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Canadian Science Advisory Secretariat
Maritimes Region | Science Response 2014/051

2014 STOCK STATUS UPDATE OF LOBSTER FISHING AREA 41 (4X + 5Zc) LOBSTER

Context

The status of the lobster resource in Lobster Fishing Area (LFA) 41 was last assessed in December 2013 (DFO 2014). The Precautionary Approach adopted in the Offshore Lobster and Jonah Crab Integrated Fisheries Management Plan (IFMP) for LFA 41 uses 12 primary indicators with upper and lower boundaries to define the healthy, cautious, and critical zones, as well as secondary indicators that aid in interpreting changes in the primary indicators. This Science Response updates 9 of the primary indicators for 2014.

This Science Response Report results from the Science Response Process of 14 October 2014 on the Lobster Fishing Area (LFA) 41 Lobster Stock Status Update.

Background

Commercial lobster fishing in LFA 41 (Figure 1) takes place offshore, from the 50 nautical mile line (92 km) to the upper continental slope.

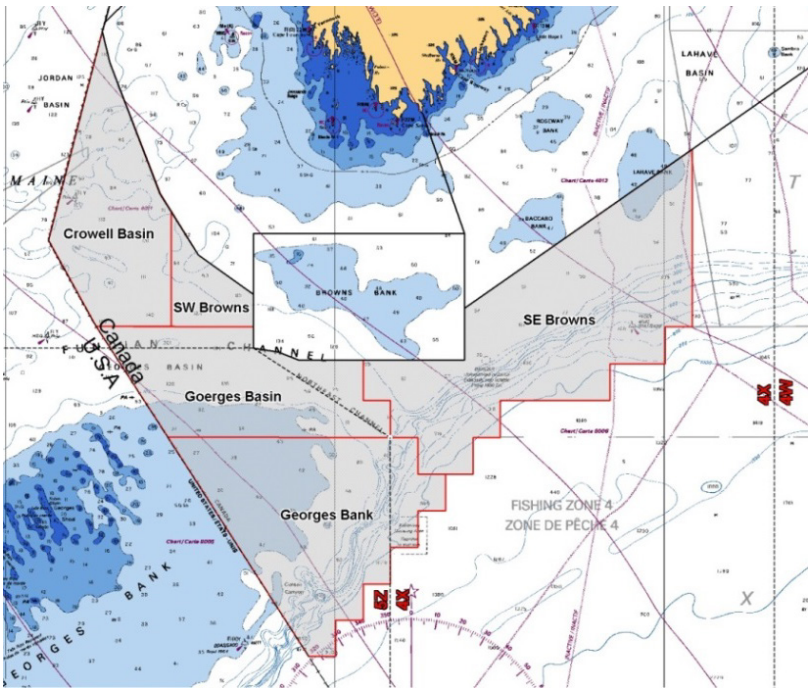

Figure 1. Map showing LFA 41 offshore subareas based on grid groupings of 10 minute latitude and longitude grid (Crowell Basin, SW Browns, and SE Browns are in 4X; Georges Basin and Georges Bank are in 5Zc).

The LFA 41 fishery operates under the Offshore Lobster and Jonah Crab IFMP with 8 licenses and an annual total allowable catch (TAC) of 720 mt. It is the only lobster fishery in Canada that is managed with a TAC. This fishery has also maintained Marine Stewardship Council (MSC) certification since 2010.

Analysis and Response

There are four groups of primary indicators for this stock – two of which are indicators of abundance, and two of which are size-based indicators of fishing pressure and reproduction (Figure 4). Primary indicators of abundance are based on the mean number of lobsters per tow in Research Vessel (RV) trawl surveys. Three of these use Maritimes Region RV surveys, but one depends on data from the US National Marine Fisheries Service (NMFS) fall survey. Indicators linked to fishing pressure and reproduction are based on changes in the median size of females in Maritimes and US trawl surveys and in at-sea samples of the commercial catch. The US survey indicators are not updated here because of issues related to data selection. All indicators updated in this Science Response are above the upper boundaries (Figure 4), and the LFA 41 stock is considered to be in the healthy zone.

