Report of the
Whale Welfare and Ethics Workshop

22/23 March 2011

Eden Project, Cornwall, United Kingdom

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Contents

Acknowledgements

The UK Government Department for Environment, Food and Rural Affairs (Defra) and the World Society for the Protection of Animals (WSPA) gratefully acknowledge the participation of all Workshop attendees and, in particular, the time, effort and expertise of all presenters. The financial contribution of the Royal Society for the Protection of Animals towards the Workshop is also acknowledged with thanks.

Cover images

Top left: Dwarf minke whale, Australia. © Matthew Curnock
Top right: Breaching humpback whale © CW AZORES/Justin Hart
Bottom left: Long-finned pilot whales, La Gomera. © Fabian Ritter
Bottom right: Humpback whale mother and calf, Tonga © Bryant Austin

1. Conclusions and recommendations

The Workshop appreciated that the International Whaling Commission (IWC) is the pre-eminent international organisation with responsibility for the conservation of whales and the management of whaling, and that it has brought about improvements for the welfare of whales affected by human activities.

The Workshop acknowledged that the IWC's responsibilities encompass oversight of, guidance about, and regulation of many direct and indirect interactions between humans and whales. With this in mind, the Workshop sought to maintain a broad perspective of the animal welfare issues facing whales with a view to providing recommendations on potential measures to mitigate a range of negative animal welfare impacts caused by humans.

NB: Throughout the report the term 'whale' refers to all cetacean (whale, dolphin and porpoise) species.

1.1 General conclusions

(i) Assurance of good animal welfare requires consideration of all the animal's needs, including the need for certain behaviours. Human activities in the marine environment can have direct and indirect, and intentional and unintentional, adverse impacts on whale welfare, sometimes causing injury, pain, distress and/or death. In evaluating the impact of poor animal welfare an assessment should consider both the severity and the duration of negative health and stress measurements.

(ii) Ethics and animal welfare science should be taken into account in decisions relating to the management of all human-whale interactions. Whilst humans cannot protect wild animals from all negative welfare impacts, we should assume responsibility to prevent negative welfare impacts caused by unnecessary human activities, where possible, and to mitigate those that cannot be prevented.

(iii) Human activities resulting in poor welfare, including acute and chronic entanglements, prolonged kills and vessel strikes, are a major animal welfare concern.

(iv) Whales are sentient animals with intrinsic value and this creates a moral obligation when determining the way in which human interactions with them are managed. In circumstances where poor animal welfare outcomes may result from human interactions with whales (i.e. interactions which cause pain or injury, fear or distress, or those which prevent whales from expressing normal patterns of behaviour), these interactions should be subject to independent scrutiny and ethical review. This should include a detriment-benefit analysis of the welfare implications of the nature and extent of human-whale interactions, including cultural, ecological and economic perspectives.

(v) Animal welfare and conservation are directly linked, and actions to optimise welfare can enhance conservation outcomes.

(vi) Ongoing monitoring with data collection and scientific analyses are essential to assess and enhance the performance of human activities against targets to minimise welfare costs to whales. Such evaluations are possible through the collection of scientifically relevant data on a range of welfare indicators relating to both short and long-term health and stress levels. Improvements in welfare outcomes for whales should be underpinned by the collection and free availability of relevant data.

(vii) Management decisions relating to human interactions with whales should undergo regular review and take account of good practices advocated and implemented by international and regional agreements which strive to optimise the humane treatment of animals, including guidelines that deal with research, conservation actions (e.g. disentanglement), animal killing and wildlife watching.

(viii) Training and education of all personnel engaged in all forms of human-whale interactions has significant potential to improve animal welfare.

(ix) In light of the Convention on Biological Diversity's 2010 Nagoya Targets to halt the escalating decline in marine ecosystems and species in response to the combined effects of climate change and ocean degradation, whale survival and welfare should be paramount concerns for whale policy makers.

1.2 Conclusions regarding specific human-whale interactions

Drawing on existing policies and standards for the humane treatment of animals (referred to in vii, above), the Workshop agreed the following conclusions of relevance to human-whale interactions.

1.2.1 Killing and euthanasia of whales

On the basis of principles applicable to maintaining good animal welfare during killing of other mammals, the following statements are pertinent to whales:

a) Killing and euthanasia methods should reliably minimise fear, distress and pain and should reliably result in instantaneous death. Weaponry and equipment (including vessels) should be manufactured and maintained to a high standard to avoid malfunctions.
b) Terminally injured/ill beached whales for whom rehabilitation or rescue has been determined by a qualified expert as inappropriate should be humanely killed as soon as practicable.[1] In instances when an appropriate method for euthanasia is not an option (such as when adequate

[1] The workshop referred to the 2010 report 'Welfare issues associated with entanglement of large whales' (IWC/62/15) for full guidance in this issue. http://iwcoffice.org/_documents/commission/IWC62docs/62-15.pdf

supplies of drugs are not available) short term welfare benefits may be conferred by administering deep sedation.

c) All personnel engaged in the killing or euthanasia of whales should be appropriately trained and licensed. Licensing should incorporate independent assessment of skills on an ongoing basis.
d) Regular and ongoing independent monitoring of welfare indicators at the time of killing are fundamentally important to allow for proper assessment of animals' welfare and to enable identification of opportunities for changes in practice to improve animal welfare standards;
e) In the event of a pregnant female being killed, specific measures should be developed to ensure the humane dispatch of exteriorised foetuses in accordance with good animal welfare practice standards for the slaughter of other mammalian species.
f) Consideration should be given to gaining a better understanding of, and mitigating against, potential welfare impacts of hunting, killing or euthanasia on con-specifics, especially in highly social species.
g) Where environmental conditions are liable to significantly compromise the welfare efficacy of the killing process, killing should not be attempted.
h) Appropriate criteria should be established to reliably and practicably determine unconsciousness and death in whales.

1.2.2 Use of whales in scientific research

Scientific research on whales should be subject to independent ethical review/detriment-benefit analysis. Ethical review should ensure that, at all stages in the scientific research there is an ethical justification for using animal. On-going critical evaluation of the research should be conducted, involving consideration of:

a) the possibility that the objectives might be achieved by alternative means, not involving the use/lethal-use of animals;
b) the balance of the predicted benefits of the work over the harms caused to the animals involved;
c) whether there is reasonable expectation that the objectives of the work will be achieved in practice and likely benefits will be maximised;
d) the extent to which animal suffering is minimised and animal welfare enhanced, by implementation of the 'Three Rs' (Replacement, Reduction and Refinement) and effective training, supervision and management of all personnel involved.

Monitoring, independent scrutiny and effective enforcement of controls should be key components in good regulation of sound scientific research involving animals.

Whale species shown to be highly sentient should be provided with the higher level of protection, and additional justification required for invasive work, which is accorded to highly sentient land mammals (such as the great apes) in the animal research legislation of a number of countries.

1.2.3 Whale watching

In order to develop responsible whale watching (i.e. operations without negative animal welfare or conservation consequences for the individuals being observed) the following should be taken into consideration:

a) Responsible whale watching should aim to eliminate the potential negative physiological and psychological effects of the activity at the individual, social group and population level;
b) All personnel involved in whale watching operations should be appropriately trained and, where possible certified by responsible bodies.
c) Regular and ongoing monitoring should be designed to identify any apparent short-term negative animal welfare impacts. These should be addressed promptly in order both to improve individual animal welfare and to help secure a good conservation status for the relevant populations in the longer term.
d) Whale watching operations should be encouraged to help monitor and record practical and informative welfare indicators (e.g. presence of injury, changes in health status, changes in behaviour) of the individuals and populations that they are observing.
e) The relevant national or regional conservation authorities should require monitoring of whale watching operations to ensure their sustainability; monitoring should involve the enforcement of appropriate regulations for the region, along with measures such as licensing systems where appropriate.
f) Cooperation, information and expertise sharing with regard to responsible whale watching should be encouraged and facilitated between Contracting Parties.

1.2.4. Entanglement and vessel strikes

In order to reduce entanglement and ship-strike related adverse welfare impacts on whales, the following should be taken into consideration:

a) Fishing gear modifications and/or practices that can be shown to significantly reduce entanglement risk to whales should be adopted.
b) Regulations should be introduced controlling the deployment of fixed fishing gear, especially in major large whale habitats in relevant seasons.
c) Reporting and documentation of whale entanglements should be encouraged. Gear marking should be mandatory and gear retrieved from live and dead entangled animals should be analysed to inform a) and b) above.

d) While recognising that disentanglement is not a sustainable, nor always practical, solution, training should be provided to responders to disentangle animals, taking allowance of human safety and practicality.
e) The co-occurrence of vessels and whales should be systematically analysed, to enable areas of high risk to be established as Areas to be Avoided (ATBAs) or areas of speed restrictions and strategic adjustment of shipping lanes in order to minimise vessel strikes while sustaining viable shipping routes.
f) Where speed restrictions are implemented a maximum limit of 10 knots should be encouraged.
g) Whenever a large whale mortality is encountered, where practical, it should be examined for cause of death to inform relevant programmes to enhance welfare and conservation, such as the above.

1.3 Recommendations for action by the International Whaling Commission

The Workshop encourages the IWC to take note of, and where appropriate act upon, the Workshop conclusions. In addition, the Workshop agreed the following specific recommendations to the IWC:

1. That it should take account of welfare issues in the development and implementation of its management and conservation actions and Procedures.
2. That it should consider adoption of a Schedule amendment regarding provision and open access to practical and relevant welfare data for all forms of whaling.
3. That it should promote 'Responsible Whale Watching' and facilitate the development of a five year strategic plan in this regard.
4. That it should introduce a mechanism by which independent ethical review can occur, particularly with reference to whaling conducted for scientific purposes.
5. That in the light of the welfare and conservation challenges faced by whales in the 21st century, the IWC should continue to strengthen its conservation agenda.
6. That the IWC convene an intersessional ad-hoc working group of interested member countries to consider in detail the recommendations and conclusions of the Workshop and to develop recommendations as to how these might be adopted by the Commission by schedule amendment and/or resolution/decision, as deemed appropriate, at IWC64.

2. Report of the Workshop

2.1 Introduction

The Workshop was held from 22-23 March 2011 at the Eden Project, Cornwall, United Kingdom. A list of participants can be found in Annex A.

The Workshop was opened by the Chair David Pritchard who thanked the participants, including those from Argentina, Australia, Belgium, Brazil and New Zealand and the United States of America for making the time and effort to attend, as well as the UK Government and the World Society for the Protection of Animals (WSPA) for their kind sponsorship of the Workshop.

The Chair welcomed participants and gave a brief background to the Workshop, noting that at the 62nd annual meeting of the International Whaling Commission (IWC) in June 2010, the United Kingdom had put forward a proposal to hold a Welfare and Ethics Workshop prior to IWC63.[2] The primary objective of such a Workshop was to collate knowledge on the current status of animal welfare science and ethics and management policies globally, and allow discussion and analysis of such information and its potential relevance to the work of the IWC.

The Chair noted that although the IWC's membership continues to be divided over the extent of the IWC's animal welfare mandate, it has recently identified that there is 'no disagreement on whether animal welfare is important'[3] and member states are broadly able to unite behind a common objective of minimising animal suffering.

The Chair noted that in most international organisations with a mandate for animal management, animal welfare is given due scientific and political consideration. In his view it was desirable for management decisions relating to whales to be consistent with progressive animal welfare standards already in place within national, regional and global policies and guidelines.

It was acknowledged that all forms of human-whale interaction present many and varied challenges when discussing how to practicably improve welfare standards.

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[2] IWC/62/24 Taking forward discussions on animal welfare and ethics within the International Whaling Commission (Submitted by the UK)

[3] IWC S08/Rep1Progress Report on the September 2008 meeting of the Small Working Group (SWG) on the Future of the International Whaling Commission, presented by Alvaro de Soto, SWG Chairman, St. Petersburg, Florida, USA. p.9

Despite the difficulties however, it was felt the IWC was the correct forum in which to address these issues at the international level. The Workshop hoped to bring together differing perspectives on animal welfare from around the world and present its findings and a series of recommendations that would allow the IWC to continue to develop its role for the proper conservation of whales and management of whaling.

Presentations were made under three broad themes: 'Whales and the way humans interact with them'; Global approaches and developments in animal welfare and ethics' and 'Wild animal welfare'. A full list of presentations and speakers can be found in Annex B. Extended abstracts for presentations can be found in Annex C. A brief summary of the discussions following presentations are included in this report.

2.2 Objectives of the Workshop

The rationale for the Workshop and its objectives are given in IWC/62/24. The report of the Workshop will be presented to the Whale Killing Methods and Associated Welfare issues Working Group at the 2011 Annual Meeting in July (IWC63). The Working Group would then be called upon to review the findings of the Workshop and provide recommendations to the Commission plenary, including assisting in the development of recommendations for further work for consideration by the Commission.

Animal welfare has been identified as an important issue requiring resolution in the IWC. A number of questions and observations have already been raised by contracting governments to the IWC: (a) whether animal welfare falls within the IWC's mandate; (b) whether reporting of animal welfare data from whale hunts should be voluntary or mandatory; (c) the relationship between animal welfare and the Revised Management Scheme (RMS), including whether the provision of data should be mandatory and whether minimum conditions should be set under which whales could be killed; (d) the perception of some that data provided from whale hunts are used in a negative manner rather than being used for constructive discussion on how to improve killing methods; (e) whether the IWC's focus should not just be on welfare issues associated with whale hunting, but also on those associated with other anthropogenic factors (e.g. entanglement, stranding).

IWC/61/6 states: 'There is an institutionalized IWC working group that has made progress in addressing concerns regarding *animal welfare*, but there are issues that need to be resolved during the interim period related to collection, provision and use of data.' The Chair noted that this Workshop's findings and recommendations should assist in helping the IWC to answer these questions.

2.3 Whales and the way humans interact with them

A series of presentations were made to the Workshop on whales and the various ways that humans may impact on their welfare. These included presentations on the possible animal welfare impact of the growing whale watching industry; commercial and aboriginal subsistence hunts; the problems of whale entanglements, by-catch, and ship strikes; and welfare implications of different types of whale research, including an overview of the Southern Ocean Research Partnership (SORP).

The Workshop noted that progress in whale welfare has been made on these and other areas both in the IWC and through national initiatives. For example; the use of the cold harpoon is banned; the electric lance has been withdrawn; countries have bilaterally assisted in the development of more efficient killing methods in Aboriginal Subsistence Whaling hunts; and protocols for disentanglement of whales in fishing gear and the euthanasia of stranded whales have been developed. It was recognised that the adoption of certain 'best practice' methods have already led to better and safer outcomes for those involved, and improved animal welfare outcomes for the whales.

Despite this, the Workshop agreed that a great many issues remain, not least that whilst provisions exist for parties to decide gear type and hunting seasons, the 1946 International Convention for the Regulation of Whaling (ICRW) does not directly address any obligation to manage activities with due consideration for the welfare of whales.

The Workshop was concerned that there is no requirement within the IWC for the provision of animal welfare data and in recent years, nations conducting commercial and scientific whaling have stopped supplying welfare data to the IWC. The Workshop recognised the intent of IWC Resolutions 1999-1 and 2004-3 to request some welfare data for each animal killed but observed that a voluntary approach to the provision of data has not been successful.

Participants pointed out that welfare indicators chosen need to be appropriate for the duration of the human-induced welfare impact. Short-term measures like heart-rate and plasma cortisol concentration are useful for assessing welfare during handling or catching but are of much less value for indicating potentially chronic welfare problems. For these, data on animals' behaviours and changes in behaviour associated with human activities may yield greater insights on chronic negative welfare impacts. It was also acknowledged that because whales are large and highly mobile animals in dynamic and often inclement environments, the use of some techniques for assessing welfare that have been developed for terrestrial and captive animals would require adaptation.

