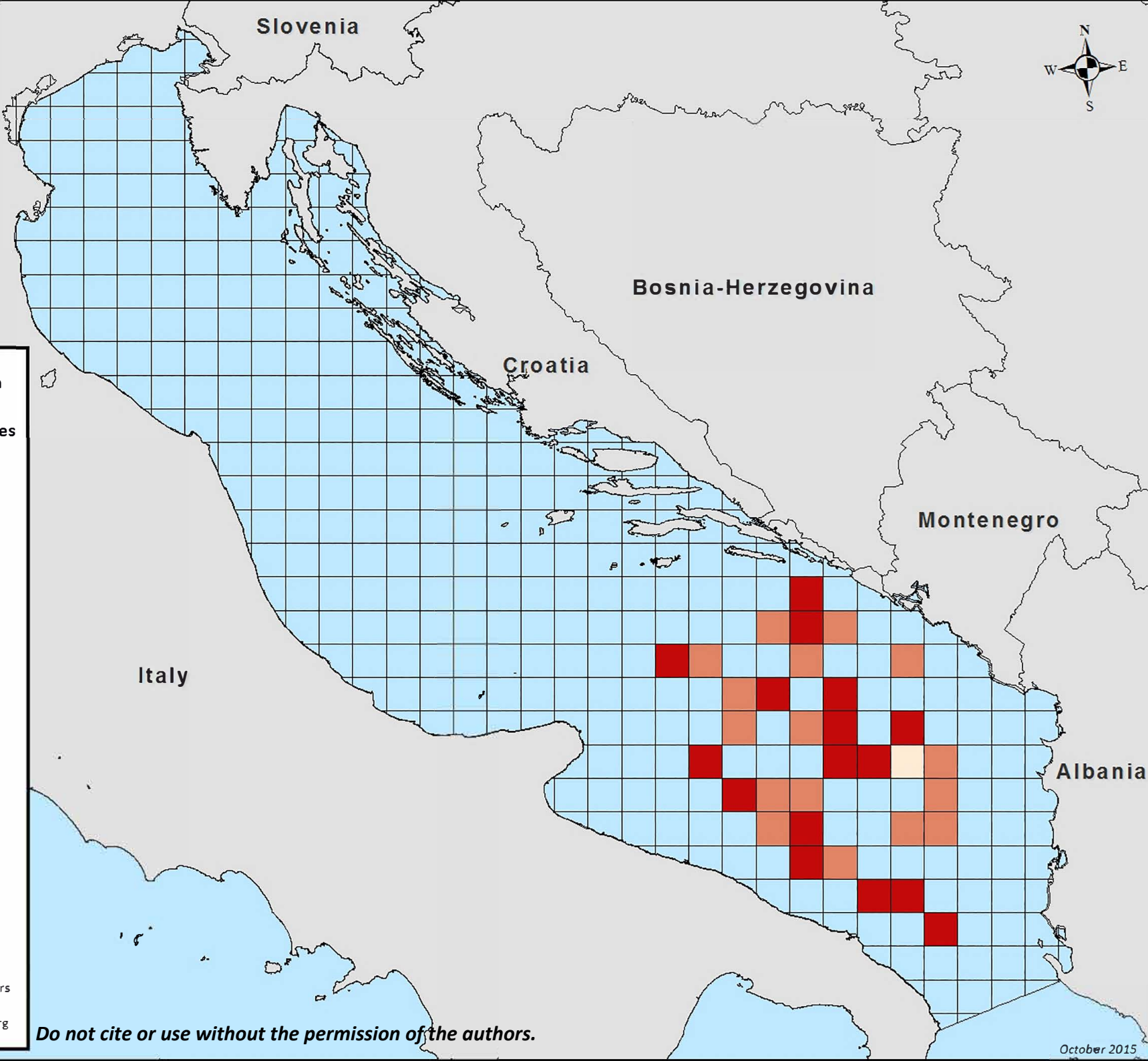
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**Encounter rate (ER) of striped dolphin (*Stenella coeruleoalba*)**  
**Aerial survey of Cetaceans and sea turtles abundance in the Adriatic sea, 2013**





-  EEA reference grid 20x20 km
- ER (sightings/km on-effort)**
-  0,04
-  0,05 - 0,06
-  0,07 - 0,15

