



# Distribution and abundance of bottlenose dolphin (*Tursiops truncatus*) along French Provençal coast

Julie Jourdan

julie.jourdan@gecem.org

J. Jourdan<sup>1</sup>, M. Chambellant<sup>1</sup> ; F. Dhermain<sup>1</sup>, M. Barbier<sup>2</sup>, O. Gimenez<sup>2,3</sup>, H. Labach<sup>2</sup>

(1) GECEM Groupe d'Etude des Cétacés de Méditerranée 1, av. Clément Monnier 13960 Sausset-les-Pins, France

(2) GIS3M Groupement d'Intérêt Scientifique pour les Mammifères Marins en Méditerranée 1, av. Clément Monnier 13960 Sausset-les-Pins, France

(3) CEFE UMR5175, Centre d'Ecologie Fonctionnelle et Evolutive 34090 Montpellier, France



www.gdegem.org

**INTRODUCTION** This research was carried out in the framework of GDEGeM (*Grand Dauphin Etude et Gestion en Méditerranée*); a collaborative project led by GIS3M aiming at improving knowledge and conservation of bottlenose dolphin in the north-western Mediterranean Sea. The Provençal coast is known to be frequently used by bottlenose dolphins (Labach *et al.* 2015) but, until now, no abundance estimates had been calculated in this area. **The aim of this study was to investigate bottlenose dolphins distribution along Provençal coast and estimate population absolute abundance based on mark-recapture analysis.**

## MATERIALS AND METHODS

- GECEM collected photo-ID and associated data each season between **May 2013 and February 2015** from sailing or inflatable boats along Provençal coast (**Fig.1**)

**Figure 1:** Study area and distribution of survey effort (kilometres per cell) in Provence in 2013-2015

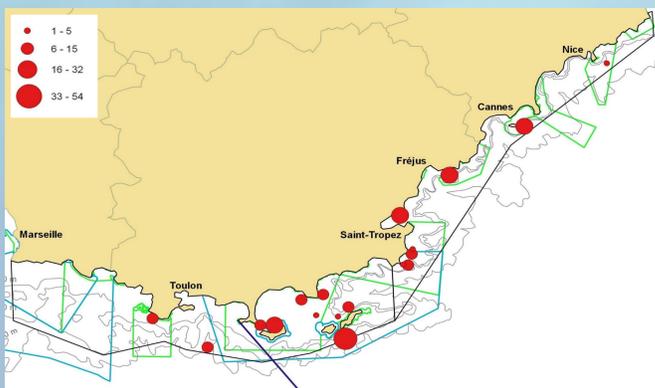


- **Analyses were performed on medium and high-quality pictures and medium and well-marked individuals** (Ingram 2000).

- **Cormack-Jolly-Seber (CJS)** capture-recapture models for open population were used to estimate annual abundance (using programs R and Mark).

## RESULTS

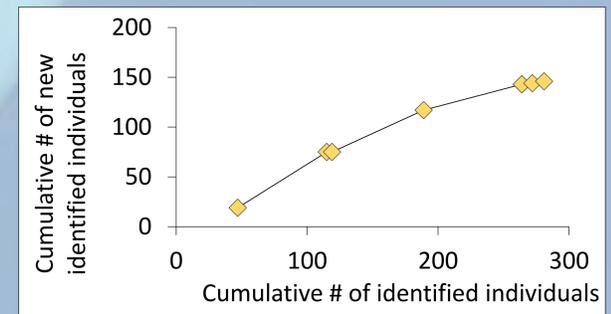
- **5 196 km** were spent on visual effort during 2 years.
- **18 encounters** allowed identification of **147 different individuals**; group size averaged **15,8 [1-55] individuals**.



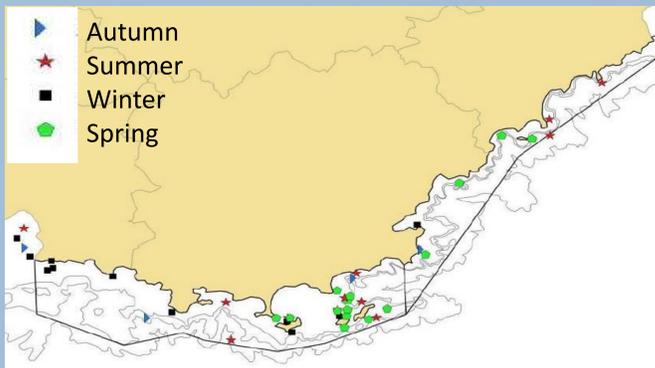
**Figure 2:** Location of groups encountered in Provence in 2013-2015.

- At the end of the study period, the cumulative discovery curve of bottlenose dolphins individuals was **still increasing**.

**Figure 4:** Discovery curve of individuals bottlenose dolphins photo-identified in 2013-2015 in Provence.



- Analyses of GECEM data from 2005 suggested that bottlenose dolphins distribution in Provence extend **eastward in summer** and **westward in winter**.



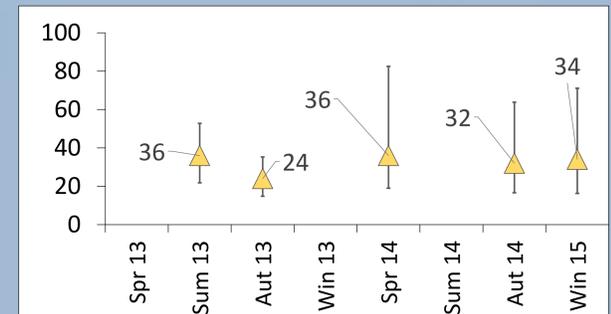
**Figure 3:** Seasonal distribution of bottlenose dolphins sighted at least 5 times in Provence in 2005-2015.

- Most individuals were sighted on one occasion (69%) but **16% of bottlenose dolphins identified were sighted on 3 or more occasions**.

- Bottlenose dolphins were sighted **throughout the year** with higher frequency in the spring.

- Mean bottlenose dolphin abundance estimate for well-marked individuals was 36 (95% CI:18-64) dolphins and **91 (95% CI:50-155)** when corrected by the proportion of unmarked ones between 2013-2015 in Provence.

**Figure 5:** Seasonal abundance estimates of bottlenose dolphins in Provence in 2013-2015 using CJS model.



**Conclusion** These are the first abundance estimates for bottlenose dolphins in Provence, **providing a useful baseline** to monitor trends in abundance of the species over the years. Maintaining monitoring program is needed in particular **to identify key areas** for bottlenose dolphin in order to implement adequate conservation efforts of the species in the north-western Mediterranean Sea.

## References

Ingram S. D. 2000. *The ecology and conservation of bottlenose dolphins in the Shannon Estuary, Ireland* (Doctoral thesis). University College Cork, Corcaigh, Ireland. 213 pp.

Jourdan J., Chambellant M., Dhermain F., Barbier M., Gimenez O., Labach H. 2015. *Abondance, répartition spatio-temporelle et comportements du Grand Dauphin en Provence*. Projet GDEGeM Grand Dauphin Etude et Gestion en Méditerranée 2013-2015. Rapport pour le GIS3M. 64 p. + annexes.

Labach H., Dhermain F., Dupraz F. 2015. Suivi de la population de grands dauphins le long des côtes provençales (Méditerranée nord-occidentale). *Scientific Reports of Port-Cros national Park*, 28:49-64.

## Acknowledgement

We would like to thank warmly all the motivated volunteers who have made this study possible. This study was supported by MAVA Foundation, Agence des Aires Marines Protégées and Pelagos Sanctuary.

