

Whaling as Science

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In an open letter published last year in the *New York Times*, 21 distinguished scientists (including three Nobel laureates) criticized Japan's program of scientific research whaling, noting its poor design and unjustified reliance upon lethal sampling. In a recent Forum article in *BioScience*, Aron, Burke, and Freeman (2002) castigate the letter's signers and accuse them of meddling in political issues without sufficient knowledge of the science involved in those issues.

As members of the Scientific Committee (SC) of the International Whaling Commission (IWC), we can attest that the signers of the open letter correctly summarized criticisms made by researchers very familiar with Japanese scientific whaling. One such critique (Clapham et al. 2002) was presented and discussed last year at a meeting of the SC. It was authored by SC members representing a broad range of countries, yet mention of this paper and others like it was absent from Aron and his colleagues' commentary, betraying a selectiveness that pervades their article. The authors quote lines from SC reports to support their contention that the IWC regards scientific whaling as valuable, but they fail to acknowledge many other sections that are highly critical of the Japanese program (IWC 1998, 2001, 2003).

Japan's scientific whaling program in the North Pacific (JARPN) was originally described as a feasibility study, but it included no performance measures by which to judge its success or failure. To no one's surprise, it was judged "suc-

cessful" by Japan, and the full program (JARPN II) began in 2002. JARPN II involves annual catches of 150 minke whales, 50 Bryde's whales, 10 sperm whales, and 50 sei whales. It is described as a "long-term research programme of undetermined duration" and gives as its primary objective studies of "feeding ecology" and, secondarily, investigations of "environmental pollutants... and stock structure" (Government of Japan 2002).

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Regarding the primary objective, we note that while the IWC has developed a revised management procedure (RMP) for future management of commercial whaling, it is not ecosystem based. IWC does not employ ecosystem-based management; consequently, none of the information derived from the feeding ecology study is relevant to the manner in which IWC assesses and manages whale populations.

Other fundamental problems of the JARPN II study include a lack of testable hypotheses or performance measures; inappropriate use of ecosystem models and failure to include sensitivity analyses and key data on other

ecosystem components; selective or inappropriate use of data or methods in estimating whale abundance; unnecessary reliance on lethal sampling; inappropriate geographic sampling for population structure analysis; and unrealistic assessments of the effect of the proposed catches on the populations concerned (some of which may be depleted, and for which no adequate assessment of current status has been undertaken). For full details, see Clapham and colleagues (2002), available at www.nefsc.noaa.gov/psb/pubs/jarpn2.pdf.

Overall, JARPN II presumes, on an almost a priori basis, that whales (not humans) are primarily responsible for worldwide declines in fish stocks and ignores the immense complexities inherent in marine ecosystems. In short, it is difficult to escape the conclusion that JARPN II exists to "demonstrate"—all data to the contrary notwithstanding—that whales eat too much fish and therefore should be culled by more whaling. Significantly, when the IWC held a workshop last year to discuss modeling approaches to this issue, the Government of Japan refused to send any of its scientists.

This obstructiveness is not uncommon. Japan has also refused—contrary to common practice in other international management contexts—to allow independent analysis of its raw data. Despite repeated formal requests, obtaining anything more than data summaries, which are unsuitable for analysis, has to date been impossible. Furthermore, Japan has refused to

participate in an IWC working group established to investigate illegal Japanese whaling catches that are known to have occurred in the North Pacific as recently as 1987 (i.e., *after* the IWC passed a moratorium on whaling).

The Japanese program in the Antarctic (JARPA) has similar problems. JARPA has been conducted for 16 years and has to date killed over 5900 minke whales. Yet as was noted in last year's SC discussions, the value of JARPA's work to management is certainly not apparent in its publication record, which is remarkably poor for a scientific effort on this scale. Aron and colleagues' pointing to "over 150 articles" resulting from JARPA is highly misleading: The list to which they refer readers (see www.whalesci.org/contribution) includes only a single paper (Kishino et al. 1991) that concerns IWC assessment needs and that is published in an international peer-reviewed journal; 19 similar papers were published by IWC. The remaining 137 "publications" consist of cruise or progress reports (7), unpub-

lished IWC papers (58), SC meeting reports (14), Japanese theses (6), conference presentations (40, many of which repeat the same unrefereed and irrelevant results in multiple forums), and peer-reviewed articles (12) on topics of no value to management (e.g., "post-thawing viability of frozen spermatozoa of male minke whales"). JARPA's failure to publish in international refereed journals says much about the quality and motives of its science.

Today, so little of any significance to IWC management can be obtained only from whaling catches that it is impossible to justify killing animals on this basis, particularly given the many thousands of whaling catch samples already analyzed or archived.

The unnecessary reliance on lethal sampling is a major issue in this debate. The point is not that lethal sampling

cannot contribute anything to knowledge of whale populations, or even that there are no data which cannot be obtained by other means; one can always find scientific value in carcasses. Rather the issue is that lethal methods are not required to obtain information needed for population assessment. Today, so little of any significance to IWC management can be obtained only from whaling catches that it is impossible to justify killing animals on this basis, particularly given the many thousands of whaling catch samples already analyzed or archived. Moreover, nonlethal techniques often provide better data at less cost, to both budget and animals. For example, population structure is most reliably studied with genetic analysis, which is routinely conducted using tissue from skin biopsies (Palsbøll et al. 1997); lethal sampling is not required for this work. Furthermore, because biopsies can be taken and processed quickly (unlike catches), a biopsy program would substantially increase sample size and analytical power. Aron and

colleagues' claim that logistical difficulties preclude such sampling is baseless; if a whale can be hit with a harpoon, the same target can just as easily be struck with a biopsy dart.

The provision in the International Convention for the Regulation of Whaling that allows member countries to kill whales for research was formulated at a time (the 1940s) when few viable alternatives to lethal sampling existed. Catches under scientific permit provided a means to obtain limited sample sizes that might be used to address specific management issues. In contrast, JARPA and JARPN II appear to be long-term, open-ended whaling programs that keep an industry operating (note also that Japan's Institute of Cetacean Research is primarily funded by sales of whale products from scientific catches).

A key point here is that the scientific whaling provision does not specify a method for calculating sample sizes, nor does it impose any upper limit on catches. As was noted by Clapham and colleagues (2002), it is unlikely that Japan would be authorized to kill the number of whales currently being taken if these "research" catches were calculated under the RMP (the accepted IWC method for specifying catch quotas). With scientific whaling, Japan has the best of both worlds: While waiting for the IWC to implement a scheme allowing commercial whaling to resume, Japan can continue to kill whales, and it can do so at levels that would not be permitted using IWC methods.

In his editorial, Timothy Beardsley paraphrases Aron and colleagues' admonitions and suggests that scientists should "take extraordinary care to acknowledge differences of opinion on science." It is worth asking just how bad science has to be before its quality ceases to be a matter of opinion, by any reasonable standard of independent judgment. Many SC members have contended that Japan's scientific whaling program is so poor that it would not survive review by any major independent funding agency (e.g., the European Commission). We repeat here a previous challenge to the Government

of Japan to submit its research whaling proposals to such third-party review, in which—unlike at the IWC Scientific Committee—a proposal's authors do not play a major role in the writing of the resulting evaluation.

Beardsley's editorial notes that researchers "are right to speak out if they believe commercial activities are being misrepresented as science." In our view, there has rarely been a more egregious example of this misrepresentation than Japan's scientific whaling program and the article by Aron and colleagues that seeks to defend it.

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