

Distribution patterns of tarpon, *Megalops atlanticus*, using remote detection technology of passive internal transponders at Boquerón, Puerto Rico

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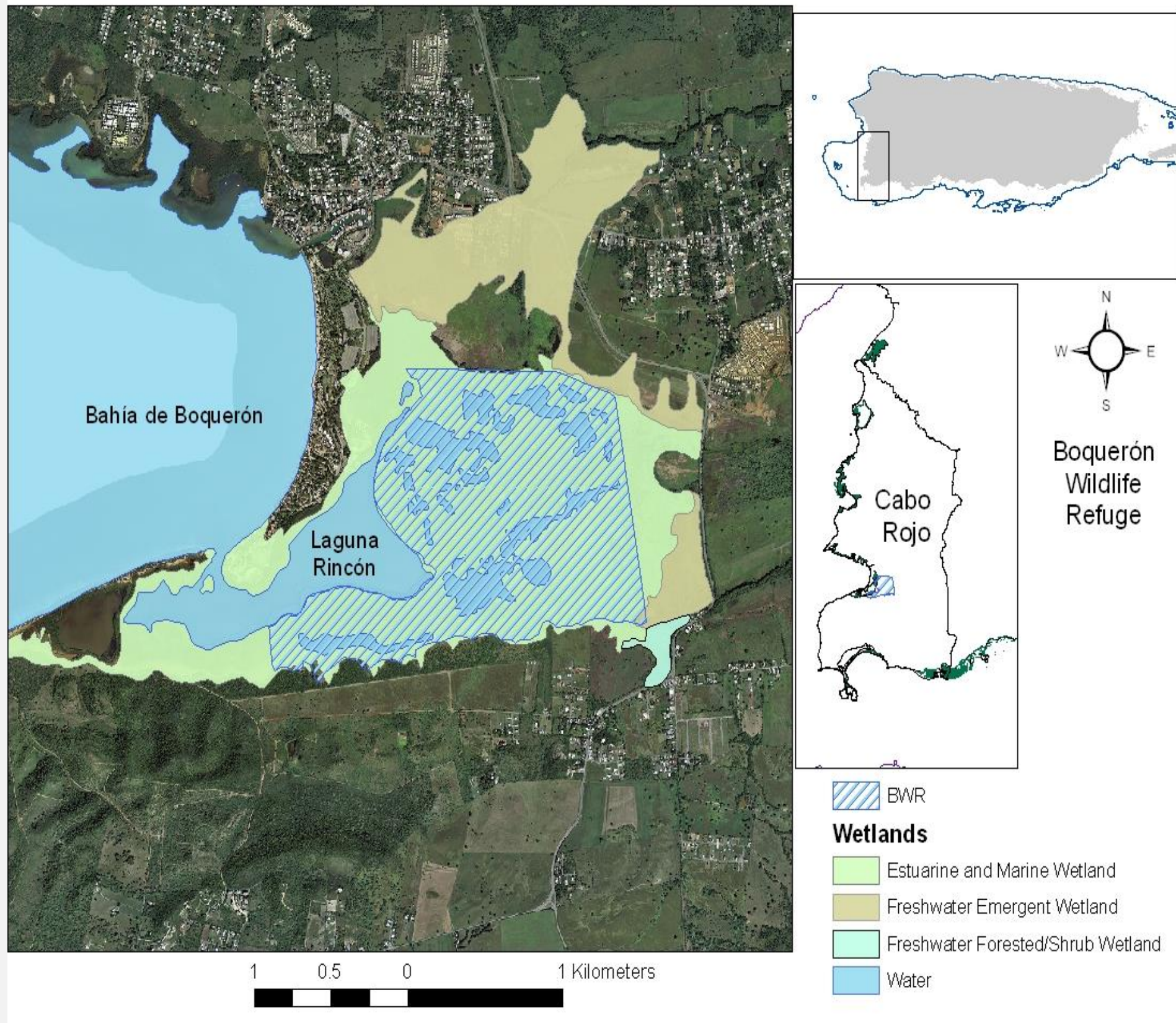
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Introduction

