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An evaluation of oil spill responses for offshore oil production projects in Newfoundland and Labrador, Canada: Implications for seabird conservation

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ABSTRACT

Seabirds are vulnerable to oil pollution, particularly in cold-water regions. We investigated the response of small spills (<7.95m^3) at offshore production platforms in Newfoundland, a region recognized for seabird diversity and abundance. In three environmental assessments for oil production operations Environment Canada requested monitoring and mitigation of small spills potentially impacting seabird populations; suggestions supported by two independent reviews. An industry spill response plan states that operators would collect systematic observations on spills and deploy countermeasures where possible. Operators' spill reports were obtained under an Access to Information request. There were 220 daytime spills with sheens (out of 381 spills; 1997–2010). Of these, six reported time to oil dispersion and eleven the presence or absence of seabirds. Industry self-reporting has not permitted an evaluation of the impact of chronic oil spills on seabirds. We recommend that independent observers be placed on platforms to systematically collect data on spills and seabirds.

1. Introduction

Environmental assessments for offshore oil production projects predict that small spills (defined as <7.95 m^3) will occur with higher frequency than larger spills (>7.95 m^3; e.g., Mineral Management Services 2007; ExxonMobil Canada Properties, 2011). Yet our understanding of small spills at offshore hydrocarbon platforms and their association to seabird mortality remains weak (Dicks et al., 1982; Mosbech, 2000; Wiese et al., 2001; McCrary et al., 2003; Fraser and Ellis, 2008a; Ellis et al., 2013; Ronconi et al., 2015). Monitoring of small spills could provide information on (Kirby and Law, 2010): 1) short and long term impacts to the marine environment; 2) distinguishing spill impacts from other types of impacts (e.g., oil sheens from legal discharges from produced water, see Fraser et al., 2006); and 3) a comparison of spill response efforts.

In areas with high concentrations of seabirds, researchers have suggested that chronic pollution may have greater population-level impacts than a single large spill (e.g., Exxon Valdez, 42,000 m^3; Hunt, 1987; Piatt et al., 1991; Wiese and Robertson, 2004; O'Hara and Morgan, 2006; Renner and Kuletz, 2015; Ronconi et al., 2015). In cold-water environments, diving seabirds in particular have a high risk of mortality from very small amounts of oil pollution due to loss of insulation and resulting hypothermia (Jenssen et al., 1985; Jenessen, 1994; Lock et al., 1994; Wiese and Ryan, 2003; O'Hara and Morandin, 2010). Due to their life-history strategies (low reproductive rates, delayed maturity, high adult survivorship), seabird populations are also sensitive to small changes in adult mortality (Wooller et al., 1992). In many parts of the world there are, or will be, offshore oil extraction projects in cold waters with high concentrations of seabirds (e.g., North Sea [Tasker et al., 1986; Ollason et al., 1997; Fraser et al., 2008], Falkland Islands [Pakhomov and McQuaid, 1996; White et al., 2002], Tasmania [Bretagnolle and Thomas, 1990; Bernecker and Totterdell, 2012], Newfoundland and Labrador [Burke et al., 2012] and Canadian arctic [Wong et al., 2014]). As most seabird populations are declining (International Union for Conservation of Nature, 2012), many species using these regions are also of conservation concern (e.g., rock hopper penguin, *Eudyptes chrysocome* [Cuthbert and Sommer, 2004]; erect crested penguin, *Eudyptes sclateri* [Taylor, 2000]); and thick-billed murre, *Uria lomvia* [Kålås et al., 2010]). Offshore oil platforms attract seabirds (Tasker et al., 1986; Baird, 1990; Wiese et al. 2001; Montevecchi, 2006; Burke et al., 2012; Ronconi et al., 2015), thus increasing the likelihood of exposure to localized oil pollution. In the absence of on-platform monitoring (see Montevecchi et al., 1999; Ronconi et al., 2015) the main approach to assess oil production spills is through beached bird surveys (e.g., Camphuysen and Heubeck, 2001). However, the move towards extraction activities further offshore means that seabirds oiled from platform spills are less likely to be detected or will be under-represented in such surveys (Robertson et al., 2012). Collecting standardized observations on seabirds from offshore platforms could help evaluate the risk small spills pose to various seabird populations (Montevecchi et al., 1999; Ronconi et al., 2015).

In this context, we first surveyed environmental impact statements for three oil production projects in Newfoundland and Labrador (NL) for their consideration of chronic oil pollution and impacts on seabirds. We then evaluated the subsequent reporting of and response to small spills from the oil production projects. The Grand Banks off NL supports

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an estimated 40 million seabirds annually (Montevecchi and Tuck, 1987) and as of 2016, there are four offshore oil production projects all over 300 km offshore (Fig. 1). While regional beached bird surveys provide oil-related mortality estimates (Wiese and Ryan, 2003; Wiese and Robertson, 2004; Wilhelm et al., 2009), it is unlikely that they detect seabirds oiled by spills from platforms so far offshore (Wilhelm et al., 2007; Robertson et al., 2012).