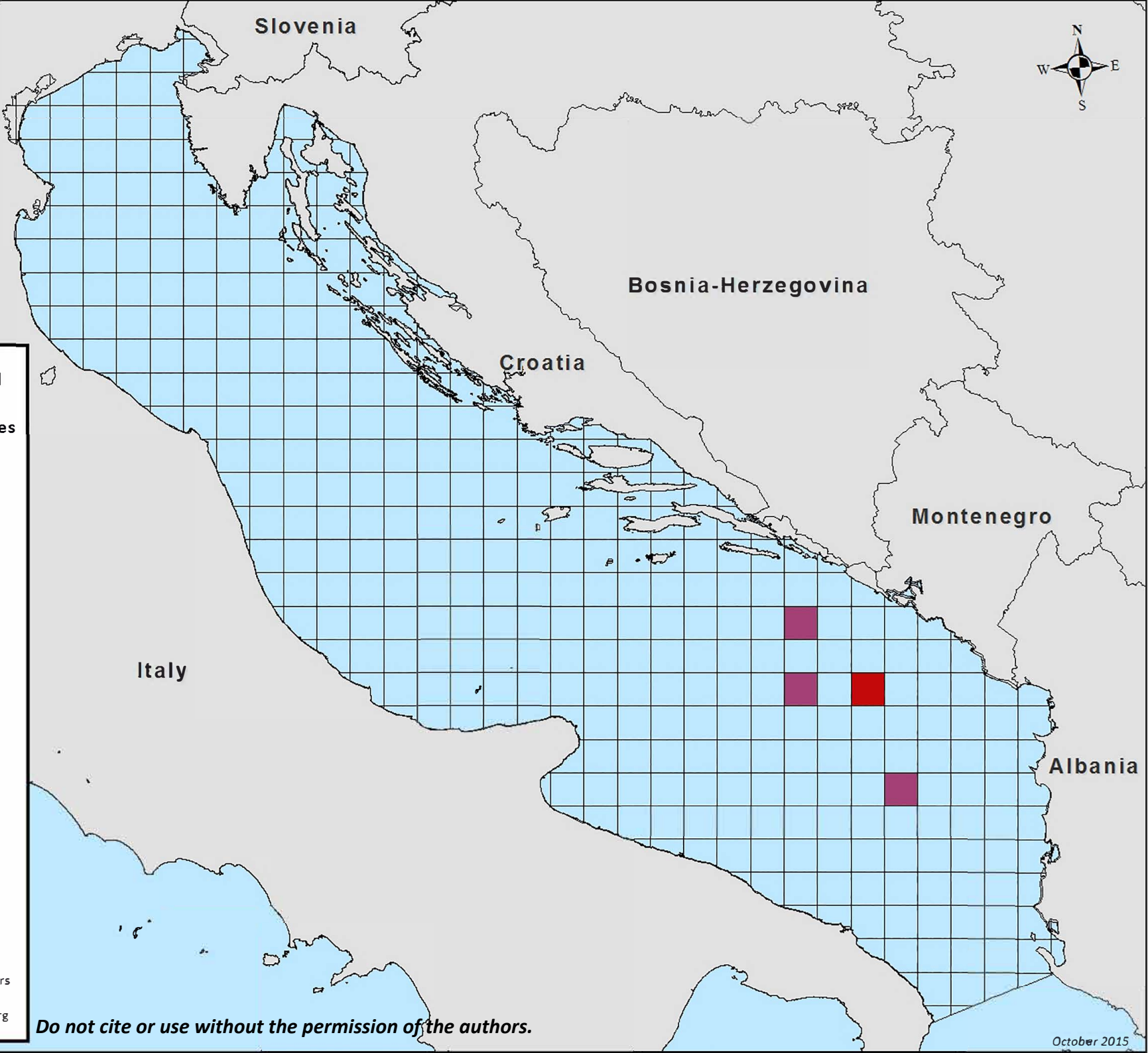




Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic - NETCET project is co-funded by the European Union IPA Adriatic Cross-Border Cooperation Programme.

**Encounter rate (ER) of Cuvier's beaked whale (*Ziphius cavirostris*)**  
**Aerial survey of Cetaceans and sea turtles abundance in the Adriatic sea, 2013**

-  EEA reference grid 20x20 km
- ER (sightings/km on-effort)**
-  0,00
-  0,01 - 0,04
- Off-effort sightings**
-  *Ziphius cavirostris*



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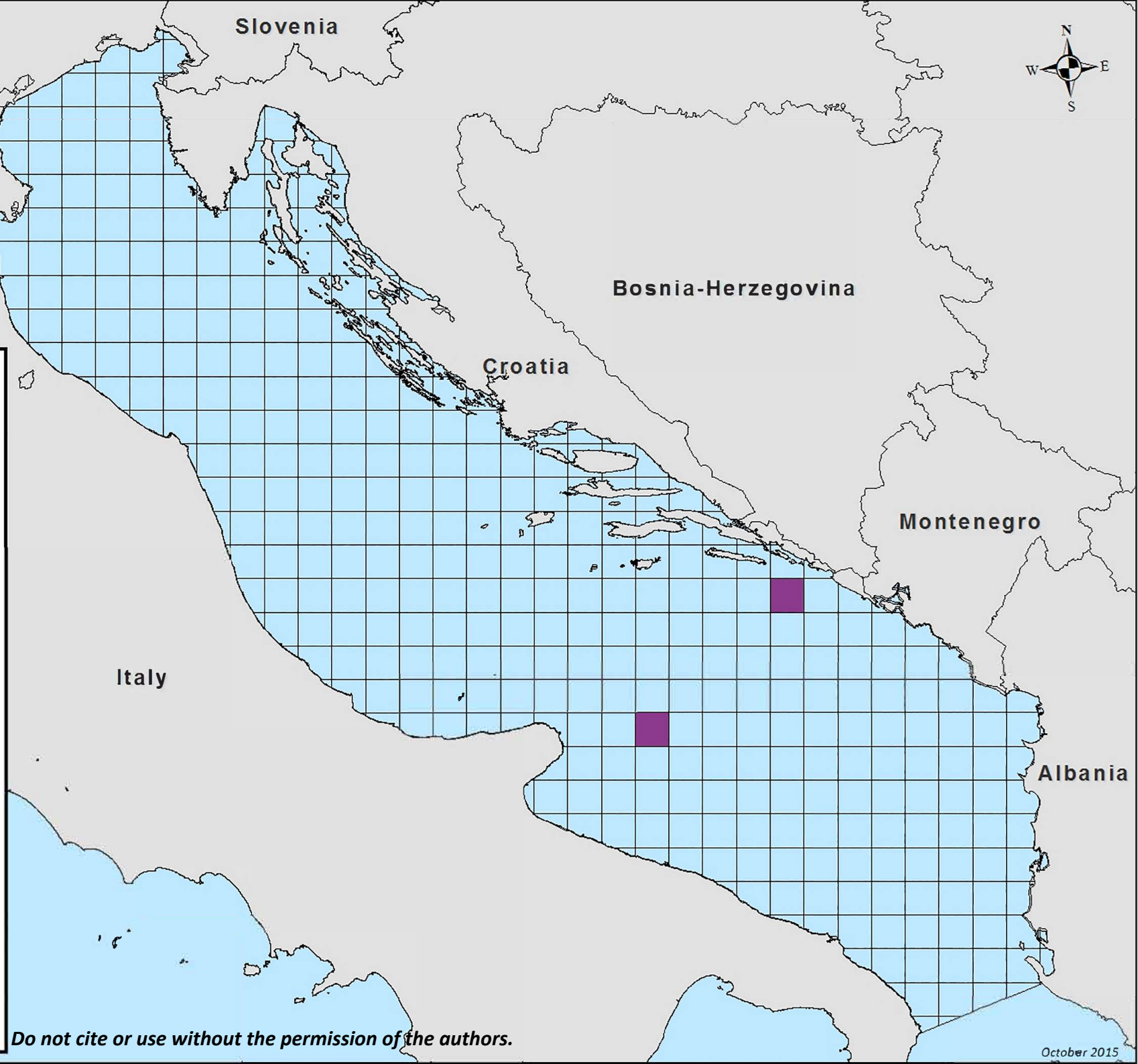
Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic - NETCET project is co-funded by the European Union IPA Adriatic Cross-Border Cooperation Programme.

**Sightings of Risso's dolphin (Grampus griseus)**  
**Aerial survey of Cetaceans and sea turtles abundance in the Adriatic sea, 2013**

