

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY) 01/07/2004		2. REPORT TYPE Final Report		3. DATES COVERED 1 May 2001 - 31 Dec. 2002	
4. TITLE AND SUBTITLE Building a global database of Marine Beaked whale occurrence and Distribution.			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER N00014-02-1-02S3		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Colin D. MacLeod			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Aberdeen, King's College Aberdeen, UK.			8. PERFORMING ORGANIZATION REPORT NUMBER 0		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of Naval Research, 800 N. Quincy St, Arlington, VA 22217-5000 USA.			10. SPONSOR/MONITOR'S ACRONYM(S) ONR		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Distribution Unlimited DISTRIBUTION STATEMENT A					
13. SUPPLEMENTARY NOTES Approved for Public Release Distribution Unlimited			20040722 028		
14. ABSTRACT The occurrence and distribution of beaked whales throughout all waters of the world was investigated through the collation of as many beaked whale distribution records as possible. In total approximately 5000 records were identified and entered into a database. These records were then used to investigate the known and probable distribution of each beaked whale species and to identify known 'hotspots' for beaked whales around the world. This information is essential for assessing and mitigating possible anthropogenic impacts on beaked whales.					
15. SUBJECT TERMS Beaked whales, Distribution of Marine animals, Hotspots.					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF		18. NUMBER
a. REPORT	b. ABSTRACT	c. THIS PAGE	ABSTRACT		OF PAGES
					19a. NAME OF RESPONSIBLE PERSON
					19b. TELEPHONE NUMBER (Include area code)

Final Report

GRANT #: N00014-020109253

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GRANT TITLE: Building a Global Database of Beaked Whale
Occurrence and Distribution

AWARD PERIOD: 1 May 2001 - 31 December 2002

OBJECTIVE: To investigate the occurrence and distribution of beaked whales throughout the world's oceans and identify known hotspots for beaked whales.

APPROACH: Beaked whale distributional records were identified from published sources, geo-referenced and entered into an access database along with information on the type of record, species, number of animals, age class of animals, body size and other biological information. These records were then augmented by unpublished information from public and private databases to provide a comprehensive and up-to-date view of the occurrence and distribution of beaked whales. A geographic information system (GIS) was then used to verify each record and investigate patterns of beaked whale occurrence and distribution.

ACCOMPLISHMENTS: Approximately 5000 records of beaked whale occurrence were collated into the database and this currently constitutes the largest database of beaked whale distribution records currently available. These records have been used to update the understanding of the distribution of each beaked whale species based on the currently available information and to identify 23 'hotspots' for beaked whales around the world. In addition, areas where little beaked whale is currently available for beaked whales were also identified, for example in the eastern tropical Atlantic. Finally, a number of modeling techniques were investigated that could utilize the data held in this database to produce predictive models of beaked whale distribution for areas where little actual information is currently available.

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CONCLUSIONS: Despite the current perception of a lack of information about beaked whales, it was possible to draw together a large, and previously disparate, number of distributional records. The resulting database has proved very useful in clarifying the distribution of beaked whale species and identifying 'hotspots' where beaked whales may be particularly vulnerable to anthropogenic impacts. Further research may allow presence-only databases such as this to be used to model the distribution of beaked whales in areas where there is currently little available information.

SIGNIFICANCE: This study provides information on the occurrence and distribution of beaked whales that is essential for assessing and mitigating possible anthropogenic impacts upon them.

PATENT INFORMATION: Not applicable

AWARD INFORMATION: No awards have been received.

PUBLICATIONS AND ABSTRACTS (for total period of grant):

1. MacLeod, C.D. and Reid, J.B. (2003) Distributions, Migrations and Bottlenecks: Implications for Anthropogenic Impacts on Beaked Whales on the Atlantic Frontier. Presented at the 17th European Cetacean Society Annual Conference, Las Palmas de Gran Canaria, 9 - 13th March 2003.
2. MacLeod, C.D. (2003) Insights into the Determination of Beaked Whale Hot Spots through the Development of a Global Database. Presented at the Active Sonar Workshop at the 17th European Cetacean Society Annual Conference, Las Palmas de Gran Canaria, 9 - 13th March 2003.
3. MacLeod, C.D. (2003) Insights into the Determination of Beaked Whale Hot Spots through the Development of a Global Database. Presented at the Environmental Consequences Of Underwater Sound (ECOUS) meeting, San Antonio, Texas, USA , 12-16th May 2003.
3. MacLeod, C.D. (2004) Niche Partition in Beaked Whales in the North-east Atlantic. Presented at the 15th Biennial Conference on the Biology of Marine Mammals, Greensboro, North Carolina, 14th - 19th December 2003.
4. MacLeod, C.D., Pierce, G.J. and Santos, M.B. (2004) Geographic and temporal variations in strandings of beaked

whales (Ziphiidae) on the coasts of the United Kingdom and the Republic of Ireland 1800 - 2002. *Journal of Cetacean Research and Management* 6:79-86.

5. MacLeod, C.D., Perrin, W.F., Pitman, R., Barlow, J., Ballance, L., D'Amico, A., Gerrodette, T., Joyce, G., Mullin, K.D., Palka, D.L. and Waring, G.T. (2004) Known and Inferred Distributions of Beaked Whale Species (Family Ziphiidae; Order Cetacea). Background paper for Marine Mammal Commission meeting on anthropogenic noise and beaked whales, Baltimore, USA 13-16th April 2004.

6. MacLeod, C.D. and Mitchell, G. Beaked Whale 'Hotspots': An Additional Approach for Conserving the Least Known Family of Large Mammals. Submitted to *Biological Conservation*.