Megalops atlanticus is an important species in sport and game fishing. Few previous studies have been conducted in Puerto Rico using tarpon. In 1999, Zerbi et al. (1999) published work on juvenile tarpon, where they implanted tags on the dorsal fin base of juveniles ranging from 40 to 80 mm SL. Following this, in 2001, Zerbi et al. (2001) worked with otoliths from juvenile *M. atlanticus* at Boquerón Bay, Cabo Rojo, Puerto Rico. However, there still remains a lack of information of tarpon's spatial distribution. To better understand fish populations, scientists and managers need long-term monitoring systems that collect population data in all environmental conditions (Barbour et al. 2010). With this study we aim to determine the spatial distribution of tarpon in the BWR using remote detection technology of passive internal transponders (PIT) tags in order to develop appropriate management strategies.



Methods

Setting up the antennae

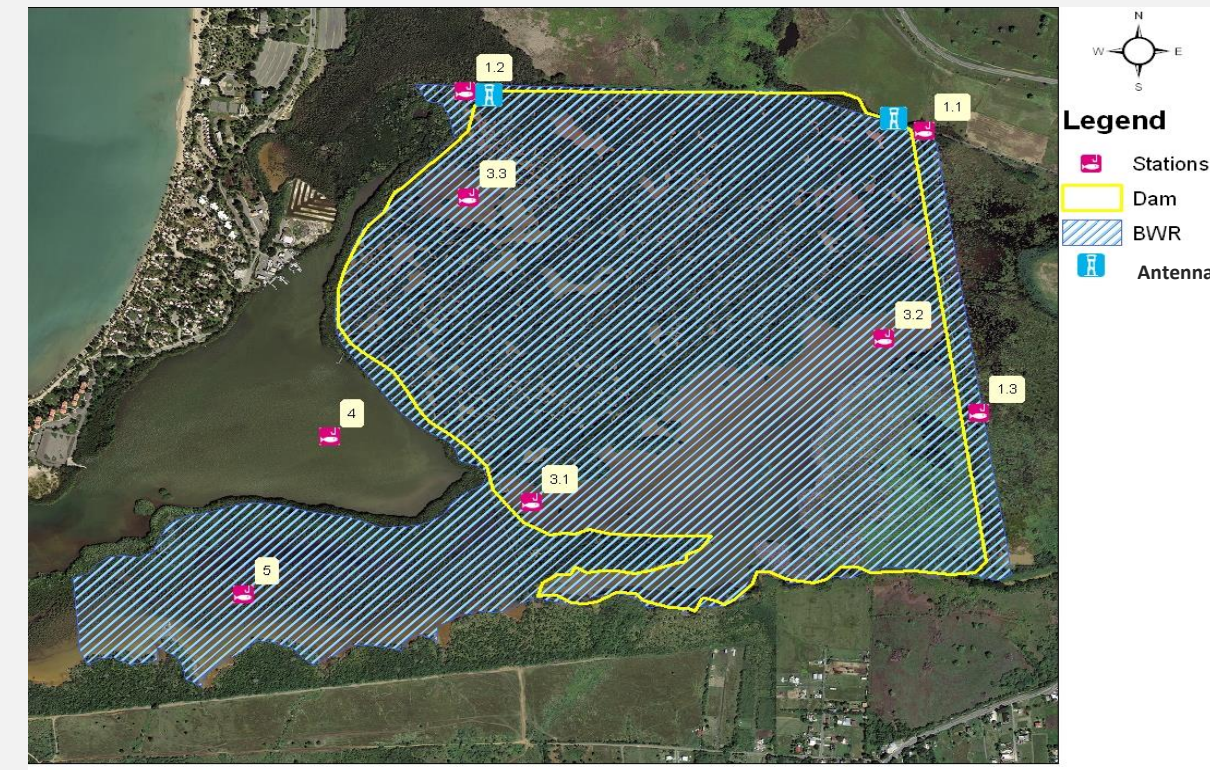


Installation of autonomous culvert antennae



Antennae were installed during November 2011 (Picture by Andrew Barbour).