□ EEA reference grid 20x20 km

**Off-effort sightings**

■ Grampus griseus



0 37,5 75 150 Kilometers





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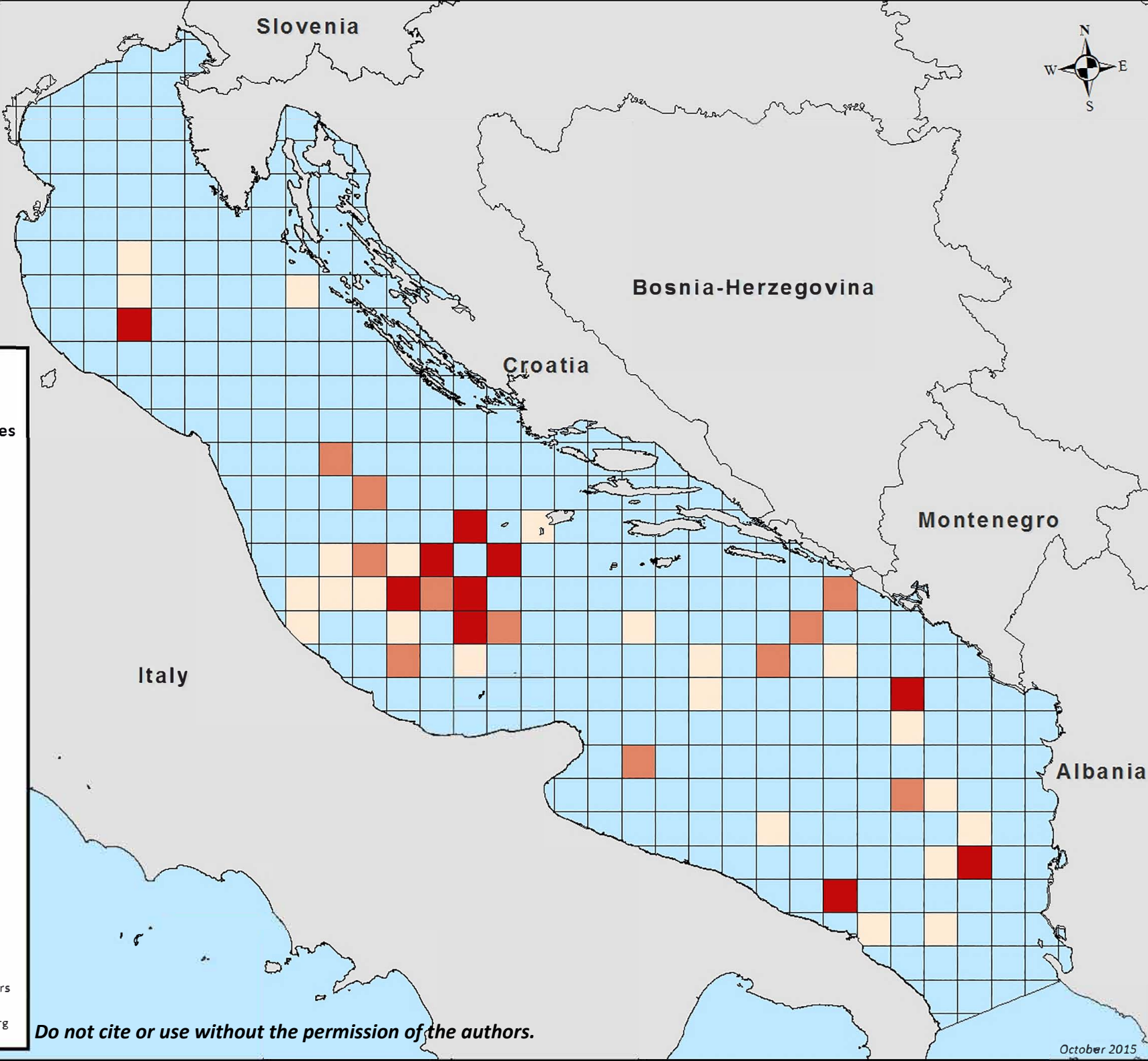
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**Encounter rate (ER) of giant devil ray (*Mobula mobular*)**  
**Aerial survey of Cetaceans and sea turtles abundance in the Adriatic sea, 2013**

-  EEA reference grid 20x20 km
- ER\_group**
-  0,04 - 0,05
-  0,06 - 0,10
-  0,11 - 0,20