The Workshop identified the unique difficulties inherent in achieving good welfare standards in the most controversial area of human-whale interaction; hunting. It expressed concern that current hunting methods had the potential for severe negative welfare impacts. These include, but are not limited to: potential

stress of pursuit; low instantaneous death rates; protracted times to death; and impacts on dependents and foetuses. The Workshop noted with concern that these low rates of instantaneous death and protracted times to death are outliers in the context of almost all other commercial animal slaughter practices.

The Workshop considered the various kinds of animal welfare data that can be collected by whaling operations, and in particular the value of video footage in determining the place of the harpoon strike and the time to lack of movement, and mechanism of secondary killing including asphyxiation.

It was felt the full involvement of all IWC member countries in welfare deliberations in the IWC, coupled with the provision of welfare data, would allow the Commission to have an open and candid debate about the welfare problems of whaling and the ways and extent to which they could be rectified.

The Workshop heard of the potential for irresponsible or unregulated whale watching to adversely impact both whale welfare and conservation. Impacts can include boat collisions with whales, noise pollution, chemical pollution, or changes in behaviour patterns resulting from disturbance by boats, aircraft, associated noise, and swimmers. The development of responsible whale watching aims to effectively prevent such impacts, ensuring the welfare of focal populations and the sustainability of the activity. This has been successfully achieved (and Argentina was given as an example) through education of tour operators and engagement with local and national authorities to effectively regulate the activity from its inception and enforce code of practice requirements for all whale-watchers (commercial, scientific and recreational). However, where it can be managed properly and responsibly, whale watching tourism presents an important and sustainable opportunity to greatly improve coastal communities.

The Workshop considered ethical issues posed by whaling for scientific purposes. Under Article VIII of the ICRW 'any Contracting Government may grant to any of its nationals a special permit authorizing that national to kill, take and treat whales for purposes of scientific research subject to such restrictions as to number and subject'. The IWC publishes figures for annual catches under special permits and it is a significant activity - 1004 animals in 2008/9, for example.[4]

Since the ICRW was signed in 1946, legislation and regulation of animal experimentation has developed significantly. Many countries have enacted specific legislation relating to the protection of animals used in research, often as part of an overarching act on the protection and humane treatment of animals. This legislation typically permits harmful actions on animals for scientific purposes that would be otherwise prohibited (e.g. under general animal welfare laws). In some countries (e.g. EU member states) the

[4] Special permit catches since 1985 available at http://www.iwcoffice.org/conservation/table_permit.htm. Accessed 18th May 2011.

legislation recognises that scientific procedures may be carried out outside scientific establishments so work on wild animals in their natural habitat is clearly covered.

The Workshop heard how international whale science has developed from lethal, whaling-linked descriptive biology to sophisticated, integrated, multi-disciplinary and non-lethal approaches and that these changes have been driven both by advances in research capabilities and the evolution of ethical consideration in our interactions with animals. Current and emerging threats to whale populations require management which is best underpinned by information derived from modern, non-lethal scientific practices.

It is increasingly common for animal research legislation, in all parts of the world, to require an ethical review and scientific justification for the proposed work, and in addition it may stipulate that the review is independent and includes an assessment of whether the likely outcome merits inflicting the expected adverse effects on the animals. The Workshop considered that all scientific research involving whales, whether or not it involves the killing of whales, should be subject to this "harm-benefit analysis" and ongoing studies may need to be re-examined, balancing the negative impacts against the positive aspects of the ultimate results of the research. It was further noted that the World Organisation for Animal Health, a 178 nation body, recently adopted guidelines for the use of animals for research and education which includes the ethical review process.[5]

The principle of the 3Rs - Replacement, Reduction and Refinement, originally developed by Professor William Russell and Rex Burch, is now widely accepted internationally as the basis for humane animal use in research and testing (Replacement - using non-sentient material that replaces use of animals in experiments or tests, Reduction – using the minimum number of animals for the scientific objectives and Refinement – avoiding, alleviating or minimising potential pain, distress and other adverse effects). In some cases (including major scientific whaling nations like Japan) the principle is clearly enshrined in national law or guidelines.

The Workshop expressed concern that despite the developments in both whale research techniques and ethical consideration of the use of animals in science, it does not appear that experimentation on whales has kept pace with the animal welfare and ethical policy advances seen in other areas of animal experimentation.

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[5] World Animal Health Organisation Terrestrial Animal Health Code Chapter 7.8: Use of animals in research and education http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.7.8.htm

One presentation detailed the serious animal welfare problems related to vessel strikes and by-catch. Chronic (long-term) entanglement has the potential to cause severe animal welfare impacts, including laceration, constriction and immobilisation, and increased drag, all of which may cause reduced feeding and reproduction capabilities. Acute lethal entanglements, common in whales caught in trawling gear, cause death by drowning. Efforts to enhance the welfare of entangled whales include measures to prevent captures, and disentanglement efforts. In the latter, sedation has been recently introduced with some evidence of improved disentanglement, although survival has yet to be enhanced. The work of the recent IWC workshop on entanglements, and efforts by some IWC member nations to share expertise on disentanglements, were noted with approval.

Vessel strikes may cause propeller incisions or blunt trauma. Lethal vessel strikes usually involve rapid blood loss, or muscle, bone and neural trauma. Work by the IWC's Ship Strike Working Group to quantify ship strikes and recommend measures for avoiding them or mitigating their effects was welcomed, as were efforts by several countries to introduce measures such as re-routed shipping lanes and introducing lower speed limits.

The Workshop acknowledged and briefly discussed the range of other anthropogenic threats to whales, including noise pollution, chemical pollution and habitat destruction. Welfare impacts of many of these threats are very poorly understood and difficult to quantify, especially given the potential for synergistic effects. Research in these areas is important to both identify and showcase such threats and to seek opportunities for avoidance and mitigation.

2.4 Global approaches and developments in animal welfare and ethics.

Several speakers noted how animal welfare has developed rapidly as a scientific discipline and that now it is commonplace for it to inform policy making. The fact that animals are sentient, coupled with the ethical claim that we have an obligation to avoid causing them unnecessary suffering and to minimise pain and distress, forms the basis of the animal welfare ethic. The acceptance of the animal welfare ethic has led to the introduction of animal welfare laws in most developed countries.

A 'sentient' animal was defined as one which has feelings and such animals may have some ability to: evaluate the actions of others in relation to it and third parties; remember some of its own actions and their consequences; assess risk; and have some degree of awareness. It was agreed that whales are sentient animals. Therefore consideration must be given to their welfare and every effort should be made to minimise the negative welfare impacts of human interactions.

The evolution of animal welfare science has greatly increased our understanding of animals' abilities, capacities and welfare needs. As they are enlightened to these insights, people around the world are

becoming motivated to show concern for animal welfare in their own treatment of animals, their preferences as consumers and through support for stronger laws to protect animals from suffering.

Over the last few decades, legislation relating to animal welfare has rapidly evolved in response to new scientific insights into animal welfare. Historically, animals were only referred to as property in legislation and efforts to protect them from suffering were anthropocentric in motive. However, over the last two decades there has been a striking increase in the number of countries enacting laws incorporating recognition of animal sentience and welfare and such laws exist in all parts of the world.

Although there is considerable variability in national legislation relating to animal welfare, there are certain principles recurring in animal-related legislation globally. These include acknowledgement that vertebrate animals are sentient and able to suffer and the notion that humans have a responsibility for their welfare. Many legislative instruments also aspire to ensure that kept animals' basic needs are met (e.g. the 'Five Freedoms' - Freedom from hunger and thirst; Freedom from discomfort; Freedom from pain, injury or disease; Freedom to express normal behaviour; Freedom from fear and distress) and that practices which routinely infringe their basic welfare needs are prohibited.

The Workshop discussed the potential for the IWC to benefit from the experience and expertise of other intergovernmental bodies with a mandate for the management of human-animal interactions. It looked at the role of, and progress made in, animal welfare in intergovernmental organisations such as the World Organisation for Animal Health (OIE) which has 178 member countries to date**.** Animal welfare was first identified as a priority in the OIE's 2001-2005 Strategic Plan and in 2002 a permanent Working Group on Animal Welfare was established. The OIE's members have since adopted nine animal welfare guidelines, including for the humane slaughter of animals for human consumption and relating to the use of animals in research and education. These standards are updated annually and are available online at www.oie.int/animal-welfare/animal-welfare-key-themes.

It was noted that the OIE has developed animal welfare standards that are being successfully applied by diverse member countries and territories It was felt that organisations involved in developing animal welfare principles and standards could learn from its approach, namely that there needs to be: an agreed definition of animal welfare; central guiding principles based on the chosen ethical approach; a risk-based, science-based process for developing standards that can be reviewed as often as required; and members need to be involved in the development of standards and local support provided in order to encourage engagement, adoption and compliance.

The Workshop heard that cultural attitudes towards animal welfare, i.e. implementing good animal welfare legislations and practices, should, can and do evolve, sometimes with assistance during a difficult transition process. It was recognised that strong traditions and/or a lack of knowledge and understanding

can block or slow down cultural progression in animal welfare but that sensitive and constructive handling and education could help to avoid such blockages.

The Workshop concluded in this discussion that there is a trend for increasing demand from the public and consumers for the avoidance of adverse effects on animal welfare and the environment and that this concept is applicable to whales. Facilitated by improved global communications and social media in the last decade, it is increasingly commonplace for companies and countries that allow activities that are unacceptable to the public to face consequences in consumer action.

2.5 Wild animal welfare and human responsibilities

Many of our interactions with kept animals (e.g. farmed, laboratory, zoo and companion animals) are being re-evaluated in the light of developing understanding of their needs. The welfare consequences of our interactions with free-living wildlife have tended - with some exceptions - to have received much less attention. The Workshop heard that laws to provide for wild animal welfare have generally been enacted far later than laws to protect the welfare of domestic and farm animals, largely because of the acknowledged difficulties of reliably avoiding a painful death when killing an unrestrained wild animal. It was discussed that the founding texts of many intergovernmental agreements affecting wildlife, including the IWC's Convention, were written from the perspective of animals as resources, with conservation objectives largely driven by a desire to maintain the 'resource' availability.

However, this position has changed as our understanding of animal sentience and ethics has developed, and social attitudes in many parts of the world now demand that welfare measures are extended to wild animals. It was acknowledged that there now appears to be a disjunction between many conservation agreements and progressive popular opinion, the former continuing to treat wild animals as inanimate resources whilst the latter increasingly expects wildlife managers to safeguard wild animals at the individual, as well as population, level. It was recognised that there are at present numerous examples of wild animal management policies which do not prioritise animal welfare but that it was desirable for the IWC to aspire to emulate best practice.

It was pointed out that anthropogenic impacts on wild animals, such as climate change, are increasingly necessitating conservation responses which bring wild animals into conditions/environments controlled or managed by humans and that in such cases it was incumbent on managers to provide for the welfare of the semi-wild animals concerned. It was also agreed that the integration of animal welfare in wild animal conservation policies was frequently complementary to conservation objectives.

It was proposed that where pursuit of human activities adversely affects wild animal welfare, there should be review to fully consider the benefits versus the welfare costs and efforts made to change practices so as

to prevent or, if that cannot be achieved, to minimise adverse welfare consequences. This process can be guided by a Three Rs approach (section 2.3).

Across all areas of human-whale interaction the Workshop agreed and stressed how adequate training of those involved and regular monitoring and evaluation of practices should be integral parts of ensuring the welfare of the wildlife we interact with, both by promoting best practice and by highlighting issues and welfare aspects that may be overlooked or considered unimportant.

The Workshop concluded that work by the IWC on animal welfare and ethics at IWC63 and IWC64 should seek to address and objectively evaluate fundamental questions and differences of opinion on these issues, with the aim of making informed decisions which unite members behind commonly agreed principles and guidelines on the humane treatment of whales.

Annex A - List of participants

David Pritchard (Chair)	Senior Veterinary Consultant - Animal Welfare, UK Government Department for Environment Food and Rural Affairs (Defra)
Jim Gray (Rapporteur)	Defra, UK
Sophie Adwick	Royal Society for the Prevention of Cruelty to Animals (RSPCA)
Claire Bass	World Society for the Protection of Animals (WSPA)
Philippa Brakes	Whale and Dolphin Conservation Society (WDCS)
Professor Donald Broom	University of Cambridge
Dr. Derek J. Fry	University of Manchester
Dr. Nick Gales	Australian Marine Mammal Centre, Australian Antarctica Division, Australia
Professor Robert Garner	University of Leicester
Tom Hardy	Cornwall Wildlife Trust
Professor Stuart Harrop	University of Kent
Miguel A. Iñiguez	Fundación Cethus, Argentina
Vicky Jackson	The Food and Environment Research Agency (Fera), UK
Dr. James Kirkwood	Universities Federation for Animal Welfare (UFAW)
Dr. Judit Krommer	Animal Welfare Unit of the Directorate General Health and Consumers, European Commission
Dr. Julie Lane	The Food and Environment Research Agency (Fera), UK
Dr. Kate Littin	Ministry of Agriculture and Forestry, New Zealand
Jennifer Lonsdale	Environmental Investigation Agency (EIA)
Siri Martinsen	NOAH - for dyrs rettigheter
Susan Millward	Animal Welfare Institute (AWI)
Dr. Michael Moore	Woods Hole Oceanographic Institution (WHOI)
Rebecca Onken	Department of Sustainability, Environment, Water, Population and Communities, Australia
Andy Ottaway	Campaign Whale
Vassili Papastavrou	International Fund for Animal Welfare (IFAW)
Dr. Roger Payne	Oceans Alliance
Professor Mateus Paranhos da Costa	São Paulo State University
Trevor Perfect	Defra, UK
Anabela Pinto	Cambridge e-learning Institute
Dr. Mohan Raj	University of Bristol

Roxana Schtienbarg	Instituto de Conservación de Ballenas (ICB), Argentina
Tanya Schumacher	Dyrebeskyttelsen Norge
Joanna Toole	World Society for the Protection of Animals (WSPA)
Steve Weddell	Universities Federation for Animal Welfare (UFAW)

Annex B – List of presentations

Dr. Roger Payne	Founder/President of Ocean Alliance, USA	Evidence for awareness in whales
Claire Bass	Oceans Campaign Leader, World Society for the Protection of Animals	Whaling and whale killing methods
Miguel Iniguez	President and Founder of Fundación Cethus, Argentina	Responsible whale watching and whale welfare
Dr. Nick Gales	Australian Marine Mammal Centre, Australian Antarctic Division	The evolution of cetacean research guidelines and approaches to non-lethal research
Dr. Michael Moore	Woods Hole Oceanographic Institution, USA	Welfare of whales by-caught in fishing gear or struck by vessels
Professor Donald Broom	Centre for Animal Welfare and Anthrozoology, Department of Veterinary Medicine, University of Cambridge, UK	The science of animal welfare and its relevance to whales
Vassili Papastavrou	Cetacean Biologist, International Fund for Animal Welfare (IFAW)	The value of animal welfare data collection – a case study on whaling operations
Dr. Mohan Raj	School of Veterinary Sciences, University of Bristol, UK	Changing cultural attitudes to animal welfare
Professor Robert Garner	Department of Politics and International Relations, University of Leicester, UK	Animal ethics and the work of the IWC

Dr. Derek Fry	University of Manchester, UK	Animal research ethics, legislation and practice and their application to scientific whaling
Judit Krommer	Animal Welfare Unit of the Directorate General for Health and Consumers, European Commission	Regional case study: Animal welfare developments in the EU and impacts of the EU's animal welfare policies over the last 20 years
Professor Mateus Paranhos da Costa	São Paulo State University, Brazil	Regional case study: Developments of animal welfare policy, legislation and practice in Latin America.
Carla Brown	Legislative Affairs Manager, World Society for the Protection of Animals	Animal welfare: emerging trends in legislation
Dr. Kate Littin	Senior Adviser, New Zealand Ministry of Agriculture and Forestry	Animal welfare and intergovernmental organisations – the role of intergovernmental organisations such as the OIE in animal welfare
Stuart Harrop	Director, Durrell Institute of Conservation and Ecology, University of Kent, UK	Potential Directions for the IWC to address the conservation and welfare challenges faced by cetacean species**.**
James Kirkwood	Chief Executive and Scientific Director of the Universities Federation for Animal Welfare and of the Humane Slaughter Association, UK	Wild animal welfare
Julie Lane	Food and Environment Research Agency, UK Government Department for Environment, Food and Rural Affairs	Human-wildlife interactions: the importance and benefits of effective training

Annex C - Presentation abstracts

Evidence for Awareness in Whales

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How ethical principles apply to whales

Ethics, the study of morals, principles and conduct, is concerned with concepts such as good and bad, right and wrong, just and unjust. However, such subjects are matters of opinion, not provable scientific facts that follow from agreed, first-principles or axioms. Ethics is therefore more like economics, which, although also a useful discipline, lacks first principles on which all practitioners agree.