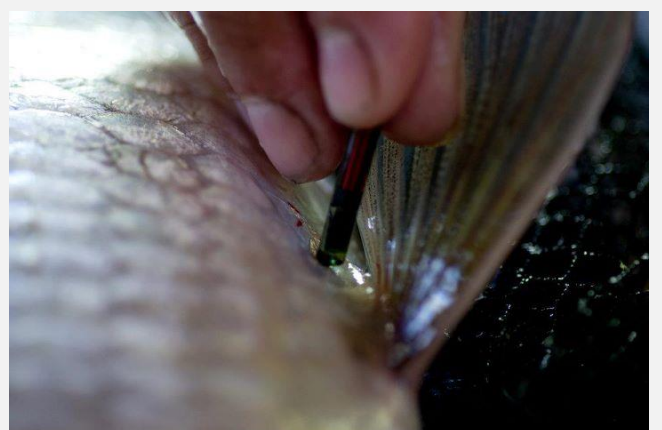
Mark and recapture



The two antennae were installed in the main channel and nine fishing stations were located around the Refuge.

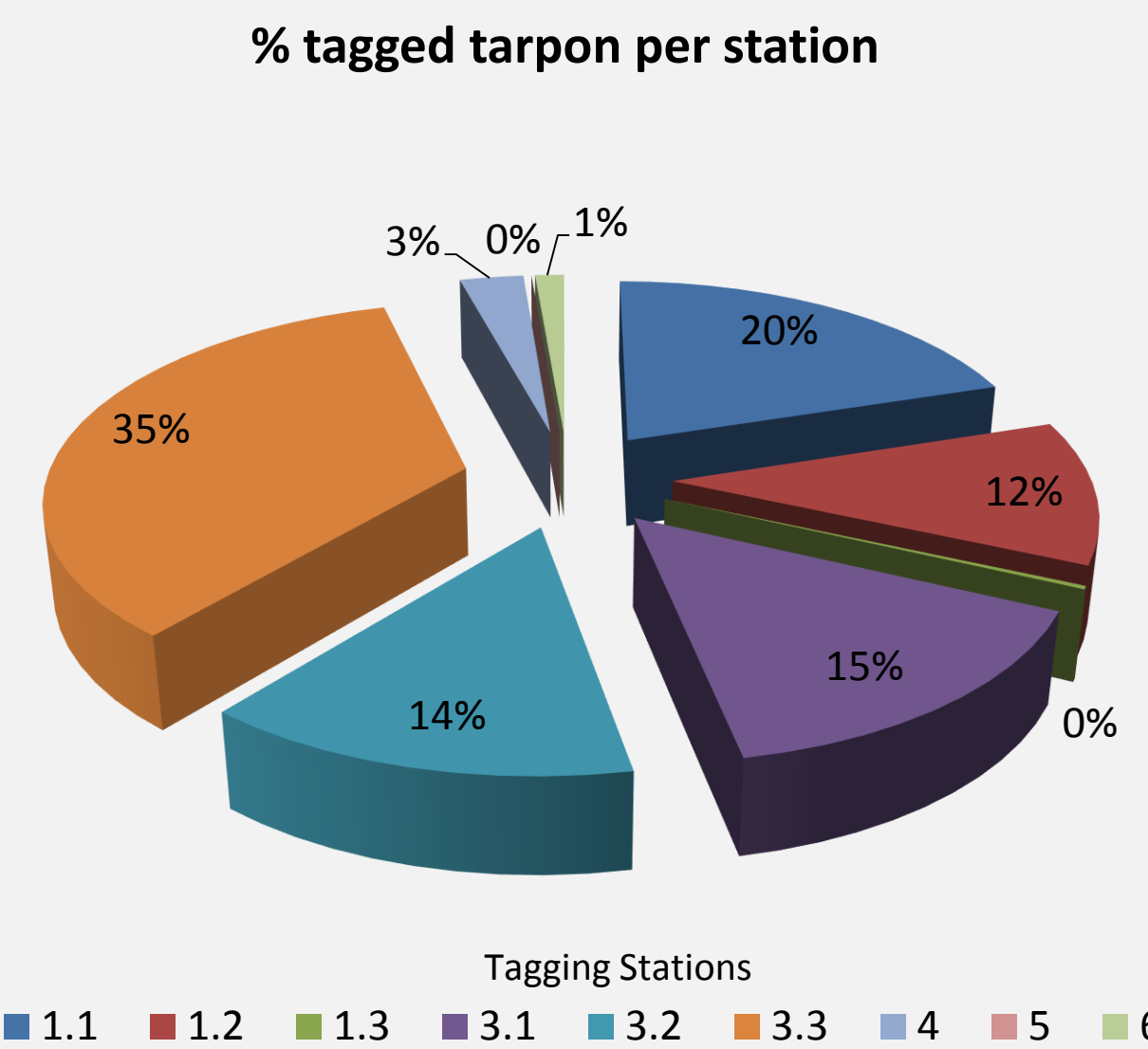


Measurements were taken with an ichthyometer to determine fork length and total length. (Picture by Isabel Martinez)