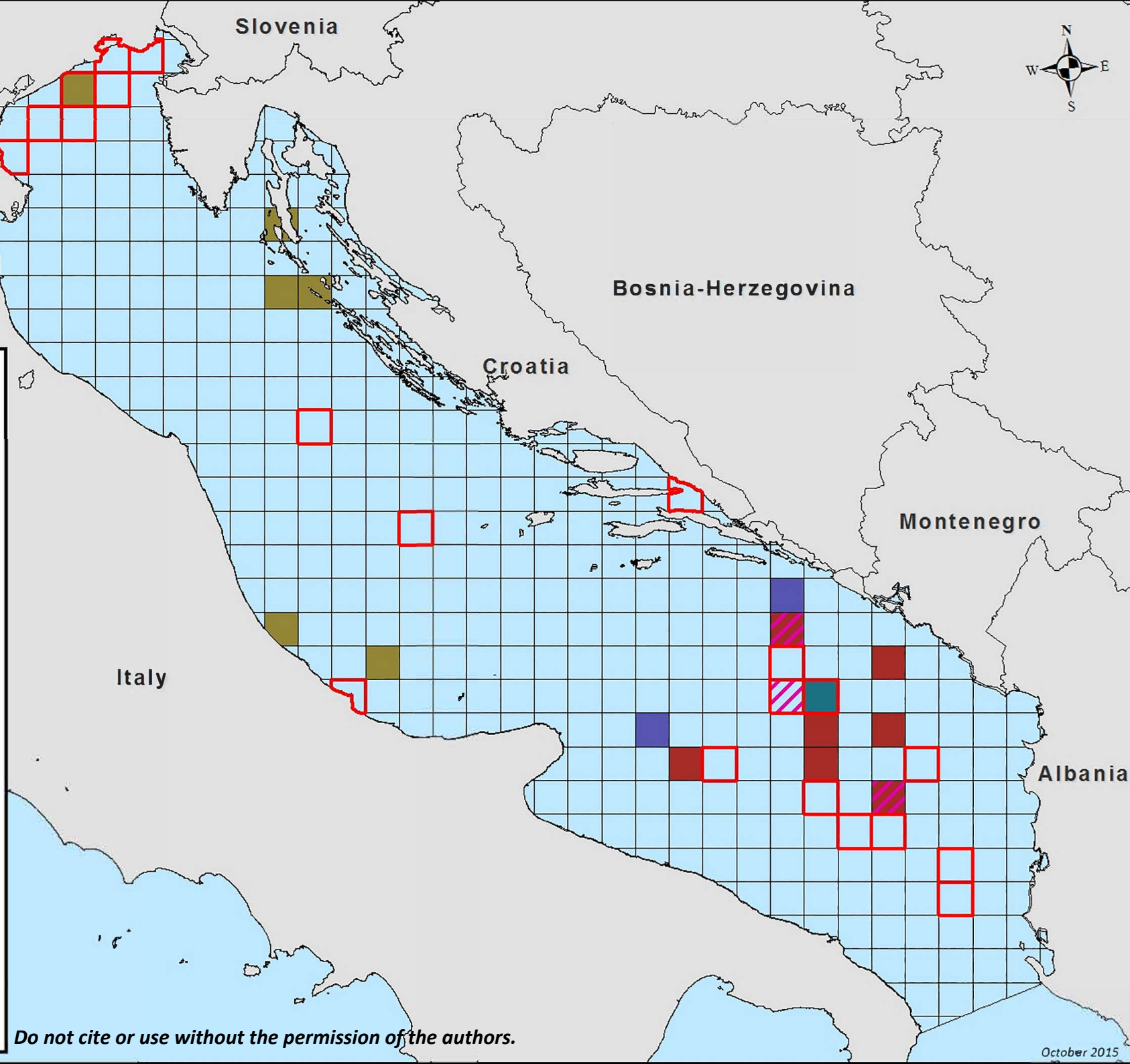
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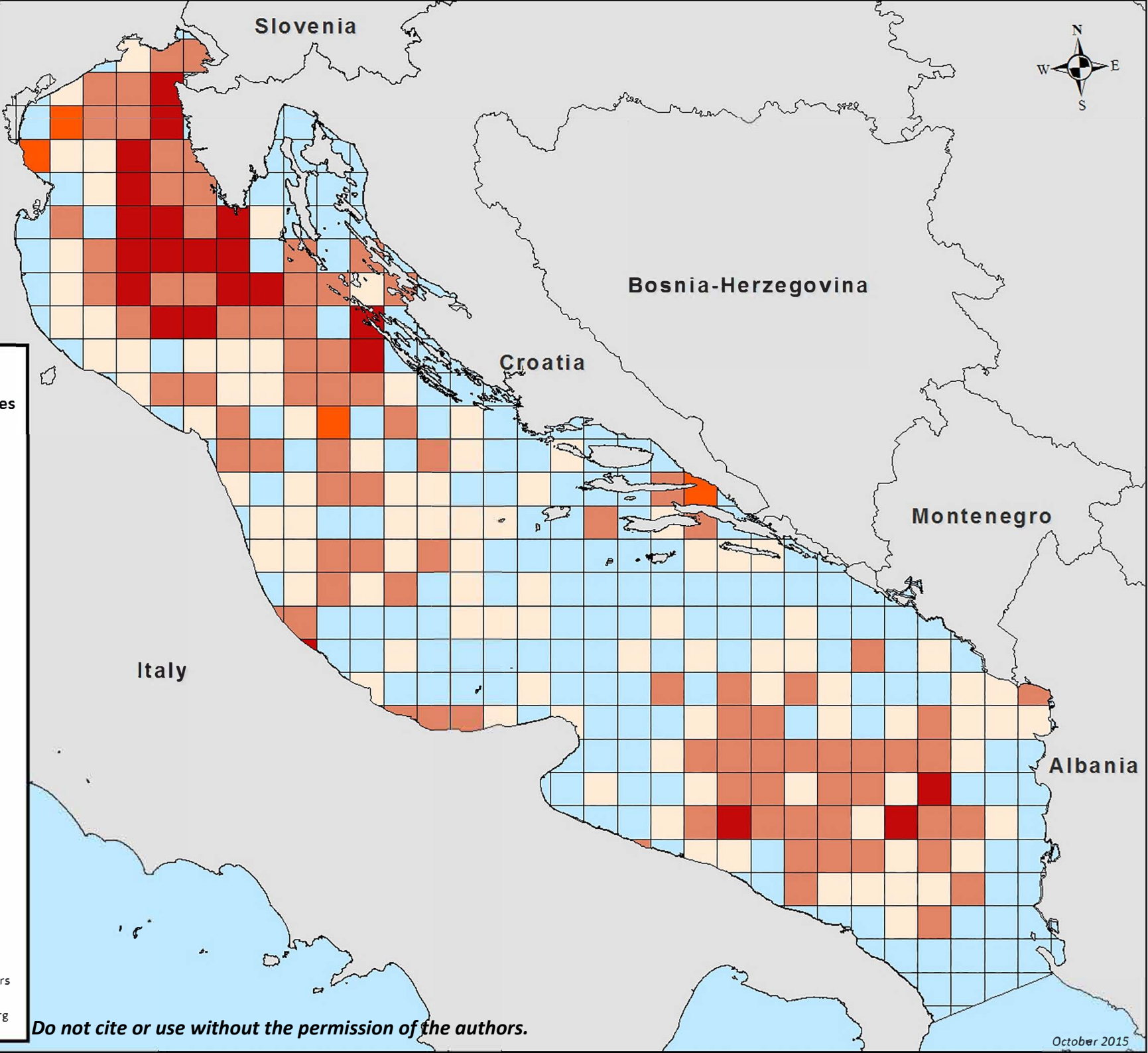
Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic - NETCET project is co-funded by the European Union IPA Adriatic Cross-Border Cooperation Programme.

**Off-effort sightings**  
**Aerial survey of Cetaceans and sea turtles**  
**abundance in the Adriatic sea, 2013**

-  EEA reference grid 20x20 km
-  *Grampus griseus*
-  *Ziphius cavirostris*
-  *Tursiops truncatus*
-  *Stenella coeruleoalba*
-  Sea turtles
-  *Mobula mobular*



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**Encounter rate (ER) of sea turtles**  
**Aerial survey of Cetaceans and sea turtles**  
**abundance in the Adriatic sea, 2013**

□ EEA reference grid 20x20 km


**ER (sightings/km on-effort)**

- 0,04 - 0,10
- 0,11 - 0,50
- 0,51 - 1,00

**Off-effort sightings**

- Sea turtles

0 37,5 75 150  
 Kilometers

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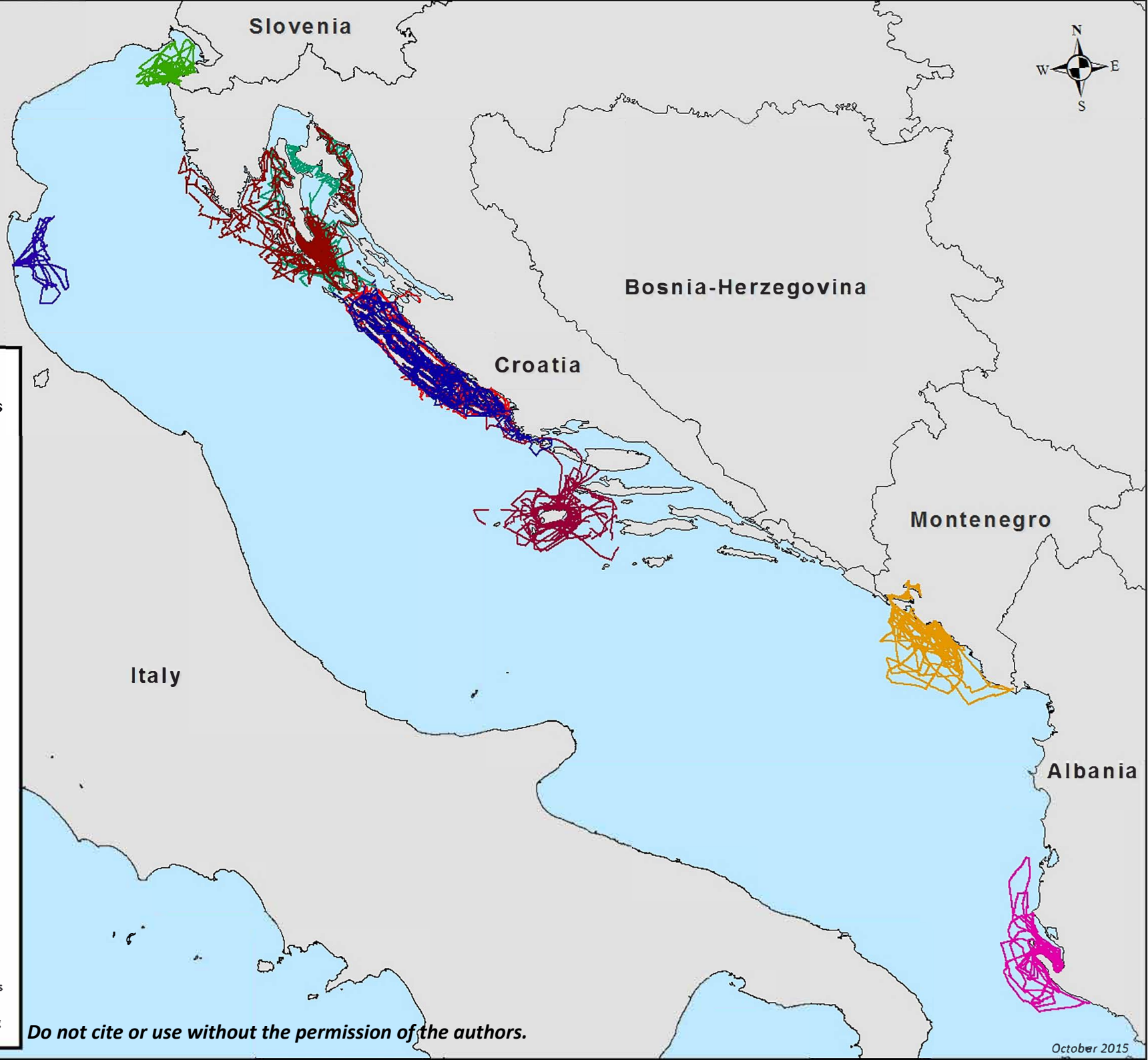
# PhotoID surveys