In Western philosophies studies of ethics fall into three rough categories. The first holds that conduct is moral if it brings the greatest happiness to the greatest number. The second says it is moral if it benefits both the practitioner and his or her society. The third claims that the possession of a rational mind obligates one to respect the rights of other rational beings. It is argued most famously in Kant's Categorical Imperative, which states that we should act in ways we believe could (and should) be mandated as universal laws. Because whale brains are large and complex this third category is relevant to deciding if ethics has a place in discussions relating to the management of human activities affecting whales, for if whales are rational beings the Categorical Imperative holds that our own rationality obligates us to respect their rights.

That means that we would like to know whether whales are just living machines or are self-aware, have emotions and can make plans and solve novel problems, as is widely accepted with such large-brained species as primates and elephants. If we find that whales are self-aware our rationality would obligate us to respect their rights.

A problem with Kant's Categorical Imperative is its requirement that people agree on ethical principles. However that need not concern us here since IWC 62/24 states: "the Small Working Group identified that there is 'no disagreement on whether animal welfare is important' and member states are broadly able to unite behind a common objective of minimising animal suffering." Along those lines, I hope this workshop's recommendations enable the International Whaling Commission (IWC) to critically evaluate human activities affecting the welfare whales and determine how and to what extent that suffering can be minimised.

How awareness is studied

Consciousness or awareness means being aware of self and to some extent determining one's own choices of action, rather than responding reflexively or according to a pre-programmed plan. Griffin (2001) points out that communication between animals serves as a window into what and how animals think. One reason we don't yet know whether the sounds made by whales constitute true language is because if an animal species uses a symbolic language, like sounds, to communicate more than its whereabouts and mood, its utterances will be untranslatable unless accompanied by behavioural evidence. Just as when we hear humans speaking an unfamiliar language we find that it is unbreakable code unless the sounds are accompanied by gestures, body language, acting out, context or other clues to meaning.

Other evidences of mind are the startling similarities in the underlying neural mechanisms operating in the brains of both humans and our non-human relatives.

Whale Brain Function

What whales use their enormous brains for still has no clear answer. I know of no conclusive evidence that whales use their brains for sophisticated intellectualizing, nor that they are philosopher poets as some people seem inclined to believe. Given that the prey of whales is found in places with little or no light it seems more likely that their large brains enable whales to be exquisitely effective in analyzing noises from the ocean, or the echoes of their own sounds, and by doing so to 'view' their underwater world acoustically—an ability that requires major computing power no matter how it is achieved. Humans do very rough acoustic imaging but nothing approaching what whales achieve. This means that whales have abilities we would love to have but are still far from mastering. As the power and benefits of bioengineering become better known, the inspiration of the exquisite abilities and adaptations of whales will become additional reasons to be concerned for their welfare.

Importance of a large brain to a whale

Although we don't know what whales use their large brains for it is clear that a large brain is of high importance to a whale. That is because most vertebrate species healthy adults use 2-8% of their basal metabolism to fuel the central nervous system (Mink et al 1981). Dolphins, however, use in their early months of life as much as 25% of their metabolism to maintain their brains. It is clear that a cetacean brain is a major investment from which it follows that if such large brains were not of basic importance to whales, the benefits of smaller, more energy-efficient brains would long ago have out-selected large brains.

Language ability in whales

The question of awareness—of whether animals are aware of their surroundings and themselves, and/or have the ability to foresee consequences, is the subject of much controversy (Snowdon 1990). Hermann (2009) studied the abilities of two bottlenosed dolphins' to understand artificial languages: one followed instructions delivered by sounds, the other by gestures. The dolphin receiving gestural instructions could understand sentences of five or more words (and not just by using word-by-word processing). When interpreting the instructions given to her she could take account of both the semantic and syntactic components of the grammar. She also carried out most novel instructions correctly when she first encountered them.

In the domain of self-awareness, both dolphins demonstrated conscious awareness of their own behaviours and own body parts. The dolphin receiving gestural instructions understood symbolic references to her own body parts from gestures and how to use them in novel ways as directed by further gestural instructions—strong evidence for self-awareness.

There seems to be a great unwillingness among many to accept the idea that large-brained animals like primates, elephants and whales are able to understand and manipulate symbols in ways, which, though not identical with our abilities, are at least parallel. In spite of carefully carried-out, well-controlled experiments of the kind performed by Herman and his collaborators this unwillingness endures. Such resistance to scientific evidence seems to be based less on perceptions of flaws in the evidence than on a general unwillingness to accept the possibility that other species may rival our proudest attribute—our mental abilities.

Anecdotal examples of mind

Current methods are inadequate for determining whether many animal species are self-aware and able to plan. However, one encounters isolated examples, which, although they constitute anecdotal evidence, are, once seen, hard to explain without invoking consciousness, self-awareness and the ability to plan. In this video (MrCristea 2009) a dog pulls another dog that has been hit by a car out of heavy traffic.

Although the narrator points out that the rescuer uses its feet rather than its teeth to drag the victim to safety, notice that the rescuer makes a single brief effort to use its teeth, then switches at once to straddling the victim and dragging it slowly backwards, using its own front feet. I have never seen a dog use this technique to drag anything, and judging by the awkwardness with which the rescuer employs it, it appears that the rescuer may have invented it in the heat of the moment.

Another compelling anecdotal example is of a young dolphin in a South African aquarium that watched as a visitor on the other side of the glass blew smoke towards it. Whereupon it went over to its mother, nursed for a moment, returned to the glass and blew a puff of milk at the smoker's face (Shaughnessy Pers. comm).

Humpback Whale Songs

Humpback whales sing songs (Payne & McVay 1971) which they learn from each other as the songs change (Payne et al 1983) over time—song change being rare or absent in all other non-human singers.

When humpback whales sing they adjust the moments that they breathe so as not to interrupt the performance of the song; like human singers they tuck in quick breaths without disturbing the notes rhythm, or structure of the song, behaviour that implies they are conscious of their performances (Payne 1995) .

Some songs employ rhyme (Guinee & Payne 1988) which the whales maintain when one part of the rhyme is changed by replacing it with other sounds that rhyme. Rhyme is most often present in complex songs indicating that it may by used by whales as a mnemonic device—as it was by human troubadours.

Culture and Spindle Neurons

Whitehead (2003) gives strong evidence that the social systems of sperm whales (owners of the largest brains ever known to have existed) and killer whales evolve by imitation—i.e. they have cultures.

The brains of Humpback whales, dolphins, sperm whales, and now elephants have been found to contain spindle neurons (Hof & Van Der Gucht 2007)—cells known only from humans and these other large-brained mammals. Spindle neurons are involved in learning, memory, and creativity. There is also evidence they mediate self-recognition. This discovery brings humpbacks closer to toothed whales, which have complex social skills like "coalition-forming, cooperation, cultural transmission and tool use."

Concentrating fish shoals with bubble nets

Humpback whales make and use bubble nets, which they generate underwater to concentrate their prey into tight shoals before engulfing it. Groups of humpbacks use the same net. Group members wait as one whale creates a curtain of bubbles around the shoal, before all rush to the surface in unison with open mouths. One whale (presumably the spinner of the bubble net) screams while forming the net. Sharpe (1984) demonstrated that the frequencies used by this whale in its screams are those that cause the fish on which the humpbacks are feeding to crowd together tightly.

The number of humpbacks taking part in this behaviour changes over time but those individuals that participate habitually play the same positions at every upward, group lunge. The same female initiates the lunge from the center of the group. She is flanked by the same two animals from lunge to lunge who each time occupy the same positions on her left and right—all reminiscent of American Football lineups in which a Center is flanked by two Guards.

Fin whales also use air bubbles to concentrate prey although they make clouds of bubbles rather than well-formed bubble nets.

All that I have described of the capabilities of cetaceans, from songs that change and include rhyme, self-awareness of a song as a vocal performance, tool use, social facilitation and culture, experimental tests measuring the ability to understand words and syntax in a gestural language, the presence in cetacean brains of spindle cells (otherwise known only in elephants and primates, including humans)…all of these argue forcefully that cetaceans are conscious, self-aware, and can plan, meaning that they are rational beings whose rights we, as rational beings, should respect.

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Whaling and whale killing methods

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History

Subsistence whale hunting dates back to 400AD (Perrin et al 2009). Large-scale industrialised whaling to provide whale oil commenced in the late nineteenth century. Hunts escalated in the early 20th century and reports to the International Whaling Commission (IWC) show that over two million great whales were killed in hunts in the Southern Ocean between 1925 and 1985 and that unreported 'pirate' whaling was also widespread (Clapham & Ivashenko 2009). In 1982, as several whale species neared extinction, the IWC agreed an international moratorium on commercial whaling, which took effect in 1986. The moratorium is currently applied only to the thirteen species of 'great' (large) whales named in the IWC's 1946 founding Convention (i.e. all baleen whales plus sperm whales).

Distinct to commercialised whaling and exempt from the moratorium are small-scale subsistence hunts, to provide food for indigenous communities. Some of these hunts have been practised for centuries and have cultural significance.

Whaling today

The IWC recognises three categories of large whale hunting: commercial, scientific, and aboriginal subsistence whaling. Large whales are currently hunted commercially for their meat in Norway (minke whales) and Iceland (minke and fin whales), both countries having lodged objections to the moratorium, allowing them to self-award quotas. Japan conducts hunts for five species of large whales in the North Pacific and minke and fin whales in the Southern Ocean. Japan conducts these hunts under Article VIII of the Convention as 'scientific' or 'special permit' whaling, although there has been significant criticism over the need for and value of the research (Clapham et al 2003), as well as ongoing political condemnation of the hunts. The meat from these hunts is sold commercially for human consumption in Japan.

Total catches by Japan, Norway and Iceland have been escalating since the early 1990s (Figure 1) (International Whaling Commission (IWC) a, b). Norwegian hunts have remained relatively stable, taking an average of 560 whales per year since 1997 but with a slight decline in 2009 and 2010 catches.

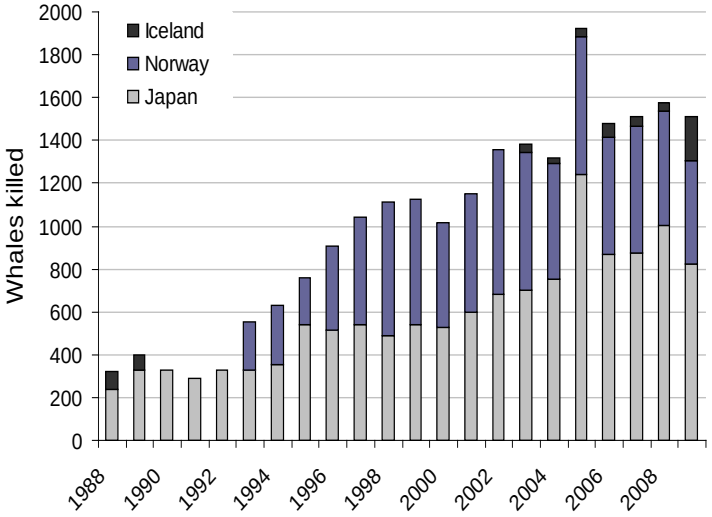

Figure 1: Catches of large whales reported to the IWC by Japan, Norway and Iceland, 1988-2009 (NB – Japanese data not yet available for 2010) (IWC 2010a, b)

Conversely, Icelandic hunts increased in 2009 and 2010, incorporating a large take of fin whales (160 animals in 2010). Quotas set in Japanese hunts have been increasing but the aspirations for these larger catches have not been met consistently.

The IWC awards Aboriginal Subsistence Whaling (ASW) quotas for large whale hunts in Russia, the USA, Greenland and St. Vincent and the Grenadines. Annual catches by these nations have totalled between 300 and 400 animals over the last ten years (IWC 2011). In addition, small scale unregulated subsistence hunts for large whales take place in Indonesia and the Philippines (World Council of Whalers 2008).

There is disagreement between Commission members on the IWC's legal competency to regulate small whale, dolphin and porpoise hunts. At present the Commission does not set hunting quotas for species other than those named in the Convention (IWC 2009). In numerous countries including Japan, Denmark (Greenland and the Faroe Islands) and Canada, hunts are carried out for a range of small cetacean species. Some of these are subsistence hunts, however Japan currently hunts some 10,000 small whales, dolphins and porpoises annually for commercial sale (Iwasaki 2009).

Whale killing methods

Commercial and scientific hunts use the exploding penthrite grenade harpoon as the primary killing method. The aim is to cause blast-induced neurotrauma which renders the animal instantaneously insensible or dead (Knudsen & Øen 2003). Hunters use further harpoons or rifles as secondary killing methods.

ASW hunt weaponry varies between nations. Hunters in West Greenland use exploding penthrite harpoons (IWC 2010c) and hunters in Russia and Alaska use non-exploding harpoons with floats attached to slow the whales and penthrite loaded darting guns or rifles to kill the whales (IWC 2010d, e). Minke whale hunts in East Greenland use rifles (minimum 7.62mm calibre) as the primary killing method (IWC 2010c). Small cetacean hunters use a variety of methods to capture and kill animals including hand thrown harpoons, darting guns, and 'drive' hunts, where pods of animals are driven into shallow coves to be killed using knives (or, in the case of the Japanese drive hunts, a specially designed spike).

Factors affecting welfare outcome of hunts

A wide range of factors can affect the welfare outcome of cetacean hunts. Hunts involving lengthy pursuit or herding may cause stress to both target animals and con-specifics (Williams & Thorne 1996).

The accuracy of harpoon or rifle shots can be significantly compromised by environmental conditions (notably wave height, swell, and the presence of precipitation) (van Liere 2004). The IWC has formally recognised that seasonal and weather variations can adversely impact times to death (IWC 2001).

Choice of weaponry is another critical factor determining welfare. Exploding penthrite harpoons (such as the Norwegian 'Whale grenade-99') result in the highest reported Instantaneous Death Rates (IDR); based on data from 2000-2002 the Norwegian government estimates that around 80% of whales die within one minute of harpoon impact (IWC 2010f). However, other hunts using the exploding harpoon report lower IDRs, e.g. on average 44% of harpooned minke whales (N = 880) are reported to have died instantaneously during the 2003-2005 Japanese Antarctic hunts (Ishikawa 2005). Subsistence hunts using non-exploding harpoons, darting guns and rifles have, on average, lower IDRs and higher times to death (TTD), e.g. in the 2009 Russian gray whale hunt the maximum TTD was 77minutes, the mean was 27 minutes (IWC 2010d).

