

Orca (*Orcinus orca*) social networks change over time at Punta Norte, Península Valdés, Argentina

Juan M. Copello¹, Elizabeth Ashley², Jorge Cazenave¹, Joseph Karl Gaydos², Diego Montecino-Latorre³, Marcela Uhart^{1,3,4}, Ingrid N. Visser^{1,5}



Abstract

Long term stable group cohesion has been documented in numerous distinct orca populations, although individual dispersal and group fission have occasionally been described. We investigated social structure and connectivity within a small group of orcas that intentionally strand to capture pinnipeds on the beaches of Punta Norte at Península Valdés, Argentina. Sighting data collected during the season when they hunt southern sea lion pups at Punta Norte (March-April) from 2007 through 2019, were used to assess individual temporal dynamics and changes in individual sub-group associations and to identify periods in which specific subsets of orca were observed. Time-specific populations were identified using orca composition that were clearly different with respect to other years. Thirty-three individuals were observed during 310 unique sighting dates, resulting in 3,897 non-independent observations. Group dynamics changed over three time periods, 2007-2010, 2011-2014, and 2015-2019, with specific community structures seen in each period. Group size varied from single to seven individuals and the number of groups varied from two to six. Despite being long-lived animals, social dynamics for this population changed over relatively short time periods. The data support that the animals within a unit were not randomly contacting each other, but actually forming communities, which were dynamic. It is not clear if social structures are maintained during times of the year when the orca are not intentionally stranding to predate southern sea lion pups, however within the three time periods, upon their return each season, most of the prior associations between the orca were still intact. These orcas have a very distinctive hunting method and it is possible that predation could be driving social organization of this ecotype.

Results

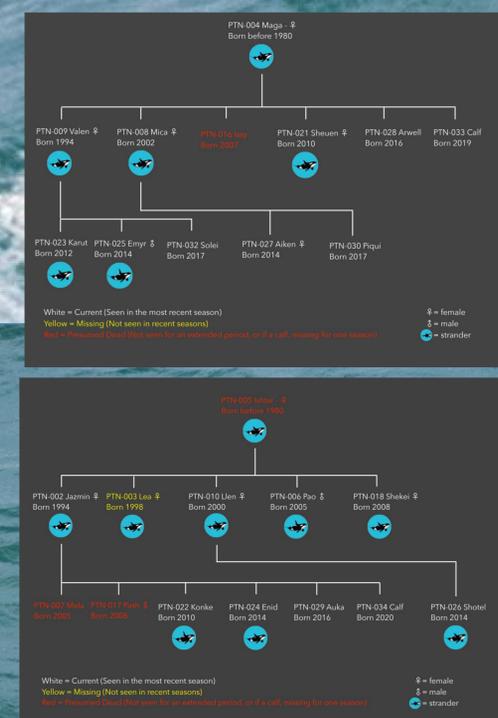
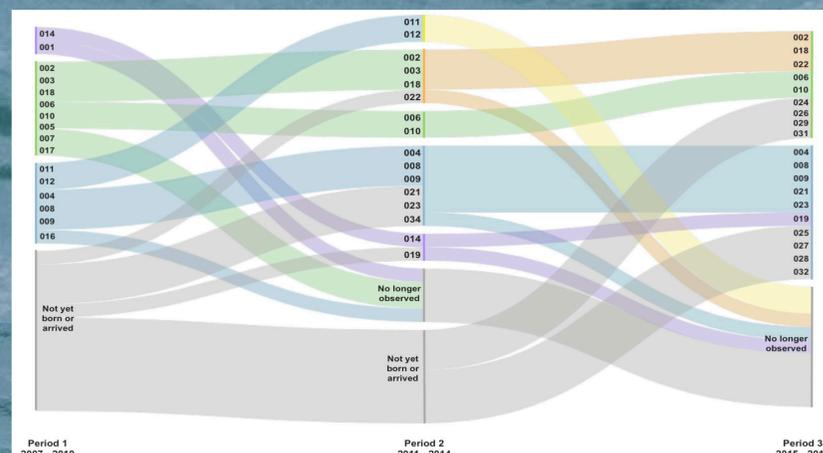


Fig 2. Number of sightings per orca per year across the study period (2007-2019).

Fig 3. Social network flow (three periods 2007-2010; 2011-2014; 2015-2019).

Fig 4. Two family trees, comprised 25 individuals & forming 2 groups from the 33 orca observed during the study period.

- ✓ Punta Norte orca (**Fig. 1**), observed on 310 dates between 2007-2019
- ✓ Group dynamics changed over three time periods (**Figs. 2-3**)
- ✓ Animals were not associating randomly, but were clustered into families (**Fig. 4**)
- ✓ Group size varied from 1-7 orca (see www.pn-orca.org),
- ✓ Number of groups varied from 2-6 (**Fig. 4** & see www.pn-orca.org)



Fig 1. (Main image) two orca hunt in tandem at Punta Norte, Argentina. Photo © Jorge Cazenave.

¹ Punta Norte Orca Research, C/- Estancia La Ernestina, Punta Norte, www.pn-orca.org
² The SeaDoc Society, UC Davis Wildlife Health Center, Orcas Island, USA
³ Karen C. Drayer Wildlife Health Center, School of Veterinary Medicine, University of California, Davis, USA
⁴ Southern Right Whale Health Monitoring Program, Puerto Madryn, Chubut, Argentina
⁵ Orca Research Trust, Tutukaka, New Zealand, ingrid@orcaresearch.org

- ### Conclusions
- Social dynamics changed relatively quickly, given longevity of individuals
 - The orca formed dynamic communities
 - Social networks were maintained during sea lion predation seasons
 - The hunting culture of this ecotype may be driving social networks

How to Cite
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