Cetacean field surveys were carried out following standard photo-ID survey procedure. Different rigid hull inflatable boats were used (5.2 to 7,5 m), depending on the locations and availability of the equipment. During the surveys data on the weather and effort were collected during the trips and additional data on the sighting location, species observed, group size, composition and behaviour of animals were collected during the sightings. Sightings were always documented with photographs and on a number of occasions with video camera. The surveys were carried out according to relevant research permits from the Authorities to carry out these surveys.

Surveys in Croatia were carried out between July 2013 and October 2014 by the Blue World Institute of Marine Research and Conservation in two sites in the Croatian Adriatic (Northern Dalmatia and Vis area). In total approximately 11,700km were covered over 652 hours in survey and with 225 sightings of *Tursiops truncatus* made. Surveys in Albania were carried out during 20 days in May and June 2015 by Association for Protection of Aquatic Wildlife of Albania, Institute of Marine Biology Kotor and Blue World Institute of Marine Research and Conservation. Surveys were carried out in the area of Vlora. In total survey covered almost 1600 km of track, and the approximate size of the area covered was about 2000 km<sup>2</sup>, from the area of Karavasta lagoon in the north up to Dhermi in the south, within Albanian territorial waters (up to approximately 6-8 NM from the coast). In total, there were 21 sightings of three Cetacean species –bottlenose dolphins, striped dolphins and Cuvier's beaked whales. Surveys in Slovenia were carried out by University of Primorska between July and August covering 1592 km<sup>2</sup> during 123 hours. Sightings of 14 groups of bottlenose dolphins were made.

Surveys in Montenegro were carried out by Institute of Marine Biology Kotor and Blue World Institute of Marine Research and Conservation during June 2013 covering approximately 2500km<sup>2</sup> during 120 hours. In total 15 sightings of bottlenose dolphins were made.

Surveys in Italy were carried out around the port of Ravenna and Cesenatico. These surveys were carried out by Fondazione Cetacea Onlus and the Blue World Institute of Marine Research and Conservation between May and August 2014 and in 2015 surveys took place between July and September. Surveys covered area of approximately 3500 km<sup>2</sup> with 19 sightings of *Tursiops truncatus* made.



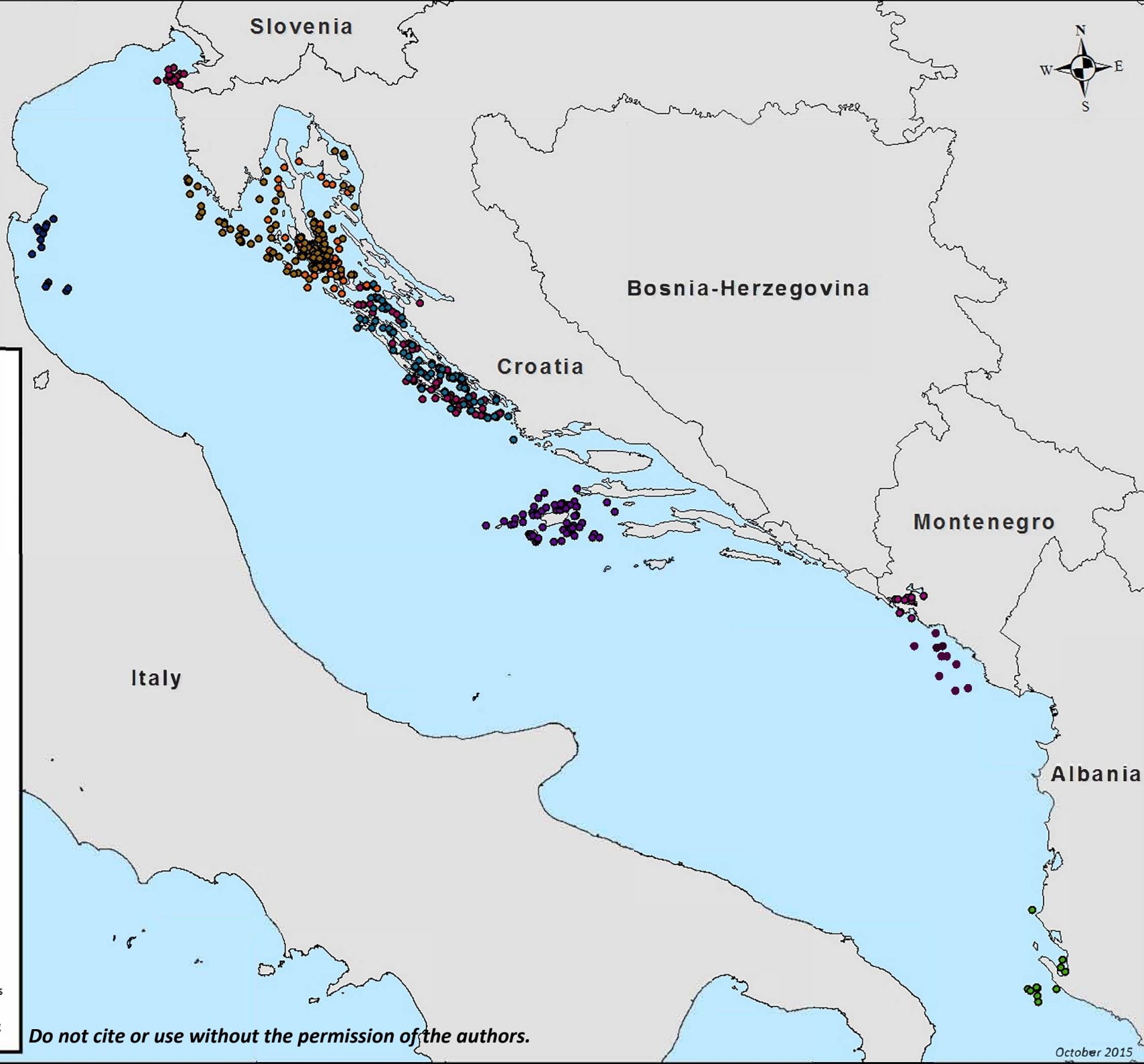
**Research effort, photo-identification  
of local bottlenose dolphin communities  
in the Adriatic sea**