Hunter training and weaponry maintenance have been shown to have a positive influence on hunt welfare, notably in reducing the rates of animals struck but lost and reducing times to death (Ugarte 2007). Norwegian scientists are working co-operatively with hunting bodies in several whaling nations to assist in training of hunters and improvement of hunting methods and weaponry (IWC, 2010f).

The location of the harpoon strike is important since a strike outside of the head/upper thoracic region is less likely to induce immediate insensibility (Knowles & Butterworth 2006). It has also been postulated that there is a relationship between whale size and times to death, larger species taking on average longer to die and with more frequent use of a second harpoon (Brakes & Donoghue 2006). The only known modifications of harpoons for the slaughter of larger whale species is an increased explosive charge and the efficacy of this adaptation has not been ascertained. Financial considerations and a desire to preserve meat have also been cited as considerations when deciding how much explosive charge to use (Hayashi et al 2006).

Norwegian research has shown that bullet calibre is important in the effectiveness of rifles as secondary killing methods (Øen & Knudsen 2003). Norway recommends a minimum calibre of 9.3mm (.365) with round nose full-jacketed bullets for minke whales. Lower calibre weaponry appears to correlate with an increase in the number of bullets required and longer times to death, for example in Russian subsistence hunts in 2009 a maximum of 260 bullets were used on one whale, with a maximum TTD of 77mins (IWC 2010d).

There is concern surrounding the adequacy of the current criteria for assessing death in whales[6]. These criteria have been identified by the IWC as "inadequate" (IWC 2004). It then follows that data on time to death and instantaneous death rate, which are based on these criteria, may be inaccurate. More sophisticated methods for ascertaining insensibility and death have been proposed (Butterworth 2006) but some present technical challenges and have yet to be implemented in the field. Finally, it should be noted that monitoring of welfare by the IWC is currently significantly compromised by a lack of data provision by the nations conducting commercial and scientific whaling.

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Responsible whale watching and whale welfare

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Background

Whale watching is defined as the observation of any of the 85 species of cetaceans in their natural habitat with at least some commercial aspects, using a variety of methods. Whale watching platforms include small boats, sailboats, cruise ships, inflatables, kayaks, helicopters, airplanes, and the activity can also include observations from land-based sites and approach by swimmers. In addition to being non-disruptive to the cetacean population, 'responsible whale watching' has many potential educational, environmental, scientific and socioeconomic benefits for human communities. As a result, tourism of this kind can have a positive effect on nature by promoting a general interest in and awareness about cetaceans, sustainable economic growth for local economies which are often otherwise struggling, and therefore provide multiple benefits, including improved motivation to preserve marine wildlife.

The growth of the whale watching industry

Whale watching has a long history and there is an increasing interest in whale watching in general. In 1955, the first commercial whale watching operation was developed by a fisherman named Chuck Chamberlain, who charged US $1 to view gray whales on their winter migration off the coast of San Diego. Over the course of a few years, the activity spread slowly up and down the west coast of North America, involving areas in the US, Canada and Mexico. In the 1970s, whale watching spread to the east coast of the US and Canada, and in the 1980s expanded to Europe, South America and other places around the world. In 2008, 13 million people participated in whale watching in 119 countries and territories, generating total expenditures of US $2.1 billion. As well as Chamberlain, who was recognized as the first commercial whale watching operator, the late Robbins Barstow, former President of Cetacean Society International, worked passionately to promote responsible whale watching and organized the first IWC "Global Conference on the Non-Consumptive Utilisation of Cetacean Resources" in 1983.

The business of whale-watching is still expanding. For example, in 2006/2007, there were 91 communities offering whale watching across 18 Latin American countries, nearly all of which were outside the main cities and industrial centres. From a comprehensive review completed in 2008, this eco-tourism activity had a steady growth of 11.3% per year (1998-2006). This rate of growth is three times the rate of world tourism and almost five times the rate of Latin America tourism over approximately the same period. In 2006/2007, whale watching trips generated US $79.4 million in ticket sales and US $278.1 million in total expenditures.

A unique aspect of whale watching in Latin America relative to other areas around the world is that whale watching in this region is often managed within marine protected areas (MPAs). This allows for a tourism experience that is more benign and the sustained success of whale watching in sanctuaries and reserves further supports the concept and maintenance of such MPAs.

Species involved

Many species of cetacean are involved in whale watching, but the most frequently "watched" are the humpback whale (*Megaptera novaeangliae*), northern and southern right whales (species of the genus *Eubalaena)*, minke whale (*Balaenoptera acutorostrata*), gray whale (*Eschrichtius robustus*), sperm whale (*Physeter macrocephalus*), orca (*Orcinus orca*), pilot whale (species of the genus *Globicephala)* , bottlenose dolphin (*Tursiops truncatus)*, Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), pantropical

spotted dolphin (*Stenella attenuata*), Atlantic spotted dolphin, striped dolphin (*Stenella frontalis*), spinner dolphin (*Stenella longirostris*), common dolphins (species of the genus *Delphinus)* and harbour porpoise (*Phocoena phocaena*).

The need for and development of responsible whale watching

The International Whaling Commission (IWC) has been working on whale watching issues since the mid-1990s. In 1996, the Scientific Committee developed guidelines for responsible whale watching which focused on three key areas: (1) managing the development of whale watching to minimize the risk of adverse impacts; (2) designing, maintaining and operating platforms to minimize the risk of adverse effects on cetaceans, including disturbance from noise; and (3) allowing the cetaceans involved to themselves control the nature and duration of "interactions". The IWC endorsed conclusions from a workshop in South Africa on sustainable whale watching and held two subsequent workshops; one on long-term impacts held in Australia in 2007 and the most recent held in Puerto Madryn, Argentina in November 2010 to develop a 5-year strategic plan for whale watching. The main recommendation of Puerto Madryn workshop is to consider "the development of a web-based *living* handbook on whale watching to achieve the objectives of the strategic plan. This handbook would be an important tool in assisting relevant authorities to develop national/local best practice approaches to whale watching."

A variety of studies reveal there is scientific evidence to show there can be an adverse impact on cetacean populations through whale watching but these are mainly caused by irresponsible or unregulated whale watching activities. The impacts of whale watching activities on cetaceans can include: boat collisions with cetaceans, noise pollution, chemical pollution, or changes in behavior patterns resulting from disturbance by boats, aircraft, associated noise, and swimmers. Recent studies on southern resident orca population from British Columbia demonstrated that dive time, swim speed and erratic movements increased as number of vessels increased. Decreases or changes in behaviors in response to boat traffic have been also recorded in bottlenose dolphin, Indo-Pacific bottlenose dolphin, Guiana dolphin *(Sotalia guianensis)*, Commerson's dolphin (*Cephalorhynchus commersonii*), short-finned pilot whales (*Globicephala macrorhynchus*) and Humpback whales . There are also some preliminary studies that monitored the impact of observation from aircrafts, likely associated with noise impact. Studies on noise at sea have been increasing recently, and direct observations and theoretical considerations both suggest that cetacean communication calls can be masked by engine noise.

There are also some important conservation reasons to protect some *critical endangered* cetacean populations, by reducing the exposure of dolphins to vessel-based tourism for example.

Different but similar recommendations have been developed by the IWC, governments, NGOs and also tour operators to reduce the potential problem for detrimental impacts on cetacean populations by whale watching activities. Long-term impacts are very difficult to determine and in this regard, the IWC's Scientific Committee is developing tools and actively working to understand and clarify this issue.

Responsible whale watching includes the protection of whale, dolphin and porpoise populations as one of its main objectives, with the aim of reducing the impact on the focal cetacean population as much as possible. In order to maximize wildlife conservation and ensure the welfare of focal populations, education of tour operators is necessary, especially where tourism growth may occur rapidly. It is also necessary to regulate the activity from its inception to enforce requirements for all whale watchers (commercial, scientific and recreational). Otherwise, new entrants seeking economic opportunity may not understand the importance of and requirements for responsible tour operation, or the potential impacts upon the cetaceans and therefore also upon human communities financially dependent on their well-being and the sustainable development of the industry. Where it can be managed properly and responsibly,

whale watching-based tourism presents an important and sustainable opportunity to improve the welfare and lifestyle of these coastal communities.

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Welfare of whales bycaught in fishing gear or struck by vessels

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The goals of this paper are to: define terms relevant to industrially induced, but unintentional, trauma to whales; place the issue in a context of the prevalence of such mortalities in North American East coast waters; examine pertinent case studies; summarize the resultant pathobiology; and from this infer likely welfare concerns.

Cetacean bycatch has been defined as mortality or serious injury of animals that are 'captured' but discarded (Alverson et al. 1994). Bycatch can include drowning, or chronic injury from fishing gear entanglement. Serious injury is defined by the US Marine Mammal Protection Act (1972) as any injury that will likely result in mortality. A wound is any injury to living tissue, while a scar is a healed wound. Vessels damage whales in two manners: incisions (sharp cuts) from rotating propellers, and blunt impacts from vessel bows, struts, skegs and rudders. Trauma can involve blubber, muscle, bone, viscera and neural tissues, with haemorrhage, oedema and hematomas.

In the period 1970 through 2009, a total of 323 whales were diagnosed as dead (222) or seriously injured (101) from fishing gear entanglement on the eastern seaboard of North America between Texas, USA and New Brunswick, Canada: species included minke (*Balaenoptera acutorostrata),* humpback (*Megaptera novaeangliae*), North Atlantic right (*Eubalaena glacialis*), fin (*Balaenoptera physalus*), sei (*Balaenoptera borealis*), Bryde (*Balaenoptera brydei*), sperm (*Physeter macrocephalus*) and unknown species. A total of 174 of these same species, and a blue whale (*Balaenoptera musculus*), were diagnosed as dead (163) or seriously injured (11) from vessel strike through the same time period. See van der Hoop et al (In prep) for these data.

Dead whales can be discovered in a variety of scenarios. Bycaught whales can be found anchored in gear, drowned or alive, swimming entangled in gear or dead floating at sea or on the shore. Whales cut by propellers are found alive or dead at sea or beached dead. Whales with lethal blunt vessel trauma are dead on a ship's bulbous bow at sea, floating or beached. Blunt trauma is usually cryptic from an external viewpoint. Some whales are negatively buoyant on death, and sink. They refloat later if water depth and temperature enable sufficient decomposition gas to refloat them with the passage of time (Allison et al. 1991). Much of the pertinent pathology observed in these scenarios has been described previously (Moore et al. 2004, Campbell-Malone et al. 2008) but will be summarized here.

Bycatch

Whale bycatch mainly involves gillnets, mobile trawls and fixed pot and trap fisheries (Johnson et al. 2005). It can involve rope, net and other gear such as surface float systems. Where a whale has insufficient power to break out of a system, it will either remain alive, if it can surface to breathe or it will drown. Where the whale has sufficient power to break out, as often seen with North Atlantic right whales and at times with humpback whales, the animal may carry the gear for months over thousands of miles. If there are two anchoring points on the animal with sufficient movement that the draw length of the gear exceeds the compliance of the epidermis and underlying tissues, the gear can saw into the blubber as recently modelled by Winn et al. (2008).

Figure 1. Left aspect of blubber dissected off right whale 2030 while still alive (Cape May, NJ 1999) by gillnet gear stretched over the back, fixed to both axillae (Moore et al. 2004).

Gillnets: Evidence of gillnet entanglement is often quite cryptic with subtle linear abrasions not penetrating the epidermis. At times gear is found, but often the animal has been removed from the gear post-mortem. A classic example of gradual gillnet invasion is North Atlantic right whale No. 2030 (Moore et al. 2004), where gillnet net stretched between both axillae slowly dissected off the intervening dorsal blubber sheet while the animal remained alive for six months (Figure 1).

Figure 2. Cable abrasion on a humpback flipper (Georges Bank 2003). Animal assumed to have drowned in a trawl.

Trawls: fish eating whales such as humpback, minke and fin can be caught in bottom and mid water trawl gear. They may show epithelial laceration from abrading trawl wires (Figure 2) and remnants of knotted trawl net twine can be found entangled in baleen and other body parts, where they have been cut out of the net at gear retrieval. They may also carry heavy rope with evidence of line parting under strain.
Drowning is assumed to be a common end point in these cases.

Figure 3. Chronic periosteal fibro-osseous proliferation (arrows) over the elbow joint in right whale No. 2301 (Virginia, USA 2004).

Fixed pot gear: pot traps are set singly or in trawls of multiple pots connected by groundlines, with one or more vertical lines to a surface float system. Right and humpback whales that encounter this gear appear to frequently become entangled (Robbins & Mattila 2001). Most of them self disentangle, others are disentangled by humans, but some remain persistently entangled. All appendages are at risk. Lethal events have involved simple wraps around the peduncle or rostrum, and complex involvement of one or both flippers, rostrum, lips and baleen. When ropes cut in around a flipper, the bone surfaces can undergo a massive proliferation of fibro-osseous new bone in an attempt to wall off the foreign body (Figure 3). In juveniles, flipper bones can grow around the constricting ropes, and vertebrae can be deformed by ropes wrapped around the body so that the animal grows a scoliosed spine (W.A. McLellan pers. comm.).

A series of 12 lethally entangled right whales averaged a duration from first seen with gear to observed dead of 5.3 months (RWC). Seven others remained entangled for an average of 30 months.

The welfare implications of entanglement depend on the scenario. Drowning presumably includes struggling, panic and gradual subsidence. Chronic entanglement includes laceration, constriction, scar formation, increased drag leading to emaciation, movement restriction, interference with feeding and scoliosis. Chronic sequelae to persistent entanglement include failure to feed though obstruction of the baleen by rope, and substantially increased drag from trailing gear (Figure 4), both of which can lead to emaciation. This could have significant energetic impacts reducing reproductive potential in sub-lethal cases.

Efforts to enhance the welfare of entangled whales include take reduction and disentanglement efforts (NOAA_1, PCCS, NOAA_2 2009), that have recently been aided in refractory cases by at sea sedation (Moore et al. 2010). However, the only lasting solution to this problem is take reduction.

Figure 4. Left: entangled right whale No. 3911 (Florida, USA 2011). Estimated to be 20% thinner than normal. Image by Jen Jakush, Florida Fish and Wildlife Conservation Commission, NOAA Fisheries Permit #932-1905-00/MA-009526. Right: normal right whale. Note substantially greater width in chest and abdomen. Image by Wayne Perryman, NOAA Marine Mammal and Endangered Species Permit # 917.

Vessel strike

Vessels can collide with whales when they are alive or when they are already dead. Necropsies and histology as practical are undertaken to describe the pathology and establish if lesions are consistent with a functional circulation at the time of impact.

Propeller incisions: these can affect any part of the body. They typically resemble an S or Z shape, depending on the rotation direction (Rommel et al. 2007), with a series of repeated incisions along the direction of travel of the vessel compared to the whale. They tend to be more lethal if including the head and or chest (Figure 5). Incisions not immediately lethal can debilitate appendages, such as a fluke blade, with resulting chronic weight loss. Sublethal incisions usually heal. In one case scars acquired as a juvenile broke down as a later pregnancy put new pressure on the wound sites with a consequent mortality (W.A. McLellan Pers. comm.). Results have included pneumothorax, loss of a fluke blade or the entire fluke, and deep incisions into the abdomen.

Figure 5. Propeller incisions (with shark scavenging) along the head and chest of right whale GA 2006025 (Florida USA 2006). Chest incisions penetrated the pleural cavity. Image by Katie Jackson, Florida Fish and Wildlife Conservation Commission, NOAA Fisheries Permit #932-1905-00/MA-009526

Blunt trauma: especially in black skinned animals, is often cryptic externally, and can only be diagnosed accurately with a full necropsy. Lesions include fractured mandibles, skull, ribs, and vertebrae (Figure 6). Where massive trauma to the vertebrae is observed, severance of the spinal cord has been suspected, although carcass condition at the time of necropsy often precludes such definitive determinations. Common lesions with pre mortem collisions include hemorrhage, hematoma, edema, and bone fracture.

