

Occurrence and seasonal residency of a community of common bottlenose dolphins (*Tursiops truncatus*) off Bimini, The Bahamas, from 2006-2016



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Key Findings

- 129 individual dolphins cataloged
- Most often in 5-12m depth, groups of 2 – 5 dolphins
- 23% seasonal residents, 30% frequent, 47% sporadic¹
- Total population estimate: 147.25 individuals \pm 8.06 SE

Goals of this study:

To establish a catalog of identified individuals and estimate site fidelity and abundance of the coastal bottlenose dolphin community in the waters near Bimini as a baseline record.

Methods

Study site:

Northwest Great Bahama Bank, off Bimini, The Bahamas (Fig. 1)



Data collection:

Opportunistic boat-based surveys, April-October 2006-2016. Surface images, mainly of dorsal fins, using a Canon Rebel XT with a 55-250 mm lens. Underwater video and still photographs collected while snorkeling.

Data analysis:

Data from 2010-2016 were analyzed to examine occurrence based on depth and the number of sightings for individual dolphins per year. To determine summer resident super-population size in the Bimini region, we applied the Jolly-Seber (JS) model, using the POPAN formulation in MARK v10.1², to the sighting history of 128 individual bottlenose dolphins observed from 2006 to 2016.

The results of the Jolly-Seber model global goodness-of-fit test indicated an overdispersion the data ($\chi^2=43.17$, $df=26$, $p=0.019$) with a variance inflation factor (c') of 1.66. Annual survival of marked individuals was estimated as 0.822 ± 0.026 SE. Capture probabilities each year ranged from 1.000 ± 0.015 SE in 2006 to 0.263 ± 0.168 SE in 2007. Probability of entry into the population ranged from 0.360 ± 0.120 SE between 2008 and 2009 to 0.000 ± 0.000 SE from 2009-2010, 2011-2012, and 2012-2013.

Acknowledgements:

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Results:



Fig 2: Number of bottlenose dolphins added to catalog over 11 years. The number of newly discovered dolphins increased each year until 2012, after which few dolphins were added, indicating the discovery curve had reached or approached an asymptote.

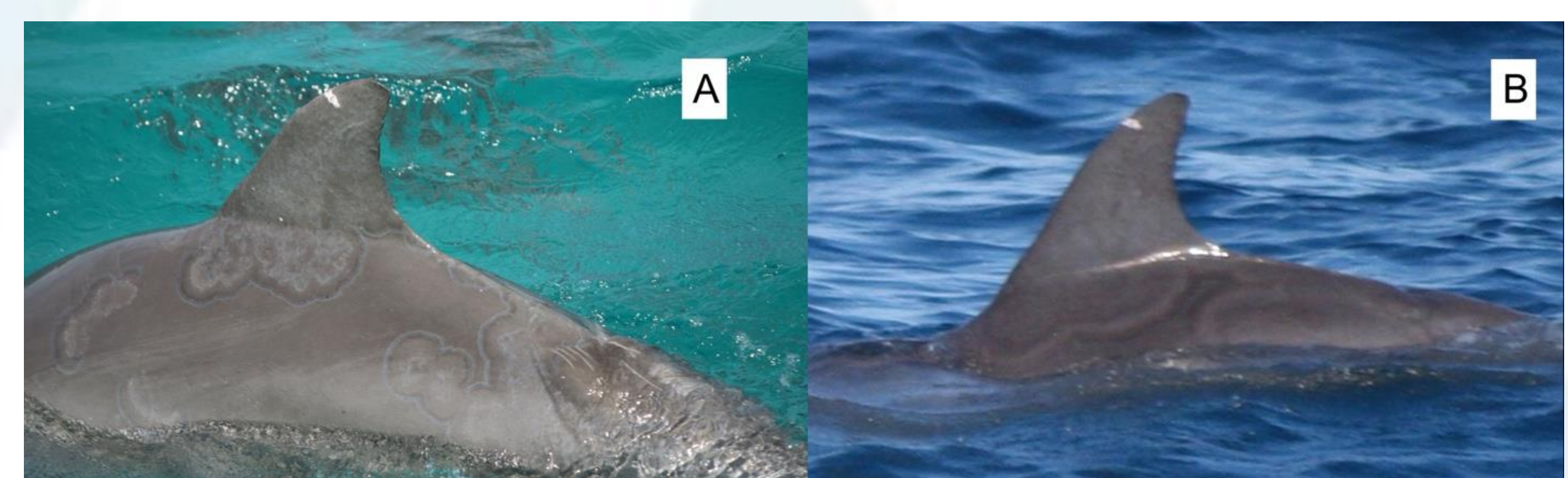


Fig 3: Tt057 was observed on 13 July 2010 (A) and 18 August 2010 (B) with an undiagnosed skin issue. The improvement in this case and the infrequency of observable skin issues provides a valuable baseline.