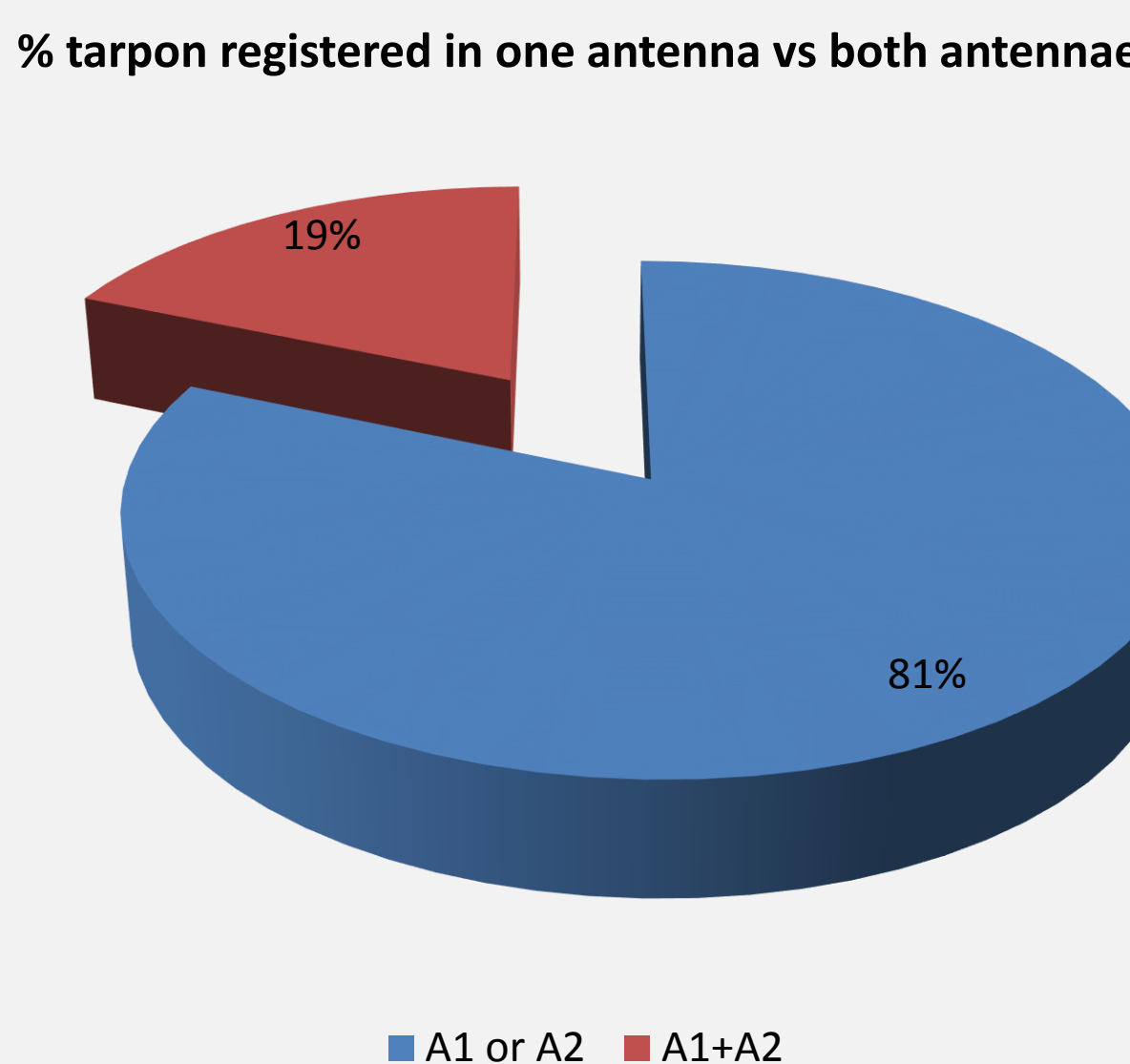


The PIT tag is inserted through an incision on the left side of the body behind the pelvic fin.
(Picture by Andrew Barbour).