Figure 6. Fractured transverse processes off twelve vertebrae from right whale mjm09406 (Nova Scotia, Canada 2006). Image by A Bogomolni, WHOI.

Welfare aspects of vessel strikes are usually less drawn out than gear entanglement. Animals appear to die from acute blood loss, or severe head or chest trauma. If they survive, there can be wound healing complications, with spread of cyamids, and loss of body condition.

Efforts to reduce vessel strike include areas to be avoided (Vanderlaan & Taggart 2009), vessel lane shifts (Vanderlaan et al. 2008), seasonal speed restrictions and mariner education.

Conclusions

Acutely lethal entanglements involve death by drowning. Chronically lethal entanglements include laceration, constriction, immobilization, and increased drag from trailing gear. The degree to which drag impacts non lethal entanglements in terms of ability to reproduce, and other health parameters is poorly understood at this time. Vessel strikes, if lethal, usually involve rapid blood loss, or muscle, bone and neural trauma. Thus the most severe animal welfare aspects of these cases involve the long drawn out chronic entanglement cases. These have been previously compared unfavourably with the welfare aspects of intentional whaling mortalities using explosive harpoons (Moore et al. 2006).

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The science of animal welfare and its relevance to whales

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Abstract
The welfare of animals is a major factor affecting the acceptability of human activities, and hence their sustainability, and whales are the subject of much concern because they are considered to be sentient animals. The scientific study of animal welfare has developed rapidly and now allows evaluation of the effects on whale welfare of potential disturbance, pain and fear and of how to assess loss of consciousness.

Introduction
It is a widely held view in most countries that we have obligations to all animals that we use, or with which we interact, and that these obligations include avoiding or minimising poor welfare in the animals (Broom 2003, 2006, Fraser 2008). A central question, when decisions are made about whether a system for exploiting resources should be used, is whether or not the system is sustainable (Aland and Madec 2009). The fact that something is profitable and there is a demand for the product is not now sufficient reason for the continuation of production. A system or procedure is sustainable if it is acceptable now and if its effects will be acceptable in future, in particular in relation to resource availability, consequences of functioning and morality of action (Broom 2001, 2010). Animal welfare is one of the key reasons why an activity or a system of production may not be acceptable. There are many examples of the actions of consumers and the general public in boycotting the products of companies or countries whose actions are thought to be morally wrong (Bennett et al 2002).

Whales are demonstrated by experimental studies to be sentient animals and their pain and other systems function in the same way as those of other mammals (Reiss and Moreno 2001, Broom 2007, 2010b).

The development of animal welfare science
Animal welfare science has developed rapidly in recent years. Welfare refers to a characteristic of the individual animal rather than something given to the animal by people (Duncan 1981). Broom (1986) defined the welfare of an individual as its state as regards its attempts to cope with its environment. It has been emphasised (Duncan 1981, Broom 1988, 1991a,b, Broom and Johnson 2000, Fraser 2008) that welfare can be measured scientifically, independently of any moral considerations. Once the welfare has been objectively assessed, ethical decisions can be taken about what is to be done about it. The definition refers to a characteristic of the individual at the time, i.e. how well it is faring (Broom and Fraser 2007, Broom 2008). This state of the individual will vary on a scale from very good to very poor. Welfare will be poor if there is difficulty in coping or failure to cope so that the individual is harmed. One or more coping strategies may be used to attempt to cope with a particular challenge so a wide range of measures of welfare may be needed to assess welfare.

Feelings, such as pain, fear and pleasure, are often a part of a coping strategy and they are a key part of welfare (Duncan and Petherick 1991, Broom 1991b, 1998). They are adaptive aspects of an individual's biology which must have evolved to help in survival just as aspects of anatomy, physiology and behaviour have evolved. Fear and pain can play an important role in the most urgent coping responses, such as avoidance of predator attack or risk of immediate injury. Coping with pathology is necessary if

welfare is to be good so health is an important part of the broader concept of welfare, not something separate (Dawkins 1980, Webster 1994, Broom 2006, Broom and Fraser 2007). When considering how to assess the welfare of animals it is necessary to start with knowledge of the biology of the animal and of all of its needs. It is more useful to consider the needs of animals of a given species, using scientific information about them, than to use the more vague concept of freedoms.

Welfare can be assessed using an array of measures including those of strength of avoidance and extent of other behavioural responses, physiological responses and pathologies (Broom and Johnson 2000, Broom and Fraser 2007, Fraser 2008). There are differences between welfare indicators for short-term and long-term problems. Short-term measures like heart-rate and plasma cortisol concentration are appropriate for assessing welfare during handling but not during long-term housing. Some measures of behaviour, immune system function and disease state are more appropriate for long-term problems. Welfare over longer periods is sometimes referred to as quality of life (Broom 2007b). Measures of good and poor welfare include a wide range of other physiological indicators and behavioural indicators of pleasure, aversion and the extent of problems encountered. In addition, measures of immunosuppression, disease prevalence, body damage, brain function, ability to grow or breed and life expectancy are used.

We can find out from animals what they need by measuring how hard an individual will work for a resource or to avoid an adverse impact. Animals will learn to travel distances, lift weights, operate levers, or undergo unpleasant experiences in order to achieve objectives so their actions can be used as measures of motivational strength. Terminology used in motivational strength estimation is similar to that used in micro-economics. Reference is made to: resources, demand, price, income, price elasticity of demand and the consumer surplus (Kirkden *et al*. 2003).

The magnitude of good or poor welfare is a function of the intensity of effect and the duration (Broom 2001). There are some papers on whale welfare and the extensive literature on the effects of handling, transport, stunning and killing of animals (Broom and Fraser 2007, Broom 2008) is relevant to whales. The assessment of whale welfare can be carried out using many of the measures mentioned above to assess the effects of disturbance by humans, fear engendered by pursuit or perceived imminent capture, pain resulting from tissue damage or other tissue modifying conditions, and procedures that lead to unconsciousness and death (Oen et al 1995, Butterworth et al 2004, Butterworth 2005, Knowles and Butterworth 2006, Gales et al 2007, Nowacek et al 2007, Ishikawa and Shigemune 2008, Giménez et al 2011).

The term humane

The term humane means the treatment of animals in such a way that their welfare is good to a certain high degree. Humane killing implies that the treatment of the animals in the course of the killing procedure does not cause poor welfare and the procedure itself results in insensibility to pain and distress within a few seconds (Broom 1999). With present methodologies for catching whales during whaling, the extent of poor welfare during catching and killing always appears to be substantial. Indeed, the magnitude of poor welfare is much greater than that of any legally permitted method of killing a domestic or wild animal. The whale killing procedure would be humane for very few whales.

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The value of animal welfare data collection – a case study on whaling operations.

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Abstract
At present there is no requirement within the International Whaling Commission (IWC) for animal welfare data and in recent years, the whaling nations have stopped supplying data regarding the welfare implications of whaling for commercial purposes. In the past, although analyses of data were provided, the raw data were not publicly accessible. In 2006, an analysis was conducted of video footage of Japan's 'scientific whaling' in the Southern Ocean during the 2005/06 season. The results of the analysis suggested some severe animal welfare issues associated with the hunt based on a limited sample size. The case is made for the provision of such data to the IWC to be made compulsory. This would be achieved through an amendment to the IWC Schedule requiring specified animal welfare data. Such a schedule amendment should be drafted to include all forms of commercial whaling (including 'scientific whaling' and whaling under objection) and should build on earlier proposals that were presented to the IWC between 2000 and 2003.

Video Analysis of Japan's Southern Ocean 'Scientific Whaling'.
An analysis was conducted of video footage obtained of Japan's whaling in the Southern Ocean Whale Sanctuary in 2005/2006 (Gales et al 2007). The footage showed the catching of sixteen Antarctic minke whales (*Balaenoptera bonarensis*). The key findings of the analysis were that:

- Whaling often starts with a high speed chase so the stress for the whale begins some time before it is even harpooned.

- Fewer than one in five of the observed whales was killed instantaneously. Average time to death for whales not killed instantly was 10 minutes. One whale survived for at least 35 minutes.

- Some whales that are not killed instantly simply suffocate as a result of being unable to raise their heads out of the water as they are winched in on the harpoon line.

- The killing of larger whales (fin, sei, Bryde's and sperm) is likely to be even more cruel, due to their larger size.

- An example was observed where a struggling whale was lashed to the side of the catcher ship, which then steamed off with the whale still alive.

- Hitting a whale at sea in rough weather from a pitching vessel is just as hard as it was in the 1950s when animal welfare concerns were first raised in the IWC. The position of the harpoon strikes on each whale was recorded where this could be determined from measurements from images.

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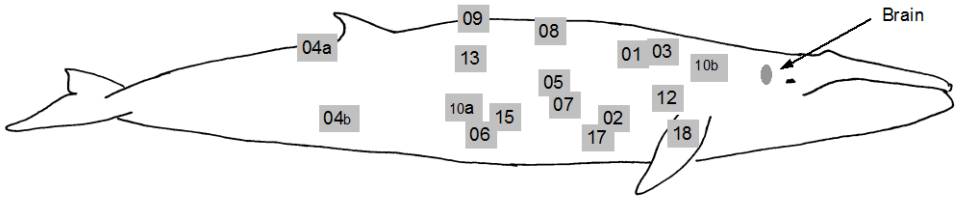

Figure 1. Locations of the harpoon hits analysed from the video footage. Nearly half of the hits were aft of the midpoint of the whale such that when the harpoon line is winched tight the whale cannot get its head above water. Harpoons which hit the animal close to the brain result in a quick death (from Gales et al 2007).

In conclusion, the high-quality video footage, which was obtained by Greenpeace, revealed information that would not otherwise have been made available. The presence of Greenpeace did not reduce the accuracy of the locations where the harpoon struck the whale when compared with previous studies.

Adopting a Requirement for the Submission of Animal Welfare Data to the IWC

At present, there is no requirement to submit animal welfare data to the IWC. Norway and Japan have submitted some information (though not raw data) to the IWC in the past but neither submits information to the IWC at present. Instead, both have provided some information (but not raw data) to the North Atlantic Marine Mammal Commission (NAMMCO), which held a workshop on the subject in 2010 (Anon 2010). Iceland does not appear to provide any animal welfare data.

The only way to require the collection of such data would be through an amendment to the IWC Schedule, under Article V of the Convention (Busby and Holt 2008). The IWC Schedule contains all the binding decisions that have been adopted by the IWC since it was set up in 1946. Schedule amendments require at least a three quarters majority for adoption and are binding on IWC members unless they take out a formal objection within the prescribed period (90 days, but opening up further periods if objections are filed within the initial 90 days as detailed in Article V).

The last animal welfare Schedule Amendment that was adopted was the cold harpoon ban (Paragraph 6 of the schedule, which came into effect in two stages, initially excluding minke whales, but with their inclusion in 1983 – see schedule paragraph 6 for details).

Since then, a schedule amendment for a ban on the use of the electric lance was proposed by the UK and New Zealand. The proposal was last put forward in 1997 and following discussion was withdrawn on the understanding that Japan, “intended to use, from next season, rifles as the principal secondary killing method”.

An additional approach to the existing schedule amendments that restrict certain killing methods, would be to require animal welfare data to be provided. If such a schedule amendment were adopted, it is possible that one or more whaling country would file a formal objection, in which case it would not be bound by the decision. In addition, in the past, although Norway submitted data on its whaling operations to the IWC as required, it also submitted restrictions on the dissemination of such information by the IWC Secretariat. The legality of such restrictions has not been seriously questioned by any member government. Such unilateral restrictions would not be legal.

There is also the question as to whether such a schedule amendment would apply to ‘scientific whaling’. Article VIII of the IWC Convention states that the, " …killing, taking and treating of whales" for the purposes of scientific research is exempt from other IWC decisions. However, the requirement that data

should be collected does not restrict the "… killing, taking and treating of whales..." and so would not be exempted by Article VIII. The precedent already in the IWC schedule is Paragraph 30, with which Japan complies and which requires certain information to be submitted to the Scientific Committee of the IWC prior to the issuance of scientific permits. In 1979, when the IWC was considering the decision to add this paragraph to the Schedule, the Commission first obtained legal advice that indicated that such a provision was permissible within the convention[7].

Provided that the schedule amendment were clearly worded, there is no reason why it wouldn't also apply to whaling under objection.

The Proposal by the UK

The idea that the provision of animal welfare data should be required in the IWC schedule was first proposed by the UK at the 52nd meeting of the IWC in Adelaide in 2000 (Anon 2000). The proposal was then considered at the Working Group on Whale Killing Methods and Associated Welfare issues in London the following year. The UK proposal was discussed again at the much more comprehensive 2003 Workshop on Whale Killing Methods and Associated Welfare Issues in Berlin.

The 2003 Workshop participants agreed an action plan including the collection and provision of information on time to death (IWC 2003), which was non-binding but "encouraged" the collection of various kinds of data. However, since then, Norway no longer maintains observers on board the vessels, Iceland does not appear to collect any animal welfare data beyond struck and lost rates and Japan does not provide data to the IWC. Thus, it has become clear in the intervening years that a voluntary approach to the provision of data has not been successful.

During the 2003 workshop, Japan took the view that a discussion regarding the collection of animal welfare data was inappropriate and left the room during the discussion of the UK paper. Norway and Iceland had taken a similar position during earlier discussions (IWC 2001). The debate concluded with no consensus regarding the usefulness or feasibility of collecting the data from commercial whaling operations but acknowledging that it would not be possible to collect some of the data for aboriginal subsistence whaling operations.

The UK proposal included a draft paragraph for inclusion in the IWC Schedule, together with a proposal for draft text which would become an annex to the schedule (see Appendix 1).

Developments since 2003

The information obtained from the footage of Japan's 'scientific whaling' in the Southern Ocean clearly demonstrates the value of video footage. Video cameras are now being trialled to record marine mammal by-catch data from fishing vessels as a component of electronic monitoring systems, even from vessels less than 15 metres in length (Leaper and Papastavrou 2010). A number of trials have already been conducted with promising results. Systems typically include video cameras linked to a GPS and other sensors on the vessel such as gear rotation sensors.

[7] A legal opinion was sought from Professor D.W. Bowett Q.C.

Conclusion - A Way Forwards: Proposal for an Animal Welfare Data Schedule Amendment
The adoption of an animal welfare data schedule amendment is the only way to require whaling countries to provide data in order that the animal welfare implications of whaling for commercial purposes can be properly determined.

A small number of vessels are involved (in 2010, the largest fleet was Norway's with 18 vessels Norwegian Directorate of Fisheries 2010) and the smallest fleet was Japan's Southern Ocean hunt with one factory ship and two catchers). Thus the use of video technology would not be onerous and a requirement for video footage should be included in a schedule amendment. The provision of the other information that was proposed by the UK should be reviewed in the light of developments since 2003, in particular the use of video technology. A schedule amendment should then be drafted in such a way that it applies to all forms of commercial whaling (including 'scientific whaling' and whaling under objection).

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UK Paper on Collection of Whale Killing Data

Draft paragraph for inclusion in RMS (Chapter VI or revised Chapter III)

For each whale hunted in whaling operations, the international observer [and/or national inspector] shall record, as a minimum, the data set out in Annex A on whale killing methods and associated welfare issues. This information shall be included in the observer's [inspector's] report to be provided to the IWC Secretariat at the end of each hunt or voyage or season as determined by the Commission.[*] The data will be publicly available.

