

EARTHWATCH FIELD REPORT 2004

Project Title: Dusky Dolphins of New Zealand

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Research Site(s): Kaikoura and Marlborough Sounds
South Island, New Zealand
About 43°S Lat.
About 173°E Long.

Scientific names of primary species being studied: *Lagenorhynchus obscurus*

Key Research Objectives:

- 1) Describe social behavior of dolphins in two different habitats
- 2) Describe foraging strategies in two different habitats
- 3) Assess behavior and habitat use patterns of dolphins relative to tourism activities
- 4) Assess behavior and habitat use patterns of dolphins relative to mussel farming
- 5) Compare strategy shifts of dolphins as they move between habitats

Data Collection and Results

a) Give a concise account of the data you have collected during the past field season.

In total, 62 days were spent on the water and 28 days at the hilltop station in the Kaikoura area; in French Pass, 10 days were spent on the water, and 8 on the hilltop. Photographic work conducted during our boat-based research was a huge success. We spent well over one hundred hours with dolphin and whale groups and managed to record data on over 250 groups of cetaceans, and took thousands of photos. With such a large quantity of dolphins in our study area, volunteers were essential in spotting marked fins and recording specific data for every group encountered. After sorting through the raw data and cataloguing the good quality photos, we began matching our new photos to previous photos taken over the past seven years. This year in Kaikoura,

we had 1,228 good quality photos with marked fins. After many hours of fin matching, our volunteers made an incredible total of 328 confirmed matches of the 1,228 good quality photos taken.

b) What progress have you made towards achieving your original objectives?

Quite a bit. We learned that some of the dolphins that feed at night in deep waters of Kaikoura in summer, spend their time feeding mainly in day-time in shallow waters of Admiralty Bay. Thus, we are learning about social and foraging strategies in both environments, how dolphins adapt to human use of both environments, and the interactional behavior and possible differences in social/sexual strategies among environments.

c) Please provide a summary of your results.

Dusky dolphins are amazingly adaptable social mammals, with great flexibilities in foraging, social/sexual, and habitat use strategies. We now need to ascertain more about relationships, gender and age role playing, and details of dolphin lives.

Significance/Benefits of Research

a) What is/are the significance/benefits of your research at the following levels?

- **local**

We are interfacing with the local communities, at the economic levels of adults and at the instructional and heuristic level with school-age children. This is a two-way road, with helpful new insights gained by all groups.

- **national**

We are helping the New Zealand Department of Conservation and the Marlborough District Council set rules and regulations relative to tourism on dolphins in the first case, and numbers and placement of mussel farms in the second case.

- **international**

Our work is helping to structure international regulations on tourism, and there is the potential to use our results (not yet realized) for management considerations relative to aquaculture in dolphin habitats.

b) How do your findings contribute to issues of sustainability?

We hope that our "advice" from targeted behavioral studies can help not just the dolphins but their ecosystems survive in better, wisely-regulated, fashion

Dissemination of Results

a) Have you provided details of results from your research to or within:

