



# Research Update



In 2007 Whale Trust supported studies on humpback whale song (PI Jim Darling) and female mating strategy and behavior (PI Meagan Jones) in Hawaii, and provided a second year of assistance to a study of humpback whales on a breeding ground in the northern Philippine Islands (PI Jo Marie Acabas) and to graduate student, Elisa Girola.

## FUNCTION OF THE HUMPBACK WHALE SONG

This study, underway since 1996, has investigated the attributes, behavior and interactions of singers leading to proposals of the role of song in humpback breeding behavior. This research has included genetic determination of the sex of whales that joined singers (males), measuring the relative size of singers for correlation with their song composition, and a study of the interactions of neighboring singers. The 2007 field effort focused on completion of song playback experiments started in 2005. This playback work, where a song (chosen by the researcher) is played back to a singer with an underwater speaker and reactions measured is one test of the hypothesis that the song plays a role in organizing male relations on the breeding ground.

This playback study arose from observations of the variability in natural interactions between neighboring singers on the breeding ground. At times one singer stopped singing and joined its neighbor, at other times they apparently ignored each other, or increased distance between each other. The playback study was set to determine if the factor that determined the type of interaction (or lack of one) was the similarity or difference of the two songs. Therefore, either a similar or different song was played-back to a singer and the singer's reaction measured.

Over three seasons a total of 23 playback trials were conducted, leading to a range of reactions that mirrored the observations of natural behavior. Some singers immediately stopped singing and joined the playback boat, others appeared to ignore the playback entirely and still others increased their distance. The analysis of the reactions is currently underway; preliminary indications were that the whales were more likely to join the playback boat when a similar song is played – this result is a compelling reason for further, more detailed study.

This phase of the playback study will be presented at the Biennial Conference for the Biology of Marine Mammals in South Africa in November 2007. The plan for the 2008 season is to continue working on isolating which factor in the song determines how males interact with each other.

## DOES SONG VARY WITH SIZE (AGE) OF SINGER?

One of the primary hypotheses on song function over the last two decades is that it is a male display to establish or maintain dominance order between competing males. If this is correct, the prediction is that there should be differences in the song that reflect individual male status. To test this idea, several years were spent estimating the relative size of individual singers by measuring the size of their tail flukes, and recording the song of each.

The result would allow comparison of the songs of smaller singers versus larger singers to test this hypothesis of dominance.

In 2005, Elisa Girola, a student from the University of Trieste, Italy, contacted us wishing to study humpback whale song as part of a graduate project. We suggested she compare the songs we had collected of larger and smaller whales. With a huge amount of detailed song analysis, looking at many different characteristics of the sounds themselves and composition of the songs, she essentially found no clear differences between the songs of smaller and larger singers. We must be cautious here and add that the sample sizes for comparison were small (as the field work of measuring singers led to a relatively small sample of clearly small and large animals). The results of this study are quite important in that they do *not* support the hypothesis that the song is a display of dominance or reflective of the size of the singer.

## FEMALE MATING STRATEGY AND BEHAVIOR

The 2007 season was the fifth, and final year of fieldwork towards Meagan's Ph.D. dissertation investigating female behavior on the Hawaiian breeding grounds. Over the last few years this study has involved genetic sexing of adults in pairs to determine the presence of females, measurement of flukes of whales to estimate size and age of individuals in female/male pairs, random surveys to determine male-female association patterns, and extended follows of individual females to determine behavior patterns and interactions with males over time. The focus this year was on conducting playback experiments, which involved the playback of 'social' sounds (i.e., sounds made by multiple males while actively chasing a female) to females in different stages of the reproductive cycle (i.e., females with and without a calf).

Over the season a total of 29 playback trials were conducted. The expectation was that females without a calf (i.e., those in Hawaii presumably to mate) would react differently than those nursing a newborn calf. Analysis is currently underway to determine if this prediction was correct, but initial observations suggest that reproductive status is a good predictor of how females respond and behave around males during the breeding season.

Meagan will be spending the next year or more completing analyses and writing her dissertation, which will both fulfill requirements of the Ph.D. program and lead to several scientific papers for Whale Trust.

## PHILIPPINE HUMPBACK WHALES

Just a few years ago, no one had even heard of a humpback whale breeding assembly in the northern Philippine, Babuyan Islands. It had not been documented historically, in whaling records, or the scientific literature. Then, researchers in the region, with WWF – Philippines, discovered this breeding ground and set out on the task of defining it, determining abundance and behavior of population, and its relationship to humpback populations in other regions of the Pacific.

Whale Trust has been able to assist on the funding of the study

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led by Jo Marie Acebes for the past two years. During that time, individual identification and song recordings have, among other things, helped with the definition of the population – with numerous matches made to Japanese breeding areas (which in turn have matches to Hawaii), and comparison of song between Hawaii and Philippines indicating some degree of association between the regions. In addition this study supplied a sample of songs to Jim Darling for a three-way comparison between Philippines, Japan and Hawaii as part of the song function study.

The 2006 and 2007 season in the Philippines documented occurrence of dynamite blasts in the breeding area

and their potential impact on the humpback whales. The dynamite is used by fishermen on the nearby reefs and shipwrecks. The explosions are clearly heard on the song recordings, although at this time the sample is not sufficient to determine impact. Jo Marie, armed with recordings, attended an international conference on the effects of sound on aquatic life in August to ask for assistance with this issue.

The first paper describing the Philippine assembly of humpback whales will be published in the *Journal of Cetacean Research and Management* in the next few months.