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## Environmental management of boating related impacts by commercial fishing, sailing and diving tour boat operators in Australia

Troy Byrnes <sup>a</sup>, Ralf Buckley <sup>b</sup>, Michael Howes <sup>c,\*</sup>, James M. Arthur <sup>d</sup>

<sup>a</sup> Gold Coast Waterways Authority, Qld 4217, Australia

<sup>b</sup> International Chair in Ecotourism Research, Griffith University, Qld 4222, Australia

<sup>c</sup> School of Environment, Urban Research Program, Griffith University, Qld 4222, Australia

<sup>d</sup> School of Environment, Australian Rivers Institute, Griffith University, Qld 4222, Australia

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## ABSTRACT

There are approximately 1500 commercial tour boat operators in Australia with a combined fleet of approximately 3800 vessels – the majority offer marine fishing, sailing or diving tours. Most of the fishing tour boat operators employ fewer staff and use smaller vessels than the dive and sail tour boat operators. Proportionately more of the vessels used by sail and dive tour boat operators have basic environmental management measures such as ashtrays and garbage bins to reduce overboard littering, and sewage holding tanks with pump-out systems to reduce the impacts of human waste. In addition, more of the sail and dive tour boat operators claim to be aware of their boat's environmental impacts and also claim to take steps to reduce or remediate them, including the use of environmental management guidelines. These differences in environmental management measures, however, are associated principally with patterns in vessel size, which affects both the practical and regulatory requirements. In addition, more of the dive tour boat operators operate in marine protected areas (MPAs) where regulations are quite often more stringent. Once these factors are allowed for, environmental management of boating related impacts by individual fishing tour boat operators is not significantly worse than by sail or dive tour boat operators. Overall the attempts to reduce environmental impacts are part of the broader thrust to improve sustainability by ecologically modernising the industry. In this regard, there appears to be significant scope for improvement within the Australian tour boat industry in the form of ensuring that their vessels have garbage bins and ashtrays on board, that such items are clearly labelled and that clients are both advised of their location(s) and the need for their use and especially by clearly advising their clients not to throw items overboard (particularly cigarette butts).

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### 1. Introduction

Controlling pollution from numerous diffuse and mobile sources is much more complex than managing discharges from small numbers of fixed identifiable point sources. From a regulatory perspective, the process involves at least seven distinct steps: (i) identifying and locating potential polluters; (ii) establishing the types, timing and levels of emissions; (iii) distinguishing their impacts from those of other potential pollution sources; (iv) establishing ambient quality targets for appropriate parameters; (v) establishing equitable emission controls to achieve those targets;

(vi) establishing means to monitor the pollution measures concerned and the mechanisms which determine them; and, (vii) establishing effective and affordable social and institutional frameworks to ensure that individual polluters comply with controls. Where there are large numbers of intermittent pollution sources, the cost of ensuring compliance through publicly-funded patrols and enforcement is high, so governments can only obtain political support for this approach where the expected social and environmental benefits are equally significant.

Given these difficulties, governments are usually keen to try less costly approaches. In particular, where potential polluters are part of an industry rather than purely private citizens, one often-promoted approach is so-called self-regulation, where the individual industry members cooperate to establish and enforce their own environmental management measures (Gunningham and

\* Corresponding author. Tel.: +61 7 55527264; fax: +61 7 55527785.

E-mail address: [m.howes@griffith.edu.au](mailto:m.howes@griffith.edu.au) (M. Howes).

Sinclair, 1999; Petts et al., 1999; Lenox and Nash, 2003). In some sectors, notably the chemical industry (Gunningham et al., 1998), it appears that this is merely a political tool to delay the introduction of government legislation (Lenox, 2006). Likewise, it is not clear that the numerous ecocertification schemes in the tourism industry have actually improved aggregate environmental practices to any measurable degree (Font and Buckley, 2001).

Accordingly, this study set out specifically to examine environmental management practices in a highly diffuse industry sector – namely the commercial tour boat industry in Australia. There are, however, broader implications for the industry around the world as many of the issues faced and the corresponding challenges for governance are global in nature. Further, the comparison undertaken by this study – between fish, dive and sail tour boat operators – has not been done previously anywhere else. Australia is also a large maritime continent with a territory of responsibility comparable to that of the USA, so results from this study are relevant internationally. Finally, the move to reduce the industry's impact on the environment is part of a larger push to improve sustainability by ecologically modernising the economy (Howes, 2000, 2005; Howes et al., 2010).