ANNEX A

Reporting Requirements Needed To Assess Whale Killing Methods And Associated Welfare Issues

Preliminary

- Time of sighting of the target whale/group containing target whale
- Distance from vessel
- Estimate of group size – presence/absence of calves in group
- Behaviour of the whale pre-chase (ie slow travel, fast travel, resting, feeding, milling, social/sexual)
- Time of start of chase.

Primary Killing Method

- Time of first harpoon
- Type of harpoon (eg penthrite grenade head)
- Distance of vessel to whale when first harpoon fired
- Position of whale relative to vessel ie ahead, abeam or other
- Behaviour of whale upon being struck, eg a) whale "runs at surface"; b) dives and disappears; c) blowing pattern; d) evidence of severe internal bleeding eg blood in exhalation; e) other behaviour eg thrashing or lolling.

All behaviours to be timed.

- Location of harpoon on detonation
- Details on performance of harpoon (notes on unusual harpoon performance, if any)
- Physical area of entry wound of harpoon, and exit wound (if appropriate).

Secondary Killing Method

- Method used
- Time of second/subsequent harpoon(s) if needed; is penthrite grenade used?
- Distance of vessel to whale when additional harpoon fired
- Position of whale relative to vessel ie ahead, abeam or other

[*] All data shall be recorded on standardised data sheets to be provided by and returned to the IWC Secretariat.

- Behaviour of whale upon being struck, eg a) whale "runs at surface"; b) dives and disappears; c) blowing pattern; d) evidence of severe internal bleeding eg blood in exhalation; e) other behaviour eg thrashing or lolling. All behaviours to be timed
- Details on performance of harpoon (notes on unusual harpoon performance, if any)
- Location of harpoon on detonation (indicated on diagram at Annex B)
- Physical area of entry wound of harpoon, and exit wound (if appropriate)
- Details of performance of gun used - calibre, number of shots, target area of whale, number of guns used.

Information on Target Whale

- Time when whale assessed as dead
- Criteria used to assess that whale is dead (according to accepted veterinary criteria, ie mouth droops open, body goes limp, etc - see item 5 of Humane Killing Action Plan)
- Total time to death ie from time of first harpoon to assessment as dead
- Time when whale hauled alongside vessel
- Time whale secured or taken on board
- Whale escapes: Time when whale escapes; reasons for this (eg failure of equipment); approximate state of health of whale (eg severely wounded, whale has harpoon in it; whale dived but lost).

Post Mortem

Where the opportunity arises, and the specialist skills and knowledge are available, the following information should be recorded.

- Exact position of entry and exit point of harpoon
- Photograph of entry and exit point
- Assessment of effectiveness of grenade, based on examination of internal injuries. Organs and tissues to be examined should, depending on location of harpoon, include lungs, heart (thoracic cavity), skull, brain, blood supply and spinal cord. Photographs should be taken where appropriate.
- Assessment of effectiveness of any secondary killing method used, based on examination of internal injuries, as above.

Data Collection

All data shall be recorded on standardised data sheets to be provided by and returned to the IWC Secretariat

Changing cultural attitudes to animal welfare

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Defining culture

Culture is defined as shared customs and traditions of a group of people at a particular time (see Useem et al 1963; Hofstede 1984) and civilisation is a society that has reached a high level of culture. One of the views cited by the United Nations Educational, Scientific and Cultural Organization (UNESCO) is that 'culture defines how we relate to nature, and the physical environment, to the earth and the cosmos, and through which we express our attitudes to and beliefs in other forms of life, both in animal and plant' (World Commission on Culture and Development (WCCD) 1995). Culture is a dynamic process that will continue to evolve and its evolution, however, will depend on our intelligent reaction to experiences, among other societal needs.

Animal welfare in ancient civilizations

An extreme example of the 'richness of civilizations' emerges from India, where cows are traditionally considered to be sacred. *Manu Needhi Cholan* was a legendary Chola king believed to have killed his own son to provide justice to a cow, following Manu Needhi or Manu's law (see Spagnoli & Samanna 1999), which could be seen as the origin of the concept of 'animal rights' or 'justice to non-human animals'. Legend has it that the king hung a giant bell in front of his courtroom for anyone needing justice to ring. One day, he came out on hearing the ringing of the bell by a cow. On enquiry he found that the calf of that cow was killed under the wheels of his chariot. In order to provide justice to the cow, he killed his own son under the chariot as a punishment to himself. It is very likely that positive animal welfare attitude could be found in most of the documented cultures and civilizations around the world, which is one of the forgotten commonalities of our history on this planet earth.

Examples of different viewpoints on culture

Cognitive anthropology

Cognitive anthropologists view culture as an information pool that emerges when members of a community attempt to make sense of the world and each other as they struggle and collaborate to achieve common goals. Three layers or levels of culture seemed to emerge from literature. The first layer may be the *traditions* that distinguish specific society, for example, based on language (Indian or Italian) or faiths (Hindu or Catholic); the second layer may be a *sub-culture* within a multicultural society, for example African American or Mexican American within the United States of America. The third layer may consist of *cultural universals*, which are thought to be learned behavioural patterns that are shared by all of humanity collectively. In this regard, no matter where people live in the world, they share these universals. For example, games, arts, humour and societal ethics (distinction between good and bad). Cultural universals could also be anything that is part of every culture, but varies from culture to culture. Animal welfare attitudes could be seen as one of the *cultural universals*, based on our levels of knowledge and understanding of sentience in non-human animals and our commitment to preservation of species and the environment, to maintain ecological balance and for the benefit of our own future generations.

Social psychology

Social psychologists infer that cognition is essential to cultural development and is learnt through different complementary mechanisms, including education and wealth. Social learning is vital to cultural

transmission in humans and other animals. The way individuals learn from each other is secondary, but that they learn from others is vital to cultural development, which should be based on ethics embedded in our multicultural society. For example, on the grounds of societal ethics, Norway has prohibited falconry (keeping of birds of prey) and banned slaughter without prior stunning of animals for human food. However, animals which are hunted, including marine mammals are specifically exempted from pre-slaughter stunning required for other food animals covered in this legislation (Ministry of Food and Agriculture 2009). While the reasons for this exclusion are unclear, it could be that because whaling and other forms of hunting have traditionally held a strong position in Norwegian society, the ability to apply animal welfare legislation to these animals is impaired. If this is the case, then it serves to demonstrate how blocks to cognitions and cultural progression may arise if the tradition is too strong. Badger baiting, cock fighting and dog fighting were banned on similar welfare grounds in many countries in which they were traditionally practiced, however, showing that cultural progression can occur over time.

Cultural diversity in modern societies

Different cultural traits are shared within today's multicultural society. Many countries are multicultural and multinational, and consist of many languages, faiths and values. This diversity is unique to human cultures, and therefore, it not surprising to note that the levels of sentience attributed to various non-human animals also differ, in some cases, due to the lack of knowledge and understanding. For instance, while scaling of fish alive was not considered by a significant proportion (about 40%) of the university students in China to be a cruel practice in 2003 (Shuxian Zu et al 2005), countries like Norway and Iceland have been investing huge sums of moneys in developing humane catching, stunning and slaughter methods for farmed fish. However, the results of a poll conducted by the International Fund for Animal Welfare (IFAW) in 2007 revealed that a majority (80%) of Chinese people would not purchase ivory if they knew its source was a dead elephant, more often killed by poachers (Grace, 2010). It is worth noting that several Halal Standards Authorities in the United Kingdom and elsewhere have accepted pre-slaughter stunning of animals on the basis that it is not against the animal welfare principles of their religion, Islam.

Cultural evolution

Literature also suggests that there has been a cultural evolution on a global scale in recent years. For example, fox hunting which originated in its current form in the United Kingdom during the 16th century was banned in Scotland in 2002, then in England and Wales in November 2004. In 2005, the World Organisation for Animal Health (OIE) Member Countries (172 in number and still growing) adopted a resolution regarding a commitment to continuously improve animal welfare based on sound scientific principles. As a consequence, certain basic standards of animal welfare, especially during transport (by air, sea and road) and slaughter for human consumption or killing for disease control purposes have also been adopted, in spite of several geographical, religious, and economic differences/constraints.

It is also worth noting that several countries and notably China are currently preparing national animal welfare/prevention of animal cruelty laws. In China an initial step with regard to its state-run zoos came into force in January of this year when animal entertainments were banned. This law ends the tradition of feeding of live and conscious animals to carnivores (e.g. tigers) as entertainment on animal welfare grounds. In November 2010, the Lebanese Agriculture Minister, Mr. Hussein Hajj Hassan, urged the government to draft and enforce far stronger animal welfare laws (The Daily Star Lebanon 26 November 2010). In December 2010 Nicaragua passed the Law for the Protection and Welfare of Domestic Animals and Domesticated Wild Animals, which among other things, bans bullfighting and *biocide* of domesticated animals (WSPA, 2010). Certain concessions were made to allow for the continuation of traditional practices such as cock fighting and rodeos - again highlighting the obstacle that strong traditions can impede cognition and delay cultural progression. Notably however, the law also contains a

pledge to make the sports less bloody which is a step in the right direction leading to cultural evolution in the future. Costa Rica has introduced animal welfare laws prohibiting the killing of the bulls in bullfighting. Similarly, the Spanish bullfight or *corrida*, a long-standing Spanish tradition, defended on cultural grounds for centuries, was banned for animal welfare reasons by the parliament of Catalonia, Spain in 2010. The ban takes effect from January 2012 and will be the second time a region of Spain has banned this iconic Spanish tradition - the Canary Islands banned the practice in 1991.

It is inevitable that our knowledge and understanding of the underpinning causes of compromises in animal welfare will improve continuously in line with advancements in science and evolution of ethics in society. It is envisaged that governments and non-governmental organisations (NGOs) will have to respond proactively and work harmoniously in order to demonstrate their commitment to progress, i.e. changing cultural attitudes to animal welfare. In this regard, it is worth mentioning a few recent examples where the difficulties associated with cultural transition have been alleviated though institutional intervention. The practice of dancing bears became illegal in India with the introduction of the Wildlife Protection Act of 1972. As a result the skills of the bear handlers, or *kalandars* became redundant. A rehabilitation program for the kalandars was successfully introduced with the assistance of NGOs, enabling them to learn new skills and trades while continuing to support their families after surrendering their bears. Similarly in recognition of the aforementioned commitment made by the OIE Member Countries, several NGOs are actively engaged in training programs aimed at personnel involved in animal handling, stunning and slaughter. In anticipation of the changing cultural attitudes towards animals, NGOs have also been proactively involved in the development of animal welfare teaching curricula for students around the world.

Concluding comments

Cultural attitudes towards animal welfare, i.e. implementing good animal welfare practices and legislations, should, can and do evolve, sometimes with assistance during a difficult transition process. Change can be perceived as being necessary for altruistic, ethical, economic or egoistic reasons but regardless of the reason, if there is the will for change, then there is a moral obligation on societal leaders to effect that change. If we fail to react to a need for change, we will not be able to rationally justify to future generations the reasons for our inaction or failure to act responsibly, in my opinion.

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Animal Ethics and the work of the International Whaling Commission

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Animal ethics is concerned with an examination of the beliefs that are held about the moral status of non-human animals. It is concerned, therefore, not with describing how animals *are* treated but with how they *ought* to be treated. This paper focuses on two particular ethical approaches chosen because they enable us to understand more clearly the debate about the moral status of animals in general, and whales in particular, as well as offering a way of maximising consensus in the debate. The first, which describes the dominant discourse within the International Whaling Commission (IWC), is based on the argument that our duties to nonhuman animals are indirect, such that their protection is dependent upon the degree to which it is in our interests to do so. This is the logic behind the discourse of anthropocentric conservation. The second approach is the ethic of animal welfare. Unlike anthropocentric conservationism, the animal welfare ethic is not based on denying, or ignoring, the moral standing of nonhuman animals, and is consistent with the widespread acceptance, in theory and practice, that we do have direct duties to animals, that they do have moral standing.

The IWC and Anthropocentric Conservation

The ethical position denoted by anthropocentric conservation is equivalent to the so-called indirect duty view approach to animals. This represented the moral orthodoxy prior to the nineteenth century. Thus, for philosophers such as Kant (1965/1797), the treatment of animals may raise ethical issues, but animal interests do not matter in their own right. In other words, ill-treating an animal does not infringe any morally important interests that animals themselves possess, but we may infringe the interests of other humans in the process. The obligation to treat an animal well is, then, an indirect obligation since it derives from the direct obligation to another human.

From the perspective of anthropocentric conservationism, since the intrinsic value of animals is not recognised, their protection depends entirely on whether it is in the interests of humans to do so. For example, the need to conserve whale stokes was, at least for the whaling nations, the reason behind the moratorium on commercial whaling, which, as an indirect consequence, has protected at least some whales. An indirect duty ethic also justifies protecting whales on aesthetic grounds as in the case of whale watching. In addition, of course, there are economic benefits to be had from facilitating whales being seen.

In theory, few philosophers would deny now that we owe at least something to animals directly. What we do to them, in other words, matters to them and not just to those humans with a vested interest in their protection. Such a position derives from the widespread recognition, deriving initially from Bentham's utilitarianism (1948), that animals are sentient, that they can suffer, and that they therefore have an interest in avoiding suffering, independently of human interests. The fact that animals are sentient, coupled with the ethical claim that we have an obligation to avoid causing them unnecessary suffering, forms the basis of the animal welfare ethic.

Animal Welfare and the IWC

In practice, the acceptance of the animal welfare ethic has led to the introduction of animal welfare laws in most developed countries which limit what can be done to animals in the pursuit of human gain in a variety of spheres (Garner, 2004). Not only has this animal welfare ethic come to predominate within many countries. It is also increasingly the basis for international agreements involving animals - see, for

instance, the animal welfare guidelines of the World Organisation for Animal Health (OIE, 2009: chapter 7.5).

Significantly, too, the recognition that whales can suffer, and that this suffering matters morally because it is in the interests of whales to avoid it, has informed the work of the IWC itself in its deliberations on such issues as ship strikes and entanglements in fishing gear (Johnson, et. al., 2005). These issues do not just effect whale conservation but also the individual welfare of whales. Indeed, the decisions made on whale entanglements reveal that, in some circumstances, it is accepted that welfare concerns should be prioritised over conservation. For example, at the IWC meeting in Agadir, Morocco, in 2010 the report of a workshop on welfare issues (originally proposed by Norway) associated with euthanasia and the entanglement of large whales was endorsed. This report accepted that, in some circumstances, euthanasia is often the most appropriate option because it is the most humane option (IWC/62/15).
Given that principles of animal welfare are widespread, consistency would therefore seem to demand that these principles play a larger role in the deliberations of the IWC, including in the debate about whaling. To fail to do so makes the IWC look rather anachronistic morally. This does not mean, of course, that whaling should necessarily be prohibited on ethical grounds. Rather, the application of an animal welfare ethic to whaling would require us to weigh up the costs to whales against the benefits to those who seek to catch them.

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Animal research ethics, legislation and practice and their application to scientific whaling

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Although the International Convention for the Regulation of Whaling states it is "to provide for the proper conservation of whale stocks and … the orderly development of the whaling industry", its Article VIII allows " any Contracting Government" to "grant to any of its nationals a special permit authorizing that national to kill, take and treat whales for purposes of scientific research". Such scientific whaling permits would be expected to only allow activities which accord with national controls on animal experimentation, where those hold sway, and with international agreements where they may not, as in international waters.

