Comparisons of the behavioral ecology of three delphinid and three baleen whale species:

**ABSTRACT**

The behavioral ecology of offshore delphinids and baleen whales is poorly known. A comparative approach was used to assess group size and behavior versus risks/rewards of group living in the Southern California Bight, U.S. Scan sampling/photographs/video documented first-observed group size, behavior state, and group cohesion (i.e., maximum nearest-neighbor distance (MNND) - in body lengths(BL)), during 72,467 km of aerial surveys between 2008-2013. Regression modeling analyses involved 566 common, 263 Risso’s and 96 bottlenose dolphin groups and 115 fin, 78 gray and 62 blue whale groups. Species body size, group size, and MNND were correlated. Group size, MNND and behavior state were significantly influenced by species, sub-region, call presence, time of day/year, water depth, and/or slope/aspect. Group size was significantly larger for common dolphin compared (277.1) vs. bottlenose (19.2) and Risso’s (18.4) and with call presence. MNND was significantly less for commons (6.1 BL), Risso’s (6.7). Group size was larger for grays (2.2) vs. fins (1.6) and blues (1.7). Gray MNND (1.5) was significantly closer than fins (5.1) and blues (12.6). Risso’s groups were observed resting 13 times more often (38%) than commons (3%). Smaller group size and more daytime resting of Risso’s match presumed nocturnal foraging patterns of this species. Larger groups are associated with higher population density and higher density of schools. Thus, as expected, larger, tighter common dolphin and gray whale groups match presumed higher predation pressure associated with smaller relative body size. Results indicate species ecological divergence in the same habitat in response to differing predation pressure and food resource availability as predicted by terrestrial mammal group-living patterns. Data lend insight into baseline behavior and ecological triggers influencing behavior. This information is needed to differentiate potential impacts of anthropogenic sources. Larger group size benefits included reduced predation pressure and improved prey detection/mate access, at the risk of increased resource competition.

**METHODS**

Sampling Methods
- Aerial surveys
- Southern California
- 2008 - 2013

**RESULTS**

- 72,467 km aerial surveys
- 1,210 cetacean sightings
- Common dolphin
  - Group size larger than Risso’s & bottlenose dolphins
  - Never seen alone
- Risso’s dolphin
  - Group size smaller than commons
  - Rarely seen alone
  - No significant differences bottlenose & Risso’s

**SUMMARY**

- Cetaceans are hardly ever “individuals” but instead socially complex groups of animals
- A critically important that an evaluation of disturbance includes evaluation of GROUP BEHAVIOR and SOCIAL INTERACTION e.g., distance apart, rate of affiliation/dissociation, potential changes or反应 of vocalisations, etc.
- Changes in overall group behavioral patterns and social disruption are important as potential responses to anthropogenic activities.

**CONCLUSIONS - Hypotheses are supported**

- Between species exhibit ecological division in the same habitat in response to differing predation pressure and food resource availability as predicted by terrestrial mammal group-living patterns.
- As cetacean body size increase,
  - Group size & cohesion decrease
  - Individuals are more likely to occur alone
  - Thus, as expected, blue whales (largest cetacean) occur in small, dispersed groups and are significantly more likely to occur alone than all other (medium) cetaceans
  - This correlation continues with other species as species body size decreases
- Larger, tighter common dolphin and gray whale groups match presumed higher predation pressure associated with smaller relative body size (mass, size and duration variables, respectively).
- Risso’s whales predation on small, dispersed dolphins and sharks is common in California waters.
- Sharpoint predation on small, dispersed dolphins and sharks.
- Larger group size benefits include reduced predation pressure and improved prey detection/mate access, at the risk of increased resource competition.
- Data lend insight into baseline behavior and ecological triggers influencing behavior. This information is needed to differentiate naturally-occurring behavior vs. potential impacts of anthropogenic sources.