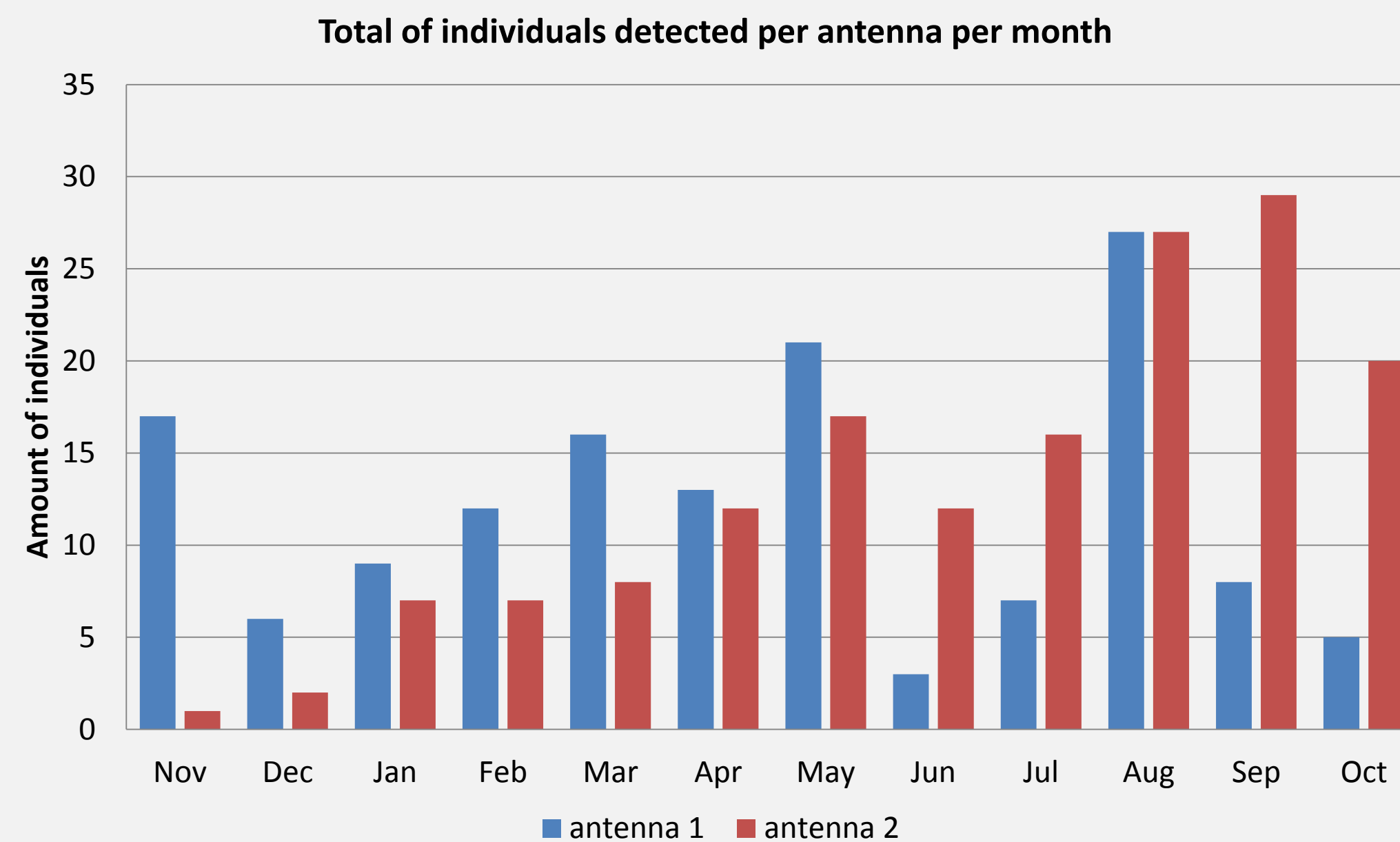
Results



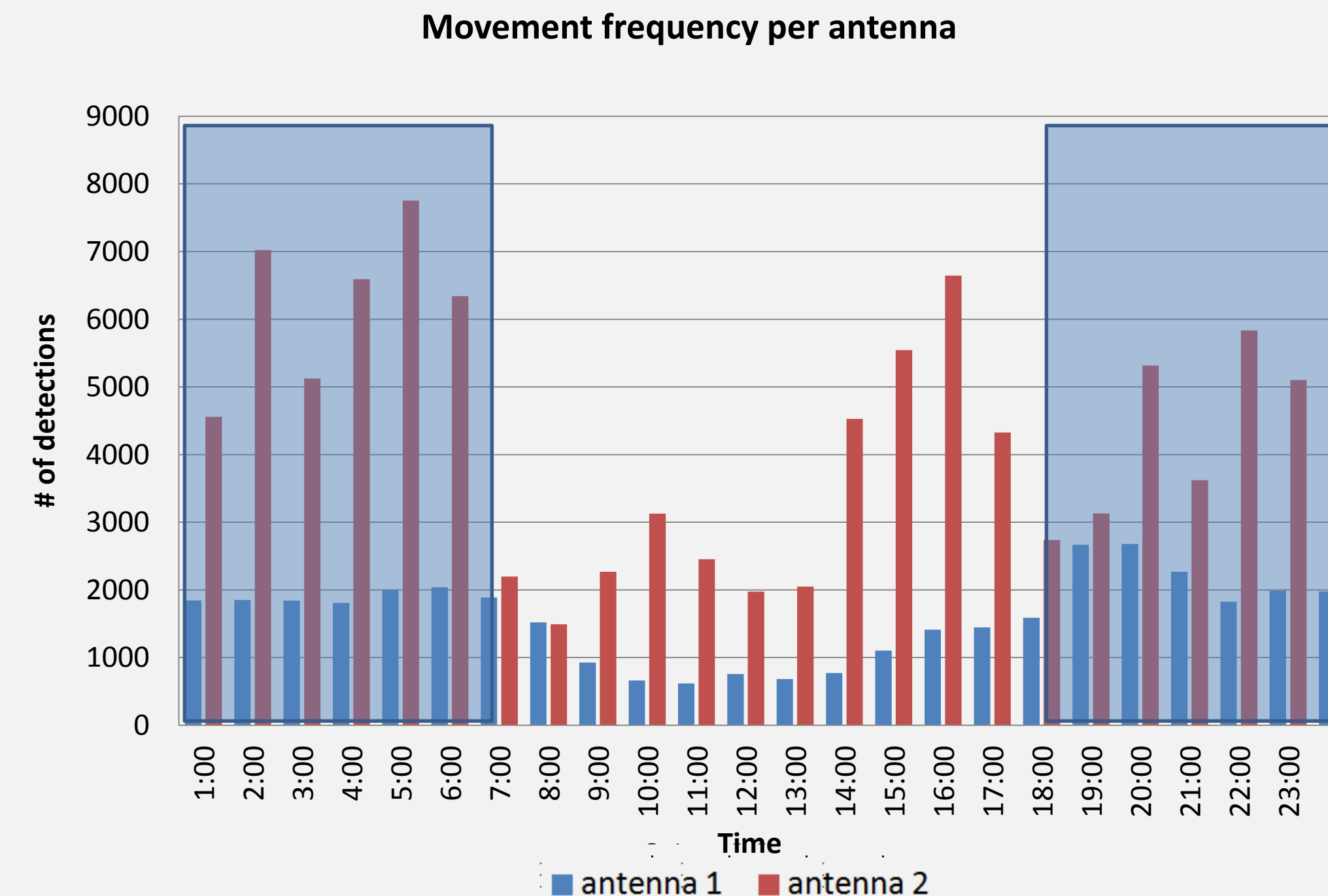
The inner lagoon and the main channel (3.1, 3.2, 3.3, 1.1, 1.2) represent areas with higher percent of tagged tarpon. The other stations are mostly mangroves and open water areas that make fishing more difficult.