- BWI & CF 2014
- UPR 2014
- BWI, IBMK & APAWA 2015
- BWI & IBMK 2013
- BWI Lošinj 2014
- BWI Lošinj 2013
- BWI North Dalmatia 2014
- BWI North Dalmatia 2013
- BWI Vis 2014



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**Sighting locations of bottlenose dolphins during photo identification surveys in the Adriatic sea**

- BWI, IBMK & APAWA 2015
- BWI & CF 2014
- UPR 2014
- BWI & IBMK 2013
- BWI Lošinj 2014
- BWI Lošinj 2013
- BWI North Dalmatia 2014
- BWI North Dalmatia 2013
- BWI Vis 2014

0 37,5 75 150  
Kilometers

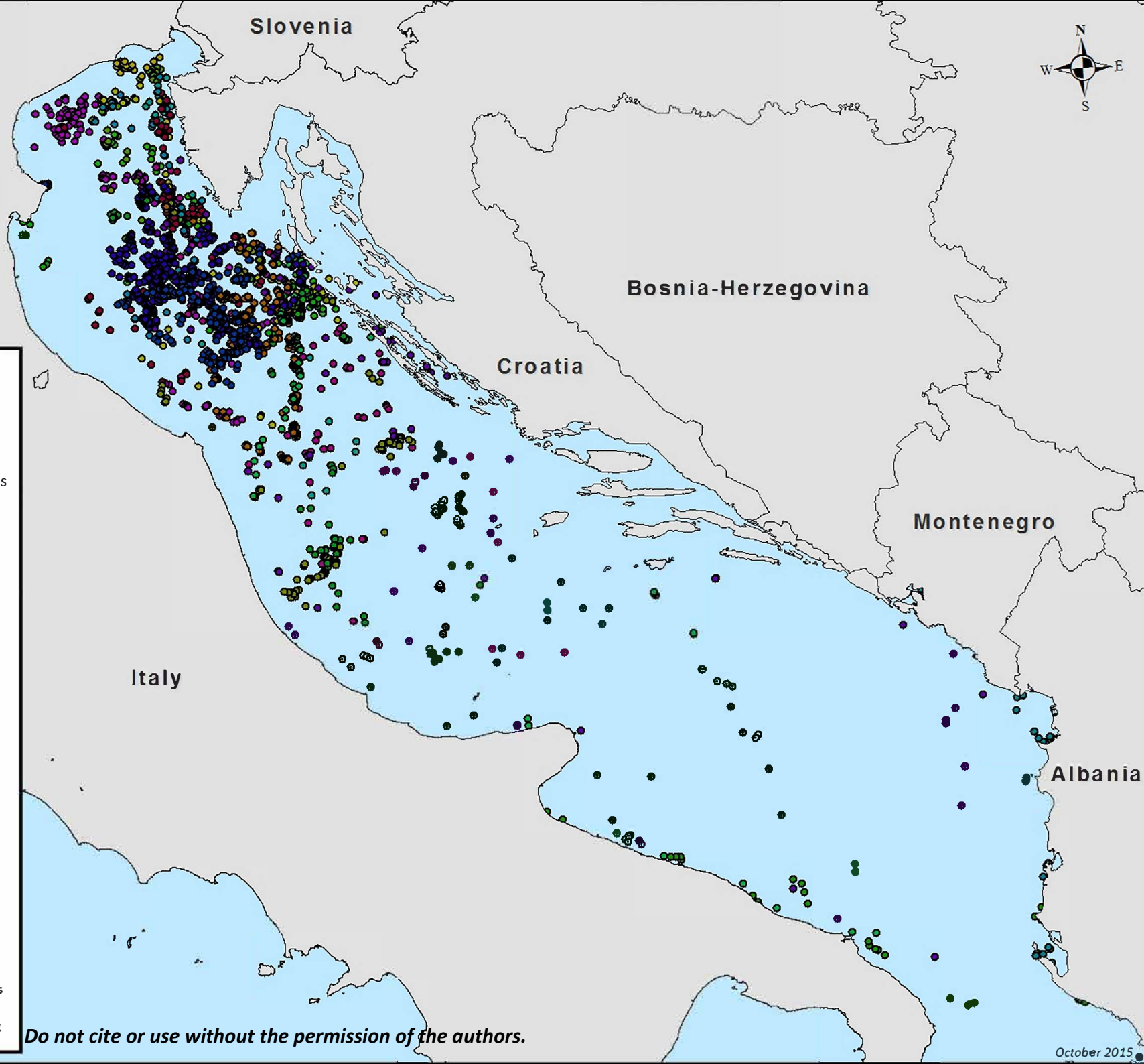
# Satellite tracking

The Adriatic Sea is one of the most important neritic foraging habitat for the loggerhead sea turtle (*Caretta caretta*) in the Mediterranean basin shared by juvenile and adults primarily belonging to Ionian-Adriatic Management Unit. Loggerhead turtles are exposed to a number of anthropogenic threats mostly due to fisheries interactions. In order to get insight into spatio-temporal distribution, behaviour and movement patterns of sea turtles from Adriatic Sea, and identify high-use habitats as a critical prerequisite for development of conservation plans, satellite telemetry was carried out, consisting of three applied studies.

1. Seasonal migrations and habitat utilization of juvenile loggerhead sea turtles from the Northern Adriatic (Gulf of Trieste) - Loggerheads recruit the northern Adriatic at small size, but habitat utilization and movements of juveniles, which constitute the bulk of population, is unknown. Within this study, we equipped 10 small juvenile loggerhead turtles with carapace length between 30 and 40 cm with pop-up archival satellite tags (PAT Mk-10, Wildlife Computers). Nine out of ten turtles provided tracking data. Results showed that such small loggerheads perform seasonal movements and leave the northernmost part of the Adriatic when sea temperatures decrease and move southwards to overwinter, not exiting Adriatic. Based upon tracking of four juveniles which transmitted over 6 months, it seems that loggerheads return to their original summer foraging areas in the northern Adriatic with increase of sea temperature in May. This study was carried out by the University of Primorska, with the logistic support from State Institute of Nature Conservation of Croatia and Marine Education Center Pula.

