UNDERUSE AND MISUSE OF DATA FROM BEACHED BIRD SURVEYS

FRANCIS K. WIESE[1] & KIM ELMSLIE[2]

[1]*North Pacific Research Board, 1007 West 3rd Avenue, Suite 100, Anchorage, Alaska, 99501, USA (francis.wiese@nprb.org)*
[2]*International Fund for Animal Welfare, 1 Nicholas Street, Suite 612, Ottawa, Ontario, K1N 7B7, Canada*

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INTRODUCTION

Beached bird surveys continue to be one of the main mechanisms by which marine oil pollution is monitored, and one of the earliest signals that an oiling event, small or large, has taken place. Beached bird surveys have been or are currently conducted in a number of countries around the world (Canada east coast: Wiese & Ryan 2003, Campbell 2005; Canada west coast: Burger 1993, O'Hara & Morgan 2006; USA west coast: Speich & Wahl 1986, Bodkin & Jameson 1991, Nur *et al.* 1997, Lyday *et al.* In press; USA east coast: Simons 1985; Argentina: Perkins 1983, Boersma 1995, Harris *et al.* 2006; Japan: Ohata *et al.* 1993; New Zealand: Veitch 1982; Australia: Raaymakers 1995; South Africa: Avery 1989; North Sea: Dahlmann *et al.* 1994; UK: Cadbury 1978, Stowe & Underwood 1984, Heubeck 1995; Shetland Islands: Heubeck 2006; Denmark: Joensen & Hansen 1977; Belgium: Kuyken 1978; Netherlands: Camphuysen 1989, 1998; Germany: Averbeck *et al.* 1992; France: Debout 1984, Raevel 1990; Lithuania: Vaitakus *et al.* 1994, Žydelis & Dagys 1997, Žydelis *et al.* 2006). Despite regional successes in reducing chronic oil pollution (e.g. Camphuysen 1998, Camphuysen & Heubeck 2001), oiled birds continue to wash ashore, and many unmonitored regions around the globe likely face similar problems.

Beached bird surveys are conducted either to help document wildlife mortality after a large oiling event or as part of regular (monthly, weekly) monitoring programs to document trends in chronic oil pollution. The first objective is reactive and restricted in time and space; the timing is crucial for achieving valid mortality estimates and overall damage assessments. The second objective can be both proactive and reactive. It is long-term, and it requires a rigorous and systematic approach for the duration of the program. Although the immediate goal of surveys is to collect data on beach conditions and bird casualties, one overall aim should be to quantify the problem in ways that help to increase awareness and raise regional, national, and international standards for dealing with marine oil pollution. That broader objective is where programs often fall short. Most of them quantify the number of birds found per kilometer of coastline and the proportion of birds found that are oiled ("oiling rate"), they generally do not advance knowledge any further than that. Thus beached bird surveys remain primarily a monitoring tool, when they could also be used as a tool for change.

A TOOL FOR CHANGE

To make beached bird surveys a tool for change rather than just a monitoring exercise, the data collected should be augmented in three important ways:

- Determine factors responsible for trends in the data, or at least establish whether a given trend reflects a change in clean or oiled birds. See Camphuysen (1989, 1998), Wiese & Ryan (2003), and Wiese & Robertson (2004) for a discussion of factors such as wind, temperature, distribution, and hunting pressure that influence the numbers of clean and oiled birds found on beaches.
- Determine as accurately as possible the total number of birds affected—managers and policymakers want an extrapolated number, not just an oiling rate or the number of birds found. Without an overall mortality estimate, the true scope of the problem will never be confronted (see Wiese & Robertson 2004 on determining seabird mortality from chronic pollution). If accurate estimates can be derived, then valid assessments of spatial and temporal trends in mortality and contributing factors can also be determined, permitting comparisons between various regions of the world.
- Determine the impact of oil pollution on seabird populations—a final step that is difficult to achieve and roundly debated even after large, well-documented spills. Unequivocally linking oil pollution and fluctuations in population sizes is difficult because of uncertainties in mortality estimates, a dearth of baseline data, imprecision in censusing seabird colonies, the existence of other anthropogenic pressures occurring simultaneously and natural variation (Wiese *et al.* 2004). Still, the need for accurate mortality estimates and assessment of population-level impacts cannot be overstated.

Unfortunately, these steps—particularly the latter two—are missing in most places, a situation that has long been a major hindrance to policy change. As noted, the problem is measured regionally, but it is global in scale. If adequate efforts were made to determine oiled seabird mortality in places where rigorous beached bird surveys are now conducted, the ability of scientists to influence the global policies of the International Maritime Organization (IMO), and consequently of the countries signatory to the International Convention for the Prevention of Pollution from Ships (MARPOL), would be strengthened significantly.

UNDERUSE AND MISUSE OF SURVEY DATA

To achieve the identified goals, more data need to be collected and fuller advantage needs to be take of data collected independently that can inform the patterns determined from current scientific observations.

