The SMM grant awarded to me allowed my travel to Seattle, USA, to perform all analysis associated with my MSc work and write the thesis under the supervision of Dr. Alexandre N. Zerbini (associated researcher of the National Marine Mammal Laboratory/NOAA). In my MSc, I aimed to improve abundance estimates of franciscana dolphin, *Pontoporia blainvillei*, by estimating correction factors to compensate for visibility bias in aerial surveys. Franciscana dolphin is the most threatened cetacean species in the southwestern Atlantic Ocean due to high, possibly unsustainable, bycatch levels in gill nets, and is listed as Vulnerable by the IUCN Red List of Threatened Species. In January 2014, field experiments were made from a Robinson R44 helicopter in Babitonga Bay, southern Brazil, to estimate the length of time during which a franciscana group remained available to be detected from an aircraft. Generalized mixed effect models (GLMMs) were used to investigate the influence of environmental and biological predictors on the proportion of time franciscana groups spend at the surface. Availability bias was then estimated following the methods proposed by LAAKE *et al.* (1997). A total of 15 hours were flow during the helicopter experiment. After filtering the whole dataset 248 complete surface-dive cycles from a total of 101 samples remained. The most supported GLMM model shows a positive relationship between the proportion of time at surface and the size of franciscana groups. The average time franciscana groups spent at the surface and in a dive was 16.10 (SD = 9.74) and 39.77 (SD = 29.06), respectively. Assuming a time window of 5.77 seconds, the estimated availability bias was 0.38 (SE = 0.01). The fraction of individuals available at the surface that were missed by the observers (perception bias) was estimated using mark-recapture-distance-sampling methods (MRDS) assuming point independence. Sightings (n = 191) were recorded through aerial surveys carried out between 2011 and 2014. The estimated probability of detecting a franciscana group that was visible at the transect line was 0.38 (SE = 0.12). Surface-dive results showed that surfacing time recorded from helicopter were 13.42 times greater than time recorded from surface platforms and applied to compute availability bias in previous aerial survey-based estimates of franciscana abundance. Most important, these results indicated that the use of dive parameters recorded from surface platforms to estimate availability bias in aerial surveys of franciscana dolphins can lead to a 15-46% positive bias in abundance estimates. Therefore, availability bias estimates for aerial surveys of franciscana dolphins must be estimated from dive parameters computed from aerial platforms. Estimates of perception bias indicated that

the number of franciscana sightings missed by observers can be significant and that correction factors to compensate for this bias are necessary. However, this study showed that methodological improvements in the sampling procedures are needed to estimate this parameter in a more robust way.

In addition, I edited a video with images of franciscana groups recorded during the helicopter surveys (see at https://www.youtube.com/watch?v=visW822nFeI).

This year, my research group (Instituto Aqualie) received founds to conduct helicopter experiments in a region with different environmental conditions than those observed in Babitonga Bay. These surveys will improve the accuracy of the estimated availability bias and will allow to apply it to range-wide estimates of abundance of franciscana dolphins. I expect to publish a scientific article after carry out these surveys integrating the whole surface-dive data.

Please, find below the abstract of my master´s thesis (availability bias chapter) submitted to the 21st Biennial Conference.

IMPROVING ESTIMATES OF AVAILABILITY BIAS FOR FRANCISCANA DOLPHINS

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The franciscana dolphin, *Pontoporia blainvillei*, is the most threatened cetacean species in the southwestern Atlantic Ocean. Most existing aerial survey-based abundance estimates are considered unreliable due to limitations associated with their estimates of visibility bias. In January 2014, helicopter surveys were conducted in southern Brazil to estimate the availability of franciscana groups to an aerial platform. The surfacing interval was defined as the period of time during which one or more franciscanas in a group were available to the observer in the helicopter. A surface-dive cycle was defined as the period from the beginning of one surfacing to the next. Generalized mixed effect models (GLMMs) were used to investigate the influence of environmental and biological predictors on the proportion of time franciscana groups spend ate the surface. Fifteen hours were flown and 101 franciscana groups ranging from 1 to 7 individuals were monitored, resulting in a sample of 248 surface-dive cycles. The most supported GLMM model show a positive relationship between the proportion of time at surface and group size. The average time (sec) groups spent at surface and in a dive was 16.10 (SD = 9.74) and 39.77 (SD = 29.06), respectively. Assuming a time window of 5.77 seconds, the estimated availability bias was 0.38 (SE = 0.01). Surfacing time was nearly 13 times greater than those obtained from surface platforms and applied to compute availability bias in previous aerial survey-based estimates of franciscana abundance. Availability bias estimated here is up to 46% higher than previous estimates. Assuming all other sources of bias are accounted for, underestimate of availability bias will result in overestimation of abundance. Therefore, availability bias estimates for aerial surveys of franciscanas must be calculated from dive parameters computed from aerial platforms. This study was supported by IWC/Small Cetacean Conservation Found, SMM, CSI, ICMBio, pgecol/UFJF, UNIVILLE.