Legislation

The laws on animal testing and research (which would cover scientific whaling) from a sample of countries in Europe, America and Asia show wide variation in controls and practice but some consensus on principles about the use and welfare protection of research animals and the ethics of animal research. It is generally recognised that scientific use is a special case, with laws on animal experimentation only part of wider animal welfare legislation, and permitting actions on animals for scientific purposes that would be otherwise prohibited. Often regulation of scientific use comes within an overarching act on treatment of animals (as in Japan). In others, e.g. UK, where different human-animal interactions are covered by different welfare laws, a specific act allows researchers to undertake activities prohibited by other laws but under strict control.

Ethics

There is wide consensus on underlying ethics. As the Council of Europe Convention ETS123 (1986) preamble puts it "man has a moral obligation to respect all animals and to have due consideration for their capacity for suffering" but "man in his quest for knowledge, health and safety has a need to use animals where there is reasonable expectation that the result will be to extend knowledge or be to the overall benefit of man or animal, just as he uses them for food, clothing and as beasts of burden". In Japan, where the scientific whaling catch was 1004 in 2008/9[8], the official translation of the Act on Welfare and Management of Animals 1973 (as amended) reads in Article 2 "animals are living beings, no person shall kill, injure, or inflict cruelty on animals without due cause" and in Article 41 "(..in the Case of Providing Animals for Scientific Use) (1) .. consideration shall be given to … alternative methods to that of the use of animals ... and reducing the number of animals .. (2)... a method that minimizes the pain and distress to the animal as much as possible shall be used". Japan thus recognises the principle of the 3Rs (Replacement - using non-sentient material that replaces use of animals in experiments or tests Reduction – using the minimum number of animals for the scientific objectives Refinement – avoiding, alleviating or minimising potential pain, distress and other adverse effects). That principle is widely accepted. It can be seen in the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes, for example, and in the Canadian Guidelines. It is explicit in EU Directive 2010/63/EU which states in preliminary paragraph 11 "the principles of replacement, reduction and refinement should be implemented".

[8] "Special Permit Catch" figures published by the International Whaling Commission

The other general principle is that of justification. The EU, Canada, and Australia for example all expect a harm/benefit analysis to be part of the assessment of a scientific programme. As the UK Animals Scientific Procedures Act 1986 states in section 5(4) this is a requirement to "weigh the likely adverse effects on the animals concerned against the benefit likely to accrue as a result of the programme". Japan and the USA only specify prior scientific justification, and minimal pain and distress for the work in progress. (USA Animal Welfare Act 1966 as amended S2143 3(a) …"in experimental procedures to ensure that animal pain and distress are minimized".) This gives no stimulus to choose beforehand a scientifically valid option likely to involve less suffering. However a benefit justification may be required by the insititution (as in the University of Minnesota).

Controls and monitoring

Controls vary from a mandatory national licensing of the researchers, the scientific programme and the place where it is undertaken (UK) to a voluntary system of animal experimentation under the responsibility of researchers (Japan). However apparent deficits in the controls specified in law or guidelines may be offset by norms of acceptable practice and, on the other hand, what seems tight regulation may be interpreted more flexibly. Commonly, as in the USA, Canada, most European countries, and Australia, the requirement is for an institutional, or local regional, animal ethics or care and use committee, whose approval is needed before work is undertaken. An institutional care and use committee is also a feature of the Japanese voluntary system.

Effective regulation needs not only good controls but also good monitoring and enforcement, and proportionate and dissuasive penalties. In the primary legislation sampled, sanctions from variation in permissions and fines to imprisonment were specified, but local disapproval can be an additional effective constraint. Monitoring typically relies on institutional review and inspection, with many countries, like the USA, supplementing this with national inspectors. In the UK, unusually, the law requires both assessment and inspection at a national level, making both less susceptible to local influences and more able to promote national standards. Prospective evaluation decisions presume adequate monitoring and inspection, without which prospective assessment and approval may educate but not be respected in practice. Also, as the FELASA Report of Working Group on Ethical Evaluation, 2005 pointed out, there should be the power to stop animal studies, when, for example authorisations are exceeded or unexpected adverse events occur. Work on wild animals such as scientific whaling is conducted without on-hand institutional management oversight or veterinary or animal care advice, and inspection is more difficult, so monitoring may be heavily dependent on scrutiny of records, and it is important that these are accurate and sufficiently comprehensive.

At the international level there is a risk that regulation may be inadequately monitored and poorly enforced. National regulation and standards, however, may deviate from international norms. Institution-level regulation is susceptible to local drift from national standards, little external verification, inadequate internal monitoring and little drive for improvement. Researcher self-regulation is liable to drift from institutional/national/international standards, andmay have inadequate external input. So best regulation would be achieved by elements at all these levels, and informed by adequate knowledge of the species.

Conclusions

Given the degree of sentience of cetaceans and the international interest in whaling, it might be expected that evaluation and monitoring of work under special permits would be of a high international standard, with good national controls and monitoring, and the reinforcement of researcher commitment to the 3Rs. This would mean a prior harm/benefit analysis as well as scientific evaluation, and consideration of replacement, reduction and refinement before, during and after the work. Ideally there would be on-going inspection and rigorous scrutiny of the records and results.

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Animal Welfare: Emerging Trends in Legislation

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Animal welfare and policy

The number of laws and standards regulating and protecting the welfare of animals is expanding around the world. The increased demand from policy makers for expertise and advice on animal welfare in order to create these new regulations has been inspired by developments in both science and ethics.

Thanks to such research, our understanding of animals' abilities and capacities is increasing all the time. It has been proven that many animal species are conscious, sentient beings which have complex social behaviours, means of communication and some demonstrate self-awareness (Chandroo et al 2004; Goodall 2006; Dawkins 2008). This is leading to a better understanding of the needs of certain animal species. In addition, the links between good animal welfare and areas beneficial to humans, such as health and the environment, are starting to be revealed by science (WSPA 2008 & CIWF 2009).

As a result of being able to prove capacities in animals which we, as human beings, value, we are forced to consider the moral implications of our interactions with animals. The notion of an ethical responsibility towards animals is growing and so animal welfare has become an additional concern in our everyday lives that needs to be balanced with other policy areas such as economics and international trade.

As understanding and knowledge expands, people around the world are becoming motivated to show concern for animal welfare - it is no longer something that only academics and NGOs care about and act upon. The scientific, veterinary, ethics and political communities must collaborate closely given that our knowledge of animals' capacities continues to grow. Policies and, as a result, legislation needs to adapt accordingly when significant information is discovered.

Animal welfare and legislation

Historically, animals were treated as property in legislation. This remains the case in many countries, especially those which have not updated older laws specifically relating to animals (Francione 1995). However, over the past 15 to 20 years there has been a striking increase in the number of laws which have been developed in countries incorporating animal sentience and welfare, especially for those laws passed specifically to protect animals (e.g. Tanzania Animal Welfare Act 2008 & Latvia's Animal Protection Law 2000).

For some months, in order to assess what level of protection is afforded to animals and what standards of welfare are set, WSPA has been conducting an audit of animal related legislation across the world (WSPA unpublished). The research has looked at both general provisions usually found in dedicated animal protection legislation and a range of specific issues of international concern. This research is still underway and is now being assisted by international law firm White and Case.

The findings so far show that it is now quite a rarity for a country to have absolutely no coverage of animal welfare in their laws. In addition, the previous assumption which many held that European countries are much further ahead in terms of legislative protection for animals is no longer necessarily accurate. There is now recognition of animal welfare across all regions, including the Middle East, Africa and Asia.

Around the world, there are several new laws in various stages of development or implementation. Thailand's draft legislation is with their parliament awaiting approval. A drafting committee has been working on a proposal in China which has gained media coverage around the world. Nicaragua recently introduced a new animal welfare law at the end of last year which includes an animal's right to respect and protection. And New Zealand is currently undertaking a review of its animal welfare legislation in order to update standards and increase protection.

Common principles

From the research findings it is becoming clear that certain trends are emerging across much animal-related legislation.

There is usually at least a basic acknowledgement that animals are able to suffer. Some Acts go on to specifically mention animal sentience and recognition of other important cognitive abilities. These are often explained within the text as the rationale for developing the legislation in the first place, providing the inspiration to protect animals' welfare. In some texts the ethical responsibility humans have when interacting with animals is specifically recognised.

Whilst what has widely become known as the 'Five Freedoms' may not always be directly referred to in legislative texts, there is a clear trend which suggests that policy makers are using these guidelines as a basis for setting welfare standards and identifying prohibited practices.

In addition, in recent years some countries have introduced the concept that those who take responsibility for an animal have a duty of care over it so they must provide for its particular individual needs. This is a move away from the traditional list of prohibited practices within this type of legislation, and allows for a more flexible framework which will adapt to the growing understanding of animals being revealed by science.

Policy gap

While many countries have made significant progress with ensuring animal welfare through the introduction of legislation, this protection has not always been extended to all species known to be sentient. There are often differing levels of legislative protection provided for animals being utilised by humans in different ways, for example animals hunted for food often receive less protection than animals being farmed. This sort of speciesism must be avoided as it makes legislation inconsistent, lessening its effectiveness.

Animal protection legislation and the IWC

In terms of relevance to the work of the International Whaling Commission (IWC), research has shown that whales can feel pain, fear and distress, and that they display a wide range of different behaviours, social structures and communication methods which vary greatly between species. Some species, particularly toothed whales, form groups where there are close bonds between individuals and even cooperative hunting. Whales may stay in these groups for many years or even their whole lifetime (Parsons et al 2004).

Because of this sentience, whales – like many other animals – have welfare needs, and any interactions with them detrimental to those needs might require regulation by law. Just as science and ethics have informed the development of policy across the world in relation to the protection of animals, legislation and regulations involving human interactions with animals is evolving. In response to this, bodies such as the IWC need to adapt their policies to ensure developments in ethics, science and national laws are reflected in the standards set.

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Animal welfare and intergovernmental organisations – the role of intergovernmental organisations such as the OIE in animal welfare

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Intergovernmental organisations – formal arrangements between governments of states, nations or countries – have a key role in global affairs, including animal health and welfare. They have advantages over countries that act by themselves, for instance their standards can be recognised under international treaties and apply across or outside of normal country boundaries and they can consider impacts at a broader or global scale rather than having to focus only on those occurring in one country.

The key intergovernmental organisation that deals with animal welfare is the OIE (the World Organisation for Animal Health). The OIE was established by an international agreement signed in 1924 to deal with the threat of animal disease and now has 178 member countries and territories[9]. From 2001, members agreed to an expanded mandate recognising the importance of animal welfare. It established an Animal Welfare Working Group in 2002 and has since adopted guiding principles for animal welfare, seven animal welfare chapters in its Terrestrial Animal Health Code (Anonymous 2010a) and two animal welfare chapters in its Aquatic Animal Health Standards Code (Anonymous 2010b). The chapters cover the transport of animals by land, sea and air, the slaughter (of terrestrial animals) for food, killing for disease control, the control of stray dog populations, the use of animals in research and education, and the welfare of farmed fish during transport and considerations when slaughtered for food.

Animal welfare is a complex issue that crosses cultural, socio-economic, political, religious and scientific boundaries. The OIE recognises this and has developed its guidance in ways that take account of these complexities. The guidance is being applied successfully by its members to improve animal welfare. Five key aspects to the OIE's approach contribute to this success: 1) it has developed underlying, guiding principles for animal welfare, 2) it has clearly defined animal welfare to suit its own purposes, 3) it allows for flexibility in the implementation and review of standards to support compliance and ensure they remain current, 4) the standards are based on science, 5) both the public and private sectors in members countries and territories are involved in the development and review of standards, which improves engagement and compliance.

The OIE's guiding principles for animal welfare recognise the link between animal health, food safety, productivity and animal welfare, and the role that animals play in human life. They refer to the accepted animal welfare ethical principles of the "Five Freedoms" and the "Three Rs", and the need to minimise harm[10]. The development of such guiding principles is an important part of the process to establish internationally-applicable animal welfare standards. It provides an opportunity for considering the ethical framework that is most appropriate for its purpose and its members. And it allows for agreement on a

[9] See www.oie.int for information.

[10] See Chapter 7.1, Article 7.1.2 in the Terrestrial Animal Health Code and Chapter 7.1, Article 7.1.1 in the Aquatic Animal Health Code.

clear statement of what is considered acceptable practice and what is unacceptable. It also means that situations that are not covered by explicit standards are still covered by the general principles.

The OIE also has an agreed definition of animal welfare[11], which is crucial to ensure that members are all clear about the intention and desired outcomes of standards. It clearly states what animal welfare is and also what it is *not*.

The OIE process allows for flexibility in two main ways. It aims to develop animal welfare standards that describe the animal welfare outcome to be achieved, leaving members free to determine the best way for themselves to meet the requirements. In addition, the standards are not fixed over time but are regularly updated and can therefore take account of changing views as well as advances in science, technology and best practice.

Animal welfare regulations or agreements must be science-based to ensure that they achieve the intended animal welfare benefits. While science cannot answer all questions (including what is or is not acceptable), it can provide information as common ground for objective deliberation on animal welfare issues by diverse stakeholders. The OIE has several successful means of drawing on scientific expertise in the development of standards. It benefits from expertise during drafting by ad hoc groups, and more broadly from three international animal welfare science "Collaborating Centres" that it can turn to for specialist advice. It further draws on relationships with outside organisations by means of memoranda of understanding or agreements to correspond. The OIE has not formally considered the role of risk assessment in the development or implementation of its animal welfare standards. However, this approach is common in managing animal health and public health risks and could be applied in the development of standards, and by members, individually or regionally, to determine when and how to apply standards.

The OIE develops its animal welfare standards by a democratic, open process that allows for expert and member input prior to them being considered for adoption by members at the General Assembly in May each year. This provision for member input is the fifth key strength of the OIE's standards development process. Member countries and territories provide experts to ad hoc groups that draft the standards, and are then given further opportunities to comment on draft standards at different stages of adoption. This approach allows for the development of standards that suit the cultural, socio-economic, ethical and religious expectations of members and that fit within their technological limitations. It recognises that animal welfare advances will not be made if standards cannot (or will not) be implemented. Adoption by members is facilitated if the benefits for them and for animal welfare are direct and clear.

The OIE has also run several conferences and workshops to assist members to understand and apply the standards. These provide additional benefits by supporting local veterinary expertise and capacity in the areas of food safety and animal productivity. The role and engagement of members is taken a further step through the development of Regional Animal Welfare Strategies[12], which can provide local support for further actions to help members apply the standards.

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[11] Animal welfare is defined in the Chapter 7.1, Article 7.1.1 of the Terrestrial Animal Health Code as "Animal welfare means how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear, and distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling and humane slaughter/killing. Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment."

[12] See, for example, the Regional Animal Welfare Strategy for Asia, the Far East and Oceania, www.daff.gov.au/animal-plant-health/welfare/regional_animal_welfare_strategy_for_asia,_the_far_east_and_oceania

In summary, the OIE has developed animal welfare standards that are being successfully applied by diverse member countries and territories. Organisations involved in developing animal welfare standards can take lessons from its approach. There needs to be an agreed definition of animal welfare, central guiding principles based on the chosen ethical approach, a risk-based, science-based process for developing standards that can be reviewed as often as required, and members need to be involved in the development of standards and local support provided in order to encourage engagement, adoption and compliance.

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Potential Directions for the IWC to address the conservation and welfare challenges faced by cetacean species

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The relationship between conservation and welfare

The gulf between ethical propositions of animal welfare and the scientific basis of wildlife conservation has at times impeded a practical working relationship between the two (Harrop 2003). Indeed quite often the two disciplines are capable of looking in different directions. The conservationist fixes on the species and its population status whilst the welfarist focuses on any animal, regardless of its conservation status, that is phylogenetically sophisticated enough to be capable of suffering. In consequence, welfare components are rare in international wildlife management law and are restricted to being subordinate to conservation objects (Harrop 2010 and Harrop, 1997). However, the two disciplines are moving closer in many ways with the development of scientific indicators of welfare and also the need to refine the principal drivers of conservation strategies which must ultimately derive form an ethical objective. In this connection the recent review of the CBD's strategy at Nagoya founded its new targets on a vision of "Living in Harmony With Nature" (Harrop 2011 (C)). This state of being would probably be a first for humanity, nevertheless, I would like to construe this vision, with the freedom of poetic licence, as conceiving both a materially and ethically harmonious future for humans and animals.