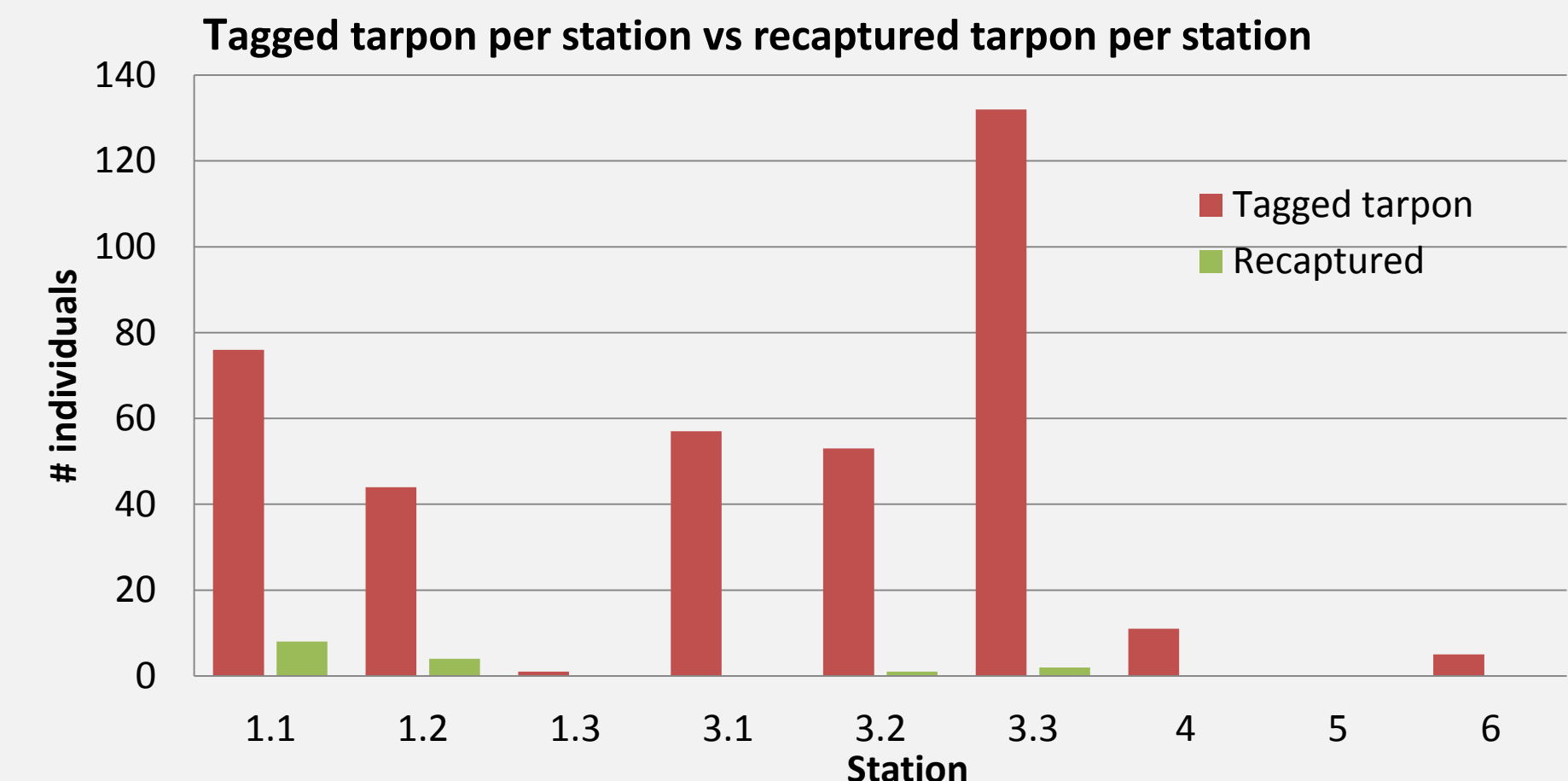
We found a high percent of tarpon detected by one of the two antennae, and a low percent of tagged tarpon detected by both antennae. That means individuals' movements between antennae are uncommon.