2. Regulatory framework

The offshore oil and gas regulatory agency, the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB, formerly C-NOPB), is an independent joint federal-provincial board (Government of Canada, 1987). The C-NLOPB issues authorizations for offshore oil activities, is the lead responsible authority in environmental assessment processes and ensures compliance to environmental protection plans (see Van Driel and MacDonald, 2002; Erlandson Consulting Inc., Petroleum Research Atlantic Canada, 2004; C-NLOPB, NDa). Environment Canada is the regulatory agency responsible for the Migratory Bird Convention Act (Government of Canada, 1994), an international treaty designed to protect migratory birds in general and from oil pollution specifically (Section 5.1(1)). As a federal agency with relevant expertise, Environment Canada participates as a responsible authority in environmental assessment review processes for oil and gas activities and is consulted for the duration of a project (Van Driel and MacDonald, 2002). The C-NLOPB has a Memorandum of Understanding with Environment Canada that outlines their respective roles for offshore oil development (C-NOPB, 1988; C-NLOPB and Environment

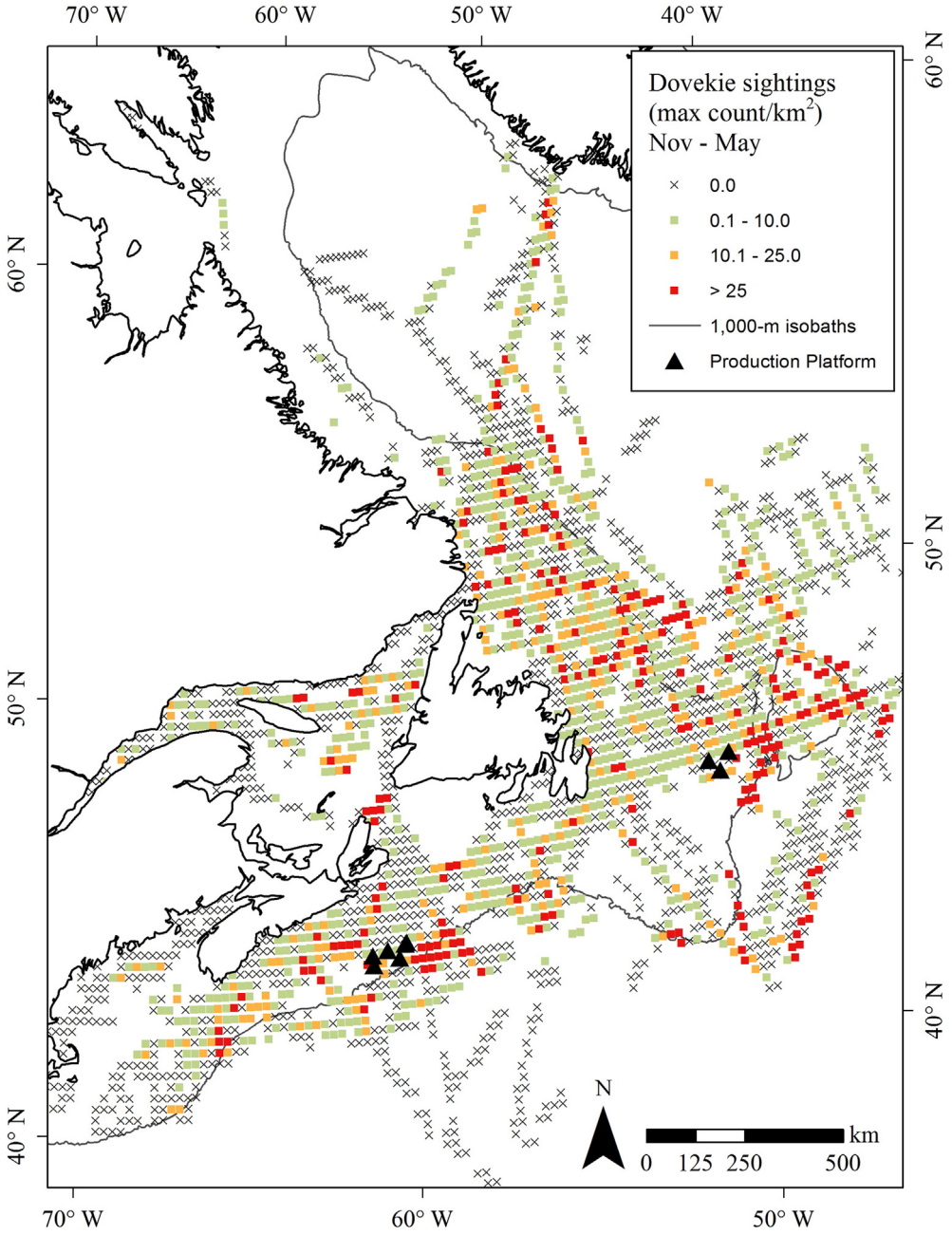

Fig. 1. Eastern Canada Seabirds at Sea (ECSAS) survey data showing Dovekie (*Alle alle*) distribution and abundance from May to November (maximum counts/km^2 per 15° grid). Data are from Canadian Wildlife Service — Environment Canada (Carina Gjerdrum) collected according to the Eastern Canada Seabirds at Sea survey protocol and area based on sightings while the ship was moving, within transect, and not following the ship (see Gjerdrum et al., 2012). The map shows relative densities and are not corrected for differences in detectability (i.e., not all birds are detected within the 300 m transect) and the data are therefore underestimates.

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