Number per Tow in RV Surveys

Stratified mean number of lobsters per tow from the Maritimes Region summer RV survey (4X) for the last 34 years (1980 to 2014) show that recent catch rates are the highest on record (Figure 2). This is based on strata 477-484, which includes the closed area (LFA 40). The upper boundary is based on 50% of the median survey catch of the 1995-2009 period (1.48), and the lower boundary is based on 40% of the median survey catch of the 1983-94 period (0.16). The metric for assessing where the catch rate is relative to the upper boundary is the 3-year moving average of the mean survey catch, which is 10.50 lobsters per tow for 2014, well above the upper boundary and the highest on record.

The stratified mean number of lobsters per tow from the Maritimes Region winter RV survey (5Z) in recent years is among the highest on record (Figure 3). This is based on strata 5Z1-4, which includes US waters. The upper boundary is based on 50% of the median survey catch of the 1995-2009 period (0.35), and the lower boundary is based on 40% of the median survey catch of the 1987-1994 period (0.07). For 2014, the 3-year moving average is 2.05 lobsters per tow, well above the upper boundary and a slight decrease from the 2013 value.

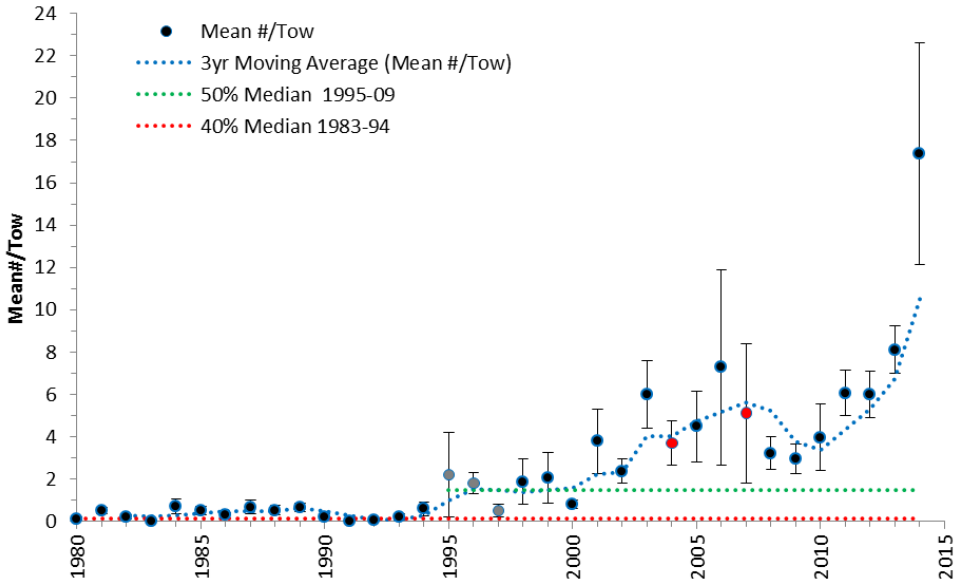

Figure 2. 4X Maritimes Region summer RV survey (Strata 477-484). Mean number per tow with standard errors and a 3-year moving average. Red circles (2004,2007) represent surveys with a different vessel, the Teleost, and grey circles (1995-1997) represent a period when count is estimated from the mean weight per tow as count was not recorded.

