Northwest Atlantic Fisheries Organization

Serial No. N6206 **NAFO SCS Doc. 13/16**

SCIENTIFIC COUNCIL MEETING - 2013

Environmental Impacts – NAFO Advisory Sheets

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Northern Shortfin Squid in SA 3 + 4 - *Environmental Impacts*
High squid catch is normally associated with a warm oceanographic regime. Cold conditions, particularly for prolonged periods such as in the early 1990's, lead to low abundance (Dawe and Hendrickson 1998, Dawe et al. 1998). Current oceanographic conditions indicate above average temperature conditions across the Newfoundland Shelf to the Scotian Shelf that may provide a favorable environment for recruitment (Colbourne et al. 2013, Hebert and Pettipas 2013).

Yellowtail in Div. 3LNO - *Environmental Impacts*
Bottom temperatures in Div. 3LNO continue to remain above the long-term average (Colbourne et al. 2013). Warmer oceanographic regimes are hypothesized to provide a more suitable environment for yellowtail spawning success, improved survival and growth rates.(Colbourne and Walsh 2006).

Capelin in Div. 3LNO - *Environmental Impacts*
Temperature conditions during egg incubation and larval emergence have been linked to recruitment success in beach-spawning capelin (Frank and Leggett 1981, Leggett et al. 1984). Higher frequency of onshore wind events with favourable orientation to the spawning beds would be expected to led to enhanced survival and recruitment. A large reduction in this stock coincided with the prolonged cold period of the early 1990's. Water temperatures across Divs. 3LNO have been generally stable and above the long-term mean since the mid-1990's and prolonged cooling has not occurred in nearly two decades (Colbourne et al. 2013).

Cod in Div. 3M and 3NO - *Environmental Impacts*
Cod on the Grand Bank and Flemish Cap will benefit in a warmer oceanographic regime due to increased growth and productivity (Drinkwater 2005). Bottom temperature across the Flemish Cap were above normal in 2012, and have remained high since 2008 (Colbourne et al. 2013).

White Hake in Div. 3NO - *Environmental Impacts*
On the Grand Bank, white hake are near the northern limit of their range, concentrating along the southwest slope of the Grand Bank at temperatures above 5°C (Kulka et al. 2005). The major spawning area is located on the shelf-edge on the Grand Bank (Han and Kulka 2007). Weaker ocean currents on the continental slope during spawning period is hypothesized to reduce potential losses of eggs and larvae due to entrainment in the Labrador Current and increase recruitment potential.

Witch Flounder in Div. 2J + 3KL - *Environmental Impacts*
This stock is near the latitudinal midpoint of the species and is therefore believed to be resilient to temperature variations. (Burnett et al. 1992). Bottom temperatures in Div. 2J, 3K and 3KL have remained well above normal for the past several years and a warm oceanographic regime may permit increased growth and productivity of these stocks.

Redfish in Div. 3M – *Environmental Impacts*
The zooplankton index for the area peaked in 2010 and has remained above normal in recent years indicating favourable feeding conditions for redfish in their early life stages (Maillet et al. 2013). Variation in stock size seems to some degree to be associated with atmospheric and temperature drivers (Devine and Haedrich 2011). Water temperatures across the Flemish Cap have been generally stable and above the long-term mean since the mid-1990's and prolonged cooling has not occurred in nearly two decades (Colbourne et al. 2013).

Redfish in Div. 3O – *Environmental Impacts*
The zooplankton index for the area peaked in 2010 and has remained above normal in recent years indicating favourable feeding conditions for redfish in their early life stages (Maillet et al. 2013). Variation in stock size seems to some degree to be associated with atmospheric and temperature drivers (Devine and Haedrich 2011). Water temperatures across Div 3LNO have been generally stable and above the long-term mean since the mid-1990's and prolonged cooling has not occurred in nearly two decades (Colbourne et al. 2013).

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