### 1.1. Theoretical framework

In 1992 at the Rio Earth Summit the governments of the world signed *Agenda 21*, an agreement that committed them to pursuing sustainable development. The most common definition of this goal comes from the preceding Brundtland Report (World Commission on Environment and Development (WCED) 1987, chapter 2, section 1), 'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. This report included a call for the better management of the world's oceans, with a particular mention of conserving fisheries and reducing marine pollution (World Commission on Environment and Development (WCED) 1987, chapter 10, part 1). Consequently, chapter 17 of *Agenda 21* (United Nations Environment Programme (UNEP) 1992), commits all governments to sustainably managing the marine environment. At the national level, Australia's corresponding *National Strategy for Ecologically Sustainable Development* (Ecologically Sustainable Development Steering Committee (ESDSC) 1992) commits the country to the sustainable management of fisheries and the tourism industry, as well as reducing pollution and waste. This strategy was endorsed by all levels of government and its principles of sustainability subsequently made their way into legislation at the national and state levels, while many local governments adopted *Local Agenda 21* policies (Howes, 2000, 2005).

Sustainability is underpinned by the theoretical school of ecological modernisation (Howes, 2005; Howes et al., 2010). The idea is that economic growth can be decoupled from environmental damage (such as pollution, waste and the loss of species) through:

1. Technological innovation that leads to a more eco-efficient use of resources
2. Engaging economic imperatives by reducing costs through eco-efficiencies and imposing financial penalties for damage
3. Political and institutional changes that encourage public-private partnerships to pursue sustainability
4. Transforming social movements so that they operate as a feedback loop that alerts business and government to unsustainable practices
5. Discursive change, where business sees good environmental management as also being good for business (*i.e.* the 'win-win' scenario) (Howes et al., 2010).

The idea of ecological modernisation originated from studies by Jänicke (2008) and Huber (2000) of several European industries in the 1980s that began to find ways to simultaneously cut both pollution and production costs. Initially the theory was narrowly focussed on technology, but over time it matured into a broader school that included more transformative changes (Christoff, 1996). The idea has been applied to the analysis of the environmental impacts of tourism (Briassoulis and van der Straaten, 2000), as well as environmental and natural resource management policies (Howes, 2005; Curran, 2009; Howes et al., 2010).

In terms of ecological modernisation, for this study we would expect to see some technological factors at work in reducing waste and pollution, either in the design of the boats themselves or how they are equipped. There might also be some indication of economic penalties and/or incentives at work in encouraging good environmental management. Politically, we would expect there to be both a baseline of regulation by government, and attempts to promote self-regulation or responsible behaviour by the industry. While we have not looked at social movements, the activities undertaken by customers may provide feedback to the operators that would encourage better environmental management (*e.g.* divers would probably not like to see waste emanating from their tour boat). Finally, there may be some indication that operators perceive a common interest in a clean environment and a healthy business.

### 1.2. Background

The Australian commercial tour boat industry is a diverse and geographically diffuse sector with around 1500 individual members with a combined fleet of approximately 3800 vessels, some of them running highly professional and fully commercial tourism businesses and others scarcely distinct from the private recreational boating sector. GIS analysis indicates that approximately half of this industry operates in seven locations (Byrnes and Warnken, 2003), and this study focuses on those sites (*i.e.* Cairns and the Whitsundays in Queensland, Sydney in New South Wales (NSW), Melbourne in Victoria, Broome and Exmouth in Western Australia (WA), and the Moreton Bay/Gold Coast region – which is mostly in Queensland but with a small overlap into NSW for locations such as Tweed Heads and Byron Bay, refer to Fig. 1 for details).

Considerable research, both nationally and internationally, has focussed on various individual aspects of boating operations, especially those that relate to interactions with charismatic megafauna (*e.g.* whales, dolphins, seals, turtles) (*e.g.* Blane and Jaakson, 1994; Au and Green, 2000; Erbe, 2002; Williams et al., 2002; Lusseau, 2003; Constantine et al., 2004; Stamation et al., 2010; Work et al., 2010; Wiley et al., 2011; Steckenreuter et al., 2012), the products applied to underwater surfaces to limit colonisation by fouling organisms (*i.e.* antifoulants) (*e.g.* Nichols, 1988; de Mora et al., 1995; Matthiessen et al., 1995; Dahl and Blanck, 1996; Schiff et al., 2004; Warnken et al., 2004; Sapozhnikova et al., 2007; Carson et al., 2009; Singh and Turner, 2009; Turner, 2010) and oil spills (*e.g.* Eberhardt and Garrott, 1997; Batten et al., 1998; Dean et al., 1998; Lancaster et al., 1998; Glegg et al., 1999; Born et al., 2003; Nikitik and Robinson, 2003; Andersen et al., 2008; Melville et al., 2009; Dalton and Jin, 2010). However, less work has focussed on taking an overview of an entire boating sector with regard to their overall boating related environmental impact and the environmental management practices and measures that they use, especially in regard to: (a) quantifying the boating related environmental impacts associated with vessel operation (see Byrnes and Warnken, 2006; Byrnes, 2008; Leon and Warnken, 2008; Byrnes, 2011a; 2011b) (*i.e.* discharges and emissions of pollutants, such as garbage, sewage and oil (including greenhouse gas emissions) and the physical disturbances of habitats and fauna

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