2. Wintering behaviour, habitat use and survivorship of released loggerhead turtles from bycatch in bottom trawls. Ten loggerhead turtles with the carapace length between 47 and 70 cm were equipped PTT satellite transmitters (Telonics), attached to carapace with epoxy resin. All turtles were incidentally captured by bottom trawls in the waters off the Lošinj Island, mostly in comatose state and released alive and active after the recovery techniques were applied. Study was carried out by on-board observers, in cooperation with collaborating fishermen from the port of Mali Lošinj, Croatia, between January and February 2014. Nine out of ten turtles released provided tracking data, pointing out on high survival rate following on-board recovery techniques. Satellite-tagged loggerheads were active and performed different movement patterns, with most animals remaining in the north-central Adriatic. No turtle was observed leaving the Adriatic. The study was carried out by the University of Primorska and Blue World Institute of Marine Research and Conservation.

3. Movements of juvenile green turtles (*Chelonia mydas*) in the southern Adriatic. Recent studies suggested that southern Adriatic Sea might present developmental habitat for part of Mediterranean juvenile green turtle population. Therefore, with this module we planned to deploy 5 PTT location satellite tags on five green turtles. Within the project duration only three green turtles of adequate size for transmitter deployment were found (one in Montenegro, and two in Albania), while the small size of other incidentally captured individuals prevented transmitter deployment. Therefore, the results are based upon tracking three green turtles. One green turtle remained in a small area of the Bay of Kotor (Montenegro) during all its transmissions. This deep bay has a very small entrance and it is possible that this affected turtle capacity to exit the bay in winter. Other two green turtles left Adriatic, moving southwards to Ionian Sea and to continental shelf of Tunisia. This study was carried out jointly by the University of Primorska, Herpetological Society of Albania and Institute of Marine Biology Kotor.



**Satellite tracking of sea turtles  
in the Adriatic sea  
(Sep 2014 - May 2015)**

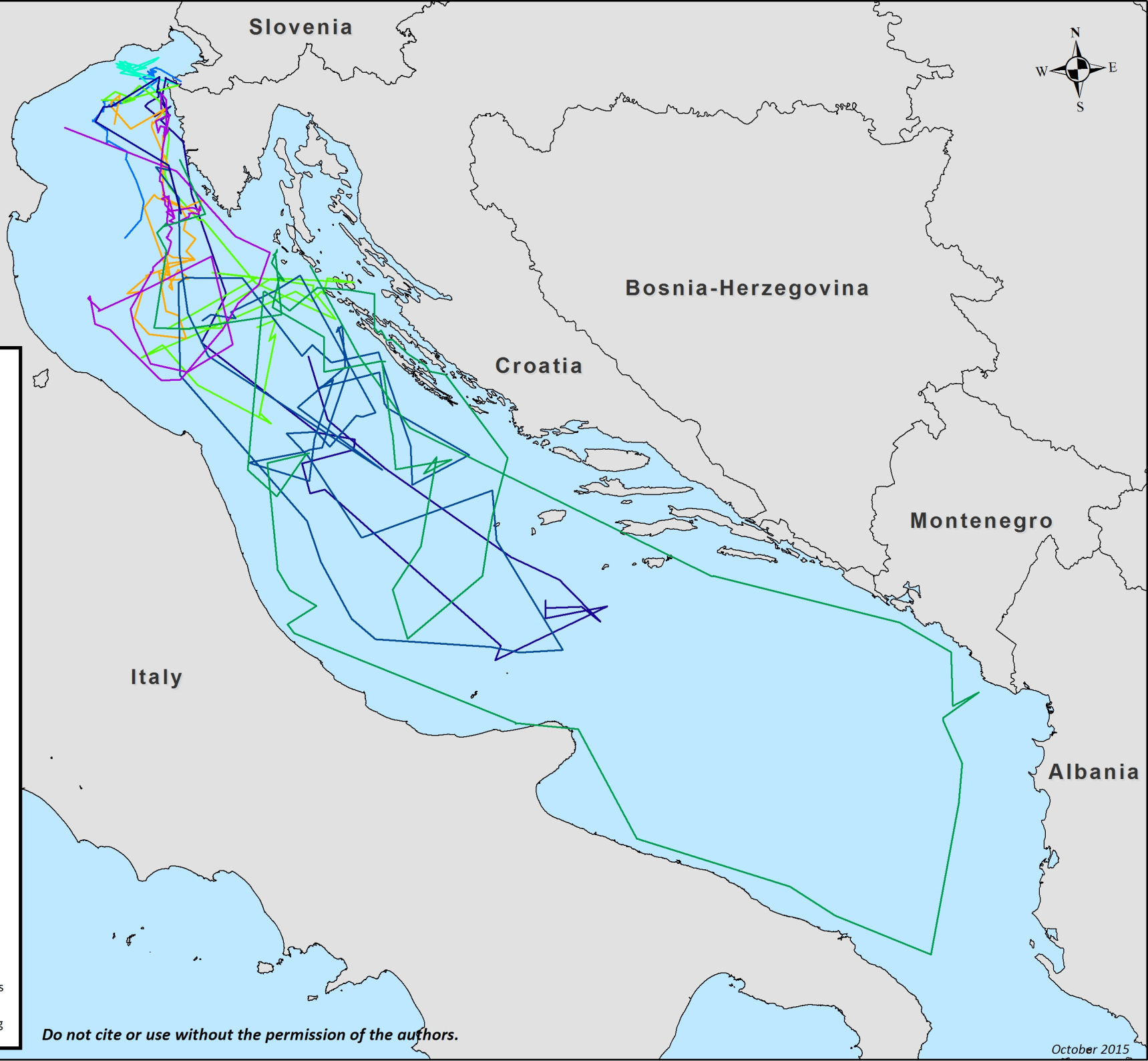
Individual sea turtle ID and surfacing locations

- |          |          |
|----------|----------|
| ● 140011 | ● 139981 |
| ● 140012 | ● 139982 |
| ● 140013 | ● 139983 |
| ● 140014 | ● 139984 |
| ● 140015 | ● 139985 |
| ● 140016 | ● 139986 |
| ● 140018 | ● 140003 |
| ● 139977 | ● 140005 |
| ● 139978 | ● 140006 |
| ● 139979 | ● 140009 |
| ● 139980 | ● 140010 |



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**Satellite tracking of sea turtles in the Adriatic sea (Sep 2014 - May 2015)**

