

Background information

The beluga whale (*Delphinapterus leucas*) is a medium-sized, toothed cetacean, or whale, that is highly adapted to life in Arctic and sub-Arctic waters. Beluga whales are capable of traveling great distances and surviving in rigorous environments, and their gregarious nature suggests that they are capable of forming complex societies (Robeck et al. 2005). In wild belugas, it is common for females and calves to make up pods that are separate from those of the adult males, with adults of the two sexes only interacting during the mating season (Glabicky, DuBrava, and Noonan 2010). Studies based on measurements of reproductive hormone levels suggest that the mating season for belugas typically occurs between January and May (Katsumata et al. 2006; Robeck et al. 2005). Belugas are known to be highly vocal animals, with sounds ranging from high-frequency whistles to squeals, clicks, and chirps (Belikov and Bel'kovich 2006). It has been shown that the frequency of underwater vocalization is associated with behavioral activity (Sjare and Smith 1986), with clicks in particular occurring more frequently during social interactions (Panova et al. 2012).

The data for the described activities were collected during observations of selected behaviors of the resident beluga whales (Figure 1) at Mystic Aquarium. The belugas are housed in a common outdoor exhibit with three

distinct, yet integrated pools. The outdoor location allows the animals to perceive external environmental cues such as day length, air temperature, and season, which may influence their behaviors. Social behaviors monitored for this study were vocalization, biting, touching, chasing, and jaw-popping. *Jaw-popping*, as observed by the lab group, was defined as a rapid drop of the lower jaw with the mouth held open resulting in a quick "pop" of the jaw. The designated behaviors were recorded using a tally system on data sheets similar to Figure 7. Each whale was monitored for a five-minute interval or focal period, and then observations rotated to another whale, continuing this pattern throughout the day. Only whale-to-whale behaviors in the absence of professional trainers were included here in order to focus solely on the social interactions between whales. There was also a unique opportunity to document the effect of changing group composition on social behaviors between whales with the introduction of Naluark (Male B) to the exhibit in October 2011.