- **Scientific papers**

- 2000 Araabi, B.N., N. Kehtarnavaz, T. McKinney, G. Hillman, and B. Würsig. A string matching computer-assisted system for dolphin photo-identification. *Annals of Biomedical Engineering* 28:1269-1279.
- 2001 Araabi, B.N., N. Kehtarnavaz, G. Hillman, and B. Würsig, Evaluation of invariant models for dolphin photo-identification, Published Proceedings of 14th IEEE Computer-Based Medical Systems Symposium, Bethesda, MD, July 2001.
- 2001 Würsig, B. and P.G.H. Evans. Cetaceans and humans: Influence of noise. pp. 565-587. In: *Marine Mammals: Biology and Conservation*, ed. by P.G.H. Evans and J.A.Raga. Kluwer Academic/Plenum Press, N.Y.
- 2002 Perrin, W.F., B. Würsig, and H. Thewissen (Eds.). *The Encyclopedia of Marine Mammals*. Academic Press. 1414 pp. [Book].
- 2002 Araabi B.N., N. Kehtarnavaz, M. Yeary, G. Hillman, B. Würsig, Locating an affine/projective invariant identifier patch on an image, Published Proceedings of the IEEE Southwest Symposium on Image Analysis and Interpretation, Santa Fe, April 2002.
- 2002 Würsig, B. and G.A. Gailey. Marine mammals and aquaculture: Conflicts and potential resolutions. pp. 45-59. IN: *Responsible Marine Aquaculture*, ed. by R.R. Stickney and J.P. McVey, CABI Publishing, Oxon, UK.
- 2002 Van Waerebeek, K. and B. Würsig. Pacific white-sided dolphin and dusky dolphin. pp. 859-861. IN: *The Encyclopedia of Marine Mammals*, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.
- 2002 Würsig, B. Bow-riding. pp. 131-133. IN: *The Encyclopedia of Marine Mammals*, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.
- 2002 Würsig, B. Courtship behavior. pp. 299-302. IN: *The Encyclopedia of Marine Mammals*, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.
- 2002 Würsig, B. Ecology, Overview. pp. 367-370. IN: *The Encyclopedia of Marine Mammals*, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.
- 2002 Würsig, B. Fluking. pp. 446-448. IN: *The Encyclopedia of Marine Mammals*, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.

- 2002 Würsig, B. Intelligence and cognition. pp. 628-637. IN: The Encyclopedia of Marine Mammals, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.
- 2002 Würsig, B. Leaping behavior. pp. 689-692. IN: The Encyclopedia of Marine Mammals, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.
- 2002 Würsig, B. Playful behavior. pp. 942-945. IN: The Encyclopedia of Marine Mammals, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.
- 2002 Würsig, B. and W.J. Richardson. pp. 794-802. IN: The Encyclopedia of Marine Mammals, ed. by W.F. Perrin, B. Würsig, and H. Thewissen. Academic Press, San Diego, 1414 pp.
- 2003 Markowitz, T.M., A.D. Harlin and B. Würsig. Digital photography improves efficiency of individual dolphin identification. *Marine Mammal Science* 19:217-223.
- 2003 Hillman, G.R., B. Würsig, G.A. Gailey, N. Kehtarnavaz, A. Drobyshevsky, B.N. Araabi, H.D. Tagare, and D. Weller. Computer-assisted photo-identification of individual marine vertebrates: A multispecies approach. *Aquatic Mammals* 29:117-123.
- 2003 Markowitz, T.M., A.D. Harlin and B. Würsig. Digital photography improves efficiency of individual dolphin identification: A reply to Mizroch. *Marine Mammal Science* 19:608-612.
- 2003 Harlin, A.D., T. Markowitz, C.S. Baker, B. Würsig, and R.L. Honeycutt. Genetic structure, diversity, and historical demography of New Zealand's dusky dolphin (*Lagenorhynchus obscurus*). *J. of Mammalogy* 84:702-717.
- 2003 Markowitz, T.M., A.D. Harlin, B. Würsig, and C.J. McFadden. Dusky dolphin foraging habitat: Overlap with aquaculture in New Zealand. *Aquatic Conservation: Marine and Freshwater Ecosystems*. 13:000-000.

- **Management plans and reports**

We have completed 6 reports in the past three years, for the New Zealand Department of Conservation and the Marlborough District Council. Since we publish our reports as soon as feasible, we refer to the published literature, above.

- **Presentations**

There have been quite a few of these, but most recently at the Taiwan Cetacean Society, as a presented paper on the effects of tourism on dolphins and whales, and ways to mitigate adverse effects. The audience was students, government employees, and academics, i.e. professors and others. About 150 people attended.

- **Popular articles or films**

The only film I have helped make the past three years is the IMAX movie "Dolphins", for which I was senior advisor. Dusky dolphin foraging strategy figured large in this educational movie (and it was nominated for an Oscar as best scientific movie)

- **Books, chapters, illustrations**

The book I recently co-edited that was helped by our dusky dolphin work is "The Encyclopedia of Marine Mammals", by W. Perrin, B. Würsig, and Hans Thewissen, Academic Press, 1414 pages, 2002.