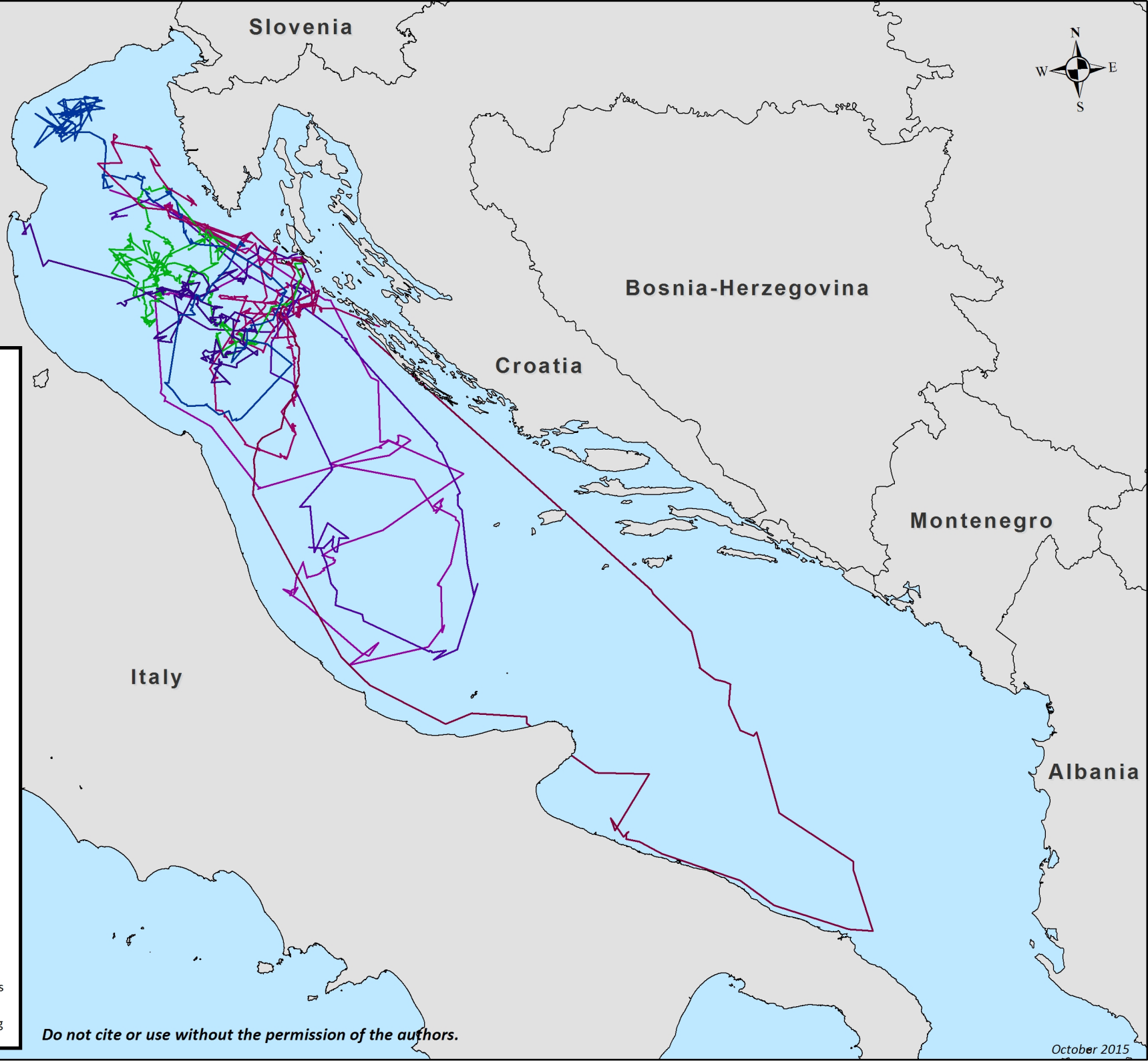
Seasonal migrations and habitat utilization of juvenile loggerhead sea turtles from the Northern Adriatic

Individual sea turtle ID and cumulative track lines

- 139977\_
- 139978\_
- 139979\_
- 139980\_
- 139981\_
- 139983\_
- 139984\_
- 139985\_
- 139986\_



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**Satellite tracking of sea turtles in the Adriatic sea (Sep 2014 - May 2015)**

Wintering behavior and survivorship of released loggerhead turtles from bycatch in bottom trawls

Individual sea turtle ID and cumulative track lines

- 140011\_
- 140012\_
- 140013\_
- 140014\_
- 140015\_
- 140016\_
- 140018\_
- 140009\_
- 140010\_





**netcet** Italy

Network for the Conservation of Cetaceans and Sea Turtles in the Adriatic - NETCET project is co-funded by the European Union IPA Adriatic Cross-Border Cooperation Programme.



**Satellite tracking of sea turtles in the Adriatic sea (Sep 2014 - May 2015)**

Movements of juvenile green turtles (*Chelonia mydas*) in the southern Adriatic.

Individual sea turtle ID and cumulative track lines

- 140003
- 140005
- 140006



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# Report a stranding

In case you find stranded animal please contact your local stranding network coordinator. If animals are alive you should report your observation as soon as possible so that the response team can act fast. This is of particular importance when you find stranded whales or dolphins.

Whether the animal is alive or dead, make sure that you

1. Record your position (as detailed as possible, use your phone to get geo-location!)
2. Make photographs of your finding – be “professional” – take pictures of the whole animal and of particular details (head, fins, carapax, coloration, injuries, etc.) – no photo is too much!
3. Report your finding by phone and send details by email
4. If possible secure the animal (if dead tie it with a rope so that the sea does not remove it, mark it visibly with some cloth or plastic bag if you can)
5. If the animal is alive - provide shade and moisturise the animal (cover in wet cloth or pour sea water often)



Report your sightings also with “[Marine Partnership](#)” smart phone app that can be freely downloaded from [Google Play](#) (Android) and [AppStore](#) (iOS)

## Italia

In caso di dubbi, problemi o per segnalare un ritrovamento, chiama la Guardia

Costiera 15300

Friuli Venezia Giulia: 040 224147

Veneto: 348 2686472

Emilia – Romagna e Marche: 0541691557 oppure 334 5688320

Abruzzo: 02 58240050

Puglia: 080 5210307

## Slovenija

Če naletite na mrtve ali poškodovane osebkke, prosimo pokličite:

Center za obveščanje 112,

Akvarij Piran 041 975386 - Društvo Morigenos 031 771077

## Shqipëri

Në rast të dyshimeve, problemeve ose për të raportuar gjetjen e një breshke detare, ju lutemi telefononi njërën nga numrat:

068 2003235; 069 4344428

## Hrvatska

Opažanje uginule ili ozlijeđene morske kornjače ili dupina dojavite na broj 112

Za više informacija obratite se:

Hrvatska agencija za okoliš i prirodu – 091 6060281

Institut Plavi svijet, Veli Lošinj – 051 604666 – [info@blue-world.org](mailto:info@blue-world.org)

Morski Obrazovni Centar Pula – 052 381402

## Crna Gora

Ako imate nedoumicu, problem ili želite da nas obavijestite o pronalasku ovih vrsta, molimo vas da zovete:

Institut za biologiju mora, Kotor - Tel: 032 334570

Mob: 068 070539; 063 206697; 063 204934

Fax: 032 334571 - e-mail: [mdjurovic@ibmk.org](mailto:mdjurovic@ibmk.org)