Both antennae read more detections during May and August, and a peak in September from antenna 2.



We observed a crepuscular movement in both antennae with some peaks in antenna 2 between 2pm to 5pm.



From the total of tagged tarpon (n=379) St 1.1, 1.2, 3.1, 3.2 and 3.3 have more accessibility for fishing. However, St 1.1 and 1.2 had the more tarpon recapture (n=12) versus St. 3.2 (n=1) and St. 3.3 (n=2).



Three movement patterns were observed: ID **177840105** was tagged on Nov 11, 2011 at St. 1.1 and detected on Dec 30, 2011 by A2. This individual continued its movement between both antennae until Sep 2012 detected by A1; ID **178695338** was captured on Jan 3, 2012 at St. 1.1 and recaptured on Jul 26, 2012 at St. 3.3. (In this case culvert # 3 was opened on May 22, 2012 and let tarpon move from the main channel to the inner lagoon); ID **180981832** was tagged in the Rincón lagoon on Aug 25, 2012 and was detected the next day by A2.

Discussion

This is the first study using the PIT tag technology and autonomous antennae to record tarpon movement patterns in the Boquerón Wildlife Refuge. The number of tagged tarpon (n=379) versus the recaptured individuals (n=15) suggests that the tarpon population in the BWR is larger than what we thought. The fishing stations with the most tagged tarpon were open areas in the inner lagoon and the main channel. The movement frequency by antennae shows a crepuscular behavior of tarpon. A low recapture percent demonstrates high movement through the main channel that connects with the Rincón lagoon, use of mangroves as a refuge for tarpon in the inner lagoon, and the effect that manipulation of the culverts has on fish movement. In order to establish management recommendations we need to better understand tarpon movement patterns and habitat use. To achieve this we must establish more antennae in order to record movements in-outside the BWR and the Rincón lagoon. Also to promote sport fishing inside the Refuge would result in higher education of anglers and the community.

References

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