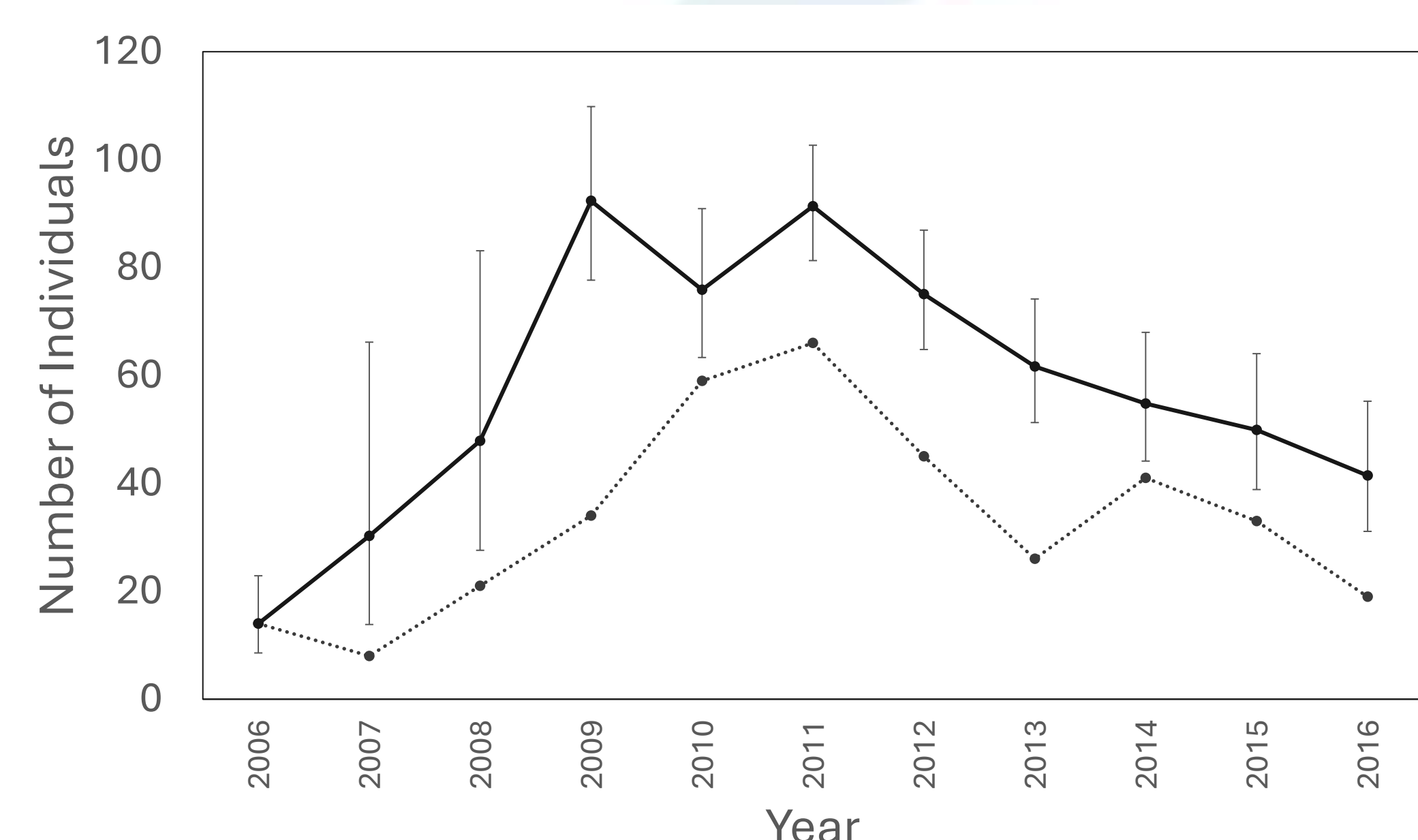


Fig 4: Number of individually identified bottlenose dolphins observed (dotted line) and an annual abundance estimates of dolphins from 2006 to 2016 from the lowest QAIC POPAN model $\phi(\cdot) p(t) b(t)$. Error bars are 95% confidence intervals as estimated by POPAN.

Conclusions: Dolphins off Bimini may represent another community of dolphins within Bahamian waters. Continued monitoring and comparisons of space use, association patterns, and interactions with the sympatric spotted dolphin population near Bimini and other dolphin communities in The Bahamas would be valuable.

Literature Cited:

- 1: Benmessaoud, R., Chérif, M., & Bejaoui, N. (2013). Baseline data on abundance, site fidelity and association patterns of common bottlenose dolphins (*Tursiops truncatus*) off the northeastern Tunisian coast (Mediterranean Sea). *Journal of Cetacean Research and Management*, 13(3), 211-219.
- 2: White, G. C., & Burnham, K. P. (1999). Program MARK: survival estimation from populations of marked animals. *Bird study*, 46(sup1), S120-S139.