Seabird sensory systems and attraction to artificial light

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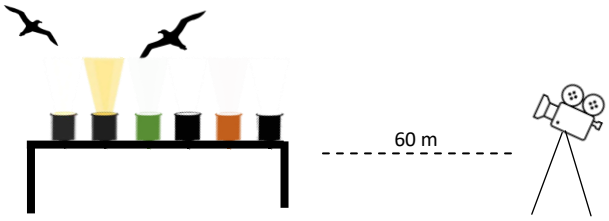
New Zealand is home to a quarter of the world's seabird species. New Zealand's Hauraki Gulf is a seabird hotspot with the offshore islands and coastal peninsulas being home to approximately 27 seabird species. These are mainly the Procellariforms seabirds including the petrels and shearwaters, very diverse in their life history, morphology and sensory features. Unfortunately, seabirds are some of the most at risk group of animals. One major threat includes light attraction.

With an increase in the growth of the human population, urbanization and fishery expansion, this leads to greater amounts artificial lighting at night (ALAN) thus enhancing seabird fall-out. ALAN causes seabirds to become disorientated, leading to collisions with structures and groundings. This can be fatal and interrupt their migration. Even the lights on fishing vessels and cruise ships leads to seabird disorientation and deck strikes with the ships.

Studies have researched if certain types and colours of lights are more or less attractive to seabirds. However, different studies have different results. Also, there is little research analyzing light attraction from the seabird's own sensory perspective. Our team decided to take a trip to the Hauraki Gulf and explore the visitation rates of seabirds to different types of lights.

Locations of experiments:

- Pokohinau/Burgess Island
- Te-Hauturu-O-Toi/Little Barrier Island
- Tawharanui Regional Park
- Tiritiri Matangi



We set up 6 different types of boat lights onto a rack facing skywards. Once an hour after sunset had occurred we would run each light individually in a randomized order for 10 minutes and count the number of seabirds visiting the lights. Once one type of light was shone for 10 minutes it would be followed by a control period of darkness to reduce the effect of the previous light on the next light. We would also count the number of seabirds during the dark period for 10 minutes. A thermal imaging camera was set up 60 meters away from the lights to record the seabirds.

We found that the different types of boat lights had different results at different locations. Therefore, when it comes to light attraction, the location is very important. This is potentially due to differences in the seabird species composition at the different locations. Different species may have differences in their sensory and visual ecology which may lead to differences in attraction towards different lights. Seabird species more attracted to lights could have larger eyeballs or optic tectums. They may even have differences in their spectral sensitivities in their eyeball physiology. Research into this field of visual ecology and light attraction in different seabird species is being undertaken.

The Birds NZ Project Assistant fund permitted us to go back to Te-Hauturu-O-Toi one final time to gather some crucial data during different moon phases and expand the dataset. This helped to statistically prove that less seabirds are attracted towards lights during a full moon compared to a new moon. We are very grateful for the funding and the results will be used for my PhD thesis and publications.