For example, information on birds should include morphometrics, age, sex, freshness (scavenging rate), cause of death, persistence and detection probabilities. Factors influencing deposition, such as wind, tides and currents, can generally be quantified using data from outside sources (e.g. weather service, universities). Combined with information about the distribution and abundance of birds at sea, such data help to elucidate factors influencing mortality levels and trends. Past studies incorporating this approach effectively focused

on temperature, wind, oceanography, shipping (number of vessels transiting an area), fishing activities and hunting (e.g. Kampp 1991, Camphuysen 1998, Chardine 1998, Wiese *et al.* 2004).

Clearly, many of the tools necessary to achieve reduced chronic oil pollution and fewer seabirds affected exist, and yet they are often not fully applied. Still worse are instances in which data are misused or misinterpreted, either because of a limited knowledge of the physical and biologic processes involved, or willfully because of political motivations. Thus, reports on the total numbers of birds encountered, numbers of birds found per kilometer or the number of oil slicks detected, including trends in data that were collected with inconsistent methodology, have all been used to advance political agendas. Deliberations generally occur in the absence of oversight by either the public or the scientists who collected the data. It is thus the responsibility of scientists to present their information in a manner that precludes misinterpretation, by incorporating all available evidence to clarify and corroborate observed patterns and trends.

OBSTACLES TO CHANGE

Paradoxically, science itself can be an obstacle to changing public policy, and misuse of scientific results by individuals unable or unmotivated to interpret the data correctly should be anticipated. Other obstacles include limited public awareness, political interests and legislative restrictions. Those issues are largely outside the realm of science, but scientists can no longer afford to ignore them. It is vital that scientists understand where their information is being communicated and how to increase the effectiveness of the message. By becoming an integral part of awareness campaigns—even by lobbying—scientists can enhance the credibility of their message and help to guard against misinterpretation. Such involvement need not sacrifice scientific integrity or objectivity, and its pursuit is necessary in today's political climate.

LEGAL REGIMES

Many laws and agreements govern how nations deal with the deliberate dumping of oil and the occurrence of oiled seabirds. In Canada, these instruments include MARPOL, the *Canada Shipping Act,* the *Canadian Environmental Protection Act,* the *Migratory Bird Convention Act,* the *Fisheries Act,* the *Species at Risk Act,* the *Oceans Act* and the Offshore Petroleum Boards.

Most prosecutions of oil polluters in Canada are carried out under the Canada Shipping Act, which deals primarily with poor shipping practices. It does not support direct charges because of affected wildlife or deleterious effects on the marine environment, as might occur with some of the other acts mentioned. There is, however, no reason that an offender cannot be charged under several acts simultaneously, as has been successful in many cases in the United States (e.g. the *Anax Liberian* in 1998). Effective methods of deterrence for marine polluters include, besides high prosecution rates, the presence of aerial surveillance, detention of ships and substantial fines.

In Atlantic Canada, little aerial surveillance has been conducted in relation to a vast area of jurisdiction, vessels have only rarely been directed to port and detained and, until recently, imposed fines have been low by international standards, making them effective deterrents to pollution. Each of these shortcomings has contributed to a failure to stop or significantly curtail the deliberate dumping of oil in Canadian waters.

Fortunately, some of this changed for Canada when Bill C-15 (www.ec.gc.ca/press/2005/050519_n_e.htm), containing amendments to the Migratory Birds Convention Act and the Canadian Environmental Protection Act, was passed on 19 May 2005. Successful passage of the bill is a credit to the many individuals and organizations throughout Canada who worked for decades on the issue of chronic oil pollution. Now, more than 50 years after the problem of oiled seabirds on Newfoundland beaches was identified (Tuck 1961), the law supports enforcement out to the 200-mile limit; increases funds for aerial surveillance; makes it possible to arrest and charge captains, crew and owners of polluting vessels; and imposes higher fines.

How the new law will be implemented and how effective it will be in reducing seabird deaths attributable to the deliberate dumping of oil off the Newfoundland coast from the currently estimated level of 300 000 annually (Wiese & Robertson 2004) are open questions that only time will answer. In any event, good science was one essential factor in this victory for animal welfare and environmental health. Among other studies, beached bird surveys were the foundation of that science, and thus that activity has indeed become a tool for change.

CONCLUSIONS

Because oiled beached birds are often the only indication that oil has been spilled at sea, it is crucial that those beachings be well documented and correctly interpreted. Beach surveys can help to ensure that national and international policymakers deal successfully with the global problem of oil dumping. Agencies responsible for enforcing anti-dumping laws have a natural tendency to use any downward fluctuations in the reported numbers of oiled birds as evidence of job performance. Others argue that the numbers are meaningless if not placed in an environmental context that specifies when, where and how birds are deposited on beaches. The discussion ranges from biology and methods—species vulnerabilities, weather regimes, currents and survey designs—to political and economic considerations such as MARPOL and the cost of transportation. All play a role in how policymakers choose to interpret the results of beached bird surveys. It is the job of the scientific community to acquire and present the relevant data in such a manner that the principal outcome is heightened public awareness and the political will to appropriately deal with chronic marine oil pollution.

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