Predictions concerning the combined effect of climate change and biodiversity decline describe a shrinking of the "wild" and the reduction of natural habitats (Pritchard et al 2011). The necessary conservation responses to this may force more species into controlled conditions and increase the need for conservation interventions that impact on the welfare of animals (Harrop 2011(A)). In these circumstances the need to inject compassion into conservation law and policy becomes much greater. It may be, therefore, that the ideal trajectory for conservation and welfare legislation, in the context of predicted climate changes, is to proceed to a more comprehensive, integrated and sophisticated international regulatory regime setting out animal welfare standards to support future conservation strategies.

The provisions that reflect wild animal welfare content in international law to date largely restrict their welfare prescriptions to animals wholly under human control. However, beyond some incidental provisions in the Berne convention that apply to the geographical region of Europe, only the IWC, as an international regulatory institution, applies welfare regulation to free-living wild animals (Harrop 1997 and Harrop 2003).

This development of international law is not an idiosyncratic factor in itself but reflects the manner in which animal welfare has developed elsewhere. In the UK, by example, wild animal welfare regulation only came into being 100 years after the early laws extending welfare to domestic and farm animals. This route of development is not surprising. It was traditionally far more difficult to avoid a painful death when killing a wild animal than a constrained domestic animal and hence some social and thus regulatory reluctance to impose welfare standards on the human interaction with animals in the wild. Nevertheless, the position has changed and social attitudes in many parts of the world now demand that welfare measures are extended to wild animals that are capable of suffering such as terrestrial and marine mammals (Harrop 2011(A)). The contemporary arguments for increased welfare protection are well practiced and I will not repeat them here. However, there are new arguments that might require us to

return to the debate and examine the question of our interaction with cetaceans from a perspective that ignores the boundaries between conservation and welfare (Harrop 2011 (A)).

Climate change and whale welfare

Irrespective of arguments about the conservation status of some species of whale we need to consider the wider picture of a world affected by accelerated climate change caused by anthropogenic factors.

A world without fragmented habitats, and with healthy ecosystems and biological diversity would have been much better placed to withstand the predicted pressures deriving from the impending transformations within the global climate. However, the networks of ecosystems and meta-systems that comprise life on Earth are deteriorating rapidly and in consequence climate change, coupled with the fragmentation of habitats and the rapid extinction of species, are together creating a spiral of feedbacks that are more likely to exacerbate and accelerate the problem. Without the foundation of complexity, diversity and linkages within nature, no human civilisations could have arisen and ironically the social, economic and industrial systems and structures that are now giving rise to the causes of the problem -and that we prioritise in national, regional and international policies -could have never come into being. Nowhere on Earth is this more dramatically demonstrated than in the oceans. Indeed, over-harvesting coupled with ocean acidification are rapidly turning the oceans into deserts so fast that even the slow-moving global community at the 2010 CBD conference recognised that some of the agreed marine targets must be achieved at a significantly earlier date than the CBD's other key targets designed to reverse the rapid decline of the Globe's biodiversity Hoegh-Guldberg O et al 2007; Opdam P and Wascher D 2004; Orr JC et al 2005 and Harrop 2011 (C)).

Potential issues for further debate

Therefore, when we look to regulate the human-cetacean relationship we should appreciate that, whatever the current status of any whale species, all are threatened because the meta-systems of the oceans are threatened (Harrop 2011 (B)). Certain propositions about the manner in which we regulate our relationship with cetaceans derive from this overall perspective some of which, if accepted, would only be achievable by amendments to the IWC convention schedule. A non-exclusive list for discussion follows.

1. The overriding presumption may now be to focus on cetacean survival and well-being rather than prioritise use. This presumption would affect the overall scope of the IWC's regulatory and other inter-governmental activities.
2. All scientific research involving cetaceans, whether or not it involves whale killing, may need to be re-examined in the light of a necessity test and, if there are negative conservation or welfare consequences, a proportionality test balancing the negative incidents against the positive aspects of the ultimate results of the research.
3. Specific exemptions to the IWC's hunting prescriptions may also need to be examined in the light of the principle described in "1". Thus the concept of "aboriginal subsistence whaling" may similarly need to be re-visited to regulate impact and ensure that only traditional subsistence whaling is permitted. In terms of impact, there may need to be more prescriptive requirements to ensure that, these exemptions only relate to small-scale activities that are demonstrably not detrimental to the survival of the target species. In terms of the subsistence nature of the hunting, it may be necessary to expressly require that the hunting takes place in response to community needs and is not in response to external market dynamics.

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Wild animal welfare

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Attitudes to wildlife welfare

In recent decades there have been great shifts in attitudes to animals and regarding the extent of our responsibilities for wildlife welfare. The world is changing rapidly and we are feeling our way with some of these issues (see Fraser 2010 for a recent review).

It is only a slight oversimplification to say that, in the past, animals were either kept, in which case their owners were responsible for their welfare, or they were wild, in which case no one was. But now it is more complicated. Because of the size of the human population and the extent to which we use or control the environment, we greatly, and often directly, influence the welfare – the quality of life - and the fates of very many wild animals (Kirkwood et al 1994, Sainsbury et al 1995). This has brought increasing responsibilities for free-living wildlife at both population (conservation) and individual (welfare) levels, but the extent to which these responsibilities are perceived, accepted, and/or acted upon varies among individuals and societies.

Threats to wildlife welfare

The world population is growing very rapidly - nearing 7 billion. We occupy many habitats and have found ways around biological limits that have imposed constraints on all other species since evolution began, with the result that not only are there very many of us, but we use resources and produce wastes at biologically unprecedented rates. We keep vast numbers of domesticated animals that require food, space and other resources. However, the world is a closed system - like a goldfish bowl – food, space and other resources are finite: the more used by humans and domesticated animals the less available for wild animals. We cannot have more of everything.

The anthropogenic factors that threaten the viability of wild animal populations: loss of habitat, environmental contamination, invasive non-indigenous species (including infectious diseases), direct killing, and others, often also have harmful effects at the individual welfare level. But the problem goes beyond that, as major welfare impacts can occur without threatening population viability (eg myxomatosis in European wild rabbits). Although free-living wild animals are not owned, from a welfare perspective, the case for trying to address anthropogenic problems in free-living wildlife seems no less than that for trying to tackle the problems in kept animals.

Almost all anthropogenic wildlife welfare problems arise in one of two ways: (i) as unintended adverse effects associated with deliberate interventions such as culling, harvesting, translocation, marking etc; and (ii) through adverse consequences of some deliberate or unintended change to the environment such as through loss of habitat, environmental pollution, introduced infectious disease, etc.

Addressing the problems depends on their nature. The greatest welfare problems are often in the second category and may not be apparent without careful investigation. Precise determination of the major threats to health and welfare in wild animals is often a difficult task requiring substantial scientific resources (eg Kirkwood et al 1997). Finding solutions can, likewise, be very difficult and, where it is possible to foresee problems, every effort should be made to prevent them. Treatment is rarely possible except in a small minority of cases and in dealing with wildlife casualties it is important to carefully consider welfare and conservation costs and benefits.

Welfare assessment and deciding priorities

Animal welfare can have other meanings, but for many people, it is concern for animals' consciously experienced feelings (positive, negative or neutral) – their pleasures and pains – the quality of their lives. We have no direct access to feelings of other animals (including humans) and cannot measure, but can only infer the likelihood of, pleasant or unpleasant feelings in other animals. Such inferences are based on knowledge of the animal's biology, its behaviour and/or clinical signs, and upon our own experiences of pleasant and unpleasant feelings.

Assessment of welfare is therefore a two-stage process: making observations (typically including pathology and behaviour), and; drawing inferences from these observations about the welfare of the animal.

The first part is objective; the second part is subjective. The problem of this unavoidable subjectivity can be minimised by making the basis of our inferences as clear as possible. (However, people can reach very different conclusions. For example, signs that some may interpret as being due to pain or fear in fish are interpreted by others - who doubt that fish have the brain circuitry necessary to generate conscious perception of feelings - as just mechanical responses to stimuli). The animal kingdom includes over a million species and deciding which are likely to have feelings (of any kind) and are therefore within the fold of welfare concern, and which are not, remains a much greater difficulty than is often supposed.

As regards identifying welfare priorities, there is something of a consensus in the scientific community that a sensible approach is to take into account the intensity and duration of the problem (eg how much it hurts and for how long) and the number of animals affected. However, it is not apparent that, society in general, ranks animal welfare concerns in this way: particular species and cases may attract great attention for other reasons. If we believe that animal welfare is an important matter then it is perhaps inconsistent to put major efforts into protecting the welfare of, for example, laboratory rodents (as society rightly does), but to put very little effort into finding humane methods of free-living rodent control (as has been the case until very recently). The accepted standards of humaneness towards laboratory and 'pest' rodents remain very different.

Rather few taxa of free-living wild animals have been the subject of welfare workshops such as this. Due to the global oceanic ranges, independent of national borders, of many species, whales make excellent 'flagships' for the promotion of efforts for wildlife welfare.

Concluding comments

Many of our interactions with kept animals (eg farmed, laboratory, zoo and companion animals) are being re-evaluated in the light of developing understanding of their needs. The welfare consequences of our interactions (witting or unwitting) with free-living wildlife have tended - with notable exceptions, including whaling - to have received much less attention. There are signs that this is changing but there remains a great need for surveillance, detection of threats, and problem solving. Finding funds for these activities remains very difficult.

Where pursuit of human interests adversely affects wild animal welfare, there should be review, consideration of the benefits versus the welfare costs, and efforts made to change practices so as to prevent or, if that cannot be achieved, to minimise risks of adverse welfare consequences. This process can be guided by a Three Rs approach (after Russell & Burch 1959). These are: Replacement with some other process that has no adverse animal welfare impacts where possible. Where this is not possible,

Refinement of protocols and methods in order to minimise adverse welfare consequences and Reduction – taking measures that minimise the number of animals that may be adversely affected.

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Human-wildlife interactions: the importance and benefits of effective training

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Introduction

Studies and projects undertaken under the auspices of conservation of wildlife are often treated as being synonymous with working to promote individual animal welfare. However, human interventions with respect to wild animals carry with them multiple risks for the animal subjects. Unfortunately, these risks and problems are sometimes given little consideration by practitioners, often because they are judged relative to natural processes or are incurred for the good of the species or population. Obviously animals are subjected to a variety of natural factors likely to cause stress and poor welfare in the wild, and conservation and management of differing species to differing extents will probably always be necessary. However, in all these interventions, the welfare of the individual animal always needs to be upheld. One way of addressing this issue is by the provision of robust training. The Food and Environment Research Agency (Fera) have recently developed a training course (winner of the UFAW Wild Animal Welfare Award 2010) which centres around promoting and educating best practice in wildlife, particularly with respect to improved methods of capture, handling, marking and release. As well as standard training techniques the course includes the use of practical scenarios and discussion platforms tackling varying issues pertinent to working with wild species with the overall aim of ensuring high standards of welfare.

The importance and benefits of training

Training is a simple and effective way of highlighting and promoting welfare in all wildlife species. The training which Fera undertakes concentrates on providing information on a range of issues:

Ethics and welfare of target species.

Before embarking on any wildlife study or interaction preparation is key. If the welfare status of an animal is unduly compromised this has repercussions in ethical terms and also (in research and conservation) on the validity and rigour of the study itself. Poor welfare can have wide ranging effects on an animal's biology, behaviour and ecology (see Lane and McDonald 2010 for review). Procedures and actions may have to vary depending on the circumstances encountered (e.g. if animal is injured, dangerous, pregnant). In an ever-changing environment it is not always possible to give specific instructions on how one interacting with wildlife needs to act, but what is constant is that these actions must be defensible, justifiable and in the best interest of the animals and ecosystem in which they live.

Ethics and welfare of others in the ecosystem.

Consideration should always be given not only to the ethical issues of treatment of the target animal but also should include issues surrounding other animals that may be inadvertently affected. This is particularly pertinent in highly social and sentient animals such as some whale species (e.g. pilot whales *Globicephala melaena, Globicephala macrorhynchus*). Although the effect on others may not always be avoidable it is important to be aware of the consequences of any interaction and factor it into the ethical assessment. Particular consideration should be given to:

Con-specifics

This is particularly of concern for group- living animals with strong social structures. Effects can include changes in dominance hierarchies and the introduction of disease through stress of an individual causing latent infections to become active (Bermúdez *et al.* 2009).

Dependents

Removing parent animals from their dependents even for short periods may cause severe stress of the young and in some cases malnutrition, particularly among animals with altricial young and those in the earliest stages of life. Treatment with drugs, including anaesthesia has the potential to affect lactation potentially exacerbating nutritional problems (Yokoyama 1965). Capture of mothers when young are likely to be dependent is a risk that should be avoided or mitigated where possible. If there are obvious signs that the animals caught have dependent young (e.g., lactation, presence of young nearby), then it is advisable to release them as soon as possible, which may involve a judgement as to whether to carry out the intended procedures.

Non-targets

Capturing non-target species or individuals is almost unavoidable in some areas of wildlife interaction, but the consequences can be more severe than those for the intended subject. For example while it may not be the breeding season of the subject it may be of the non-target, or the capture method may not be appropriate and cause injury.

Best practice in capture.

Capture of wild animals can have far reaching consequences and so it is important to be aware of, and where possible, minimise the potential adverse effects. Best practice in this instance does not only include practical techniques (e.g. best form of capture) but also other factors that may reduce welfare in these instances such as:

i) Time of year - it is best if possible to avoid times of year when the animals will be naturally under severe external stressors (e.g. when food resources are low, when feeding young)
ii) Time of day - an awareness of an animal's circadian activities is essential for appropriate capture and handling
iii) Extreme weather conditions (heat/cold/wind force/precipitation)
iv) Place of capture – some areas of capture may prove less fraught and dangerous for the animal than others – e.g. depth of water , presence of other competing species.

Best practice in handling.

Wild animals should never be handled unless necessary and if handling is required the amount of contact should be kept to a minimum with the safety of both the handler and animal paramount. The concept that handling is a major cause of stress to wild animals is a theme throughout our training course. The correct use of handling skills plays a major role in reducing stress during capture or tracking of all wild animals.

Best practice in marking.

Recognition of individual animals plays an important part in most wildlife research and in other areas of wildlife conservation. Marking can provide information about survival, site fidelity, population dynamics, social behaviour, feeding ecology and almost every facet of an animal's ecology. Several invasive techniques for sea mammals are available (such as telemetry, streamers). However, many of these forms of marking can cause a myriad of adverse effects - not only directly (such as pain, stress, injury), but also indirectly such as external marks affecting social standing, mating success and potentially foraging behaviour (e.g. Brown 1997). It is always important that the least invasive but effective type of marking is used. The use of non-invasive techniques such as individual recognition (using natural markings/tail fluke recognition) should always be considered first.

Conclusion

Human- animal interactions can pose welfare issues even when the interaction is intended to be in the animal's own interest. However, when handling or interacting with live animals, not only in long term projects such as wildlife research but also in the more immediate short term such as aiding whales in distress, training can drastically improve their welfare. Training should be an integral part of ensuring the welfare of the wildlife we interact with both by promoting best practice and by highlighting issues and welfare aspects that may be overlooked or considered unimportant.

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