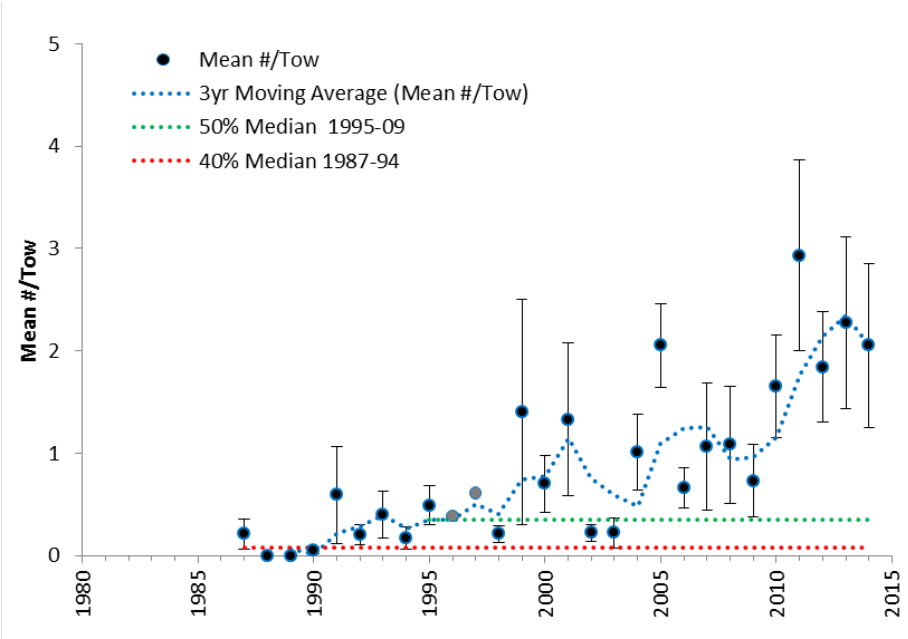

Figure 3. 5Z Maritimes Region winter RV survey (Georges, Strata 5Z1-4). Mean number per tow with standard errors and a 3-year moving average. Grey symbols (1996-1997) represent a period when count is estimated from the mean weight per tow as count was not recorded.

Large Female Abundance

The mean number per tow of females greater than or equal to 140 mm carapace length (CL) in the Maritimes Region summer survey (4X, 1999-2014) is a direct indicator of abundance, as well as an indirect indicator of reproductive potential and exploitation rate. Small sample size in the trawl surveys is a source of uncertainty in the interpretation of this indicator, and analysis is based on strata 480-481, which includes the closed area. The upper boundary is 80% of the minimum value of the time series (0.27). For 2014, the 3-year moving average is 2.29, which is slightly more than double the 2013 value and still well above the upper boundary.

The large female abundance indicator from the US trawl survey has not been updated in this Science Response.

Median Female Size

The median female size indicators proposed in the last assessment (DFO 2014) are based on trawl surveys and at-sea samples and, when considered with indicators of abundance, can be used as proxies for exploitation rate and reproductive potential. The median female size indicator from the US trawl survey has not been updated in this Science Response.

In 4X, the upper boundary for median female size based on the Maritimes Region RV survey is the midpoint between the median size for the reference period (1999-2012, 106 mm CL) and the lower boundary (size at 50% maturity, which is currently estimated to be 95 mm CL). The metric for assessing where the median female size is relative to the boundary is the 3-year moving average of the median female size, which is 111 mm CL for the 2014 fishing year, well above the upper boundary.

The upper boundary for median female size based on at-sea samples is also the midpoint between the median size for the reference period (1977–2012) and the lower boundary (size at

50% maturity = 95 mm CL). Unlike other indicators, the at-sea sample time series is interrupted by years with no available data; therefore, a 3-year moving average cannot be applied as the metric. The metric is the median female size specific to each time period and location (Figure 4). Four out of the 6 medians for 2014 show an increase in median size, while a slight decrease in the median is observed for 4X-Southeast Browns (Spring). All of these are still above the upper boundary. One indicator, 4X-Southwest Browns (Fall), was not updated as the sampling has not yet occurred for 2014 (November-December).

Conclusions

Figure 4 uses a traffic light approach to display where annual stock status indicators fall relative to the upper and lower boundaries defined for each. For the abundance indicators, 2014 values are well above the upper boundary for the LFA 41 stock. For the size indicators, the 2014 trawl-based 3-year mean and the at sea sample medians are also well above the upper boundary. Given that all the indicators are providing similar signals, there is confidence that abundance remains relatively high.

According to the current framework (DFO 2014), the LFA 41 lobster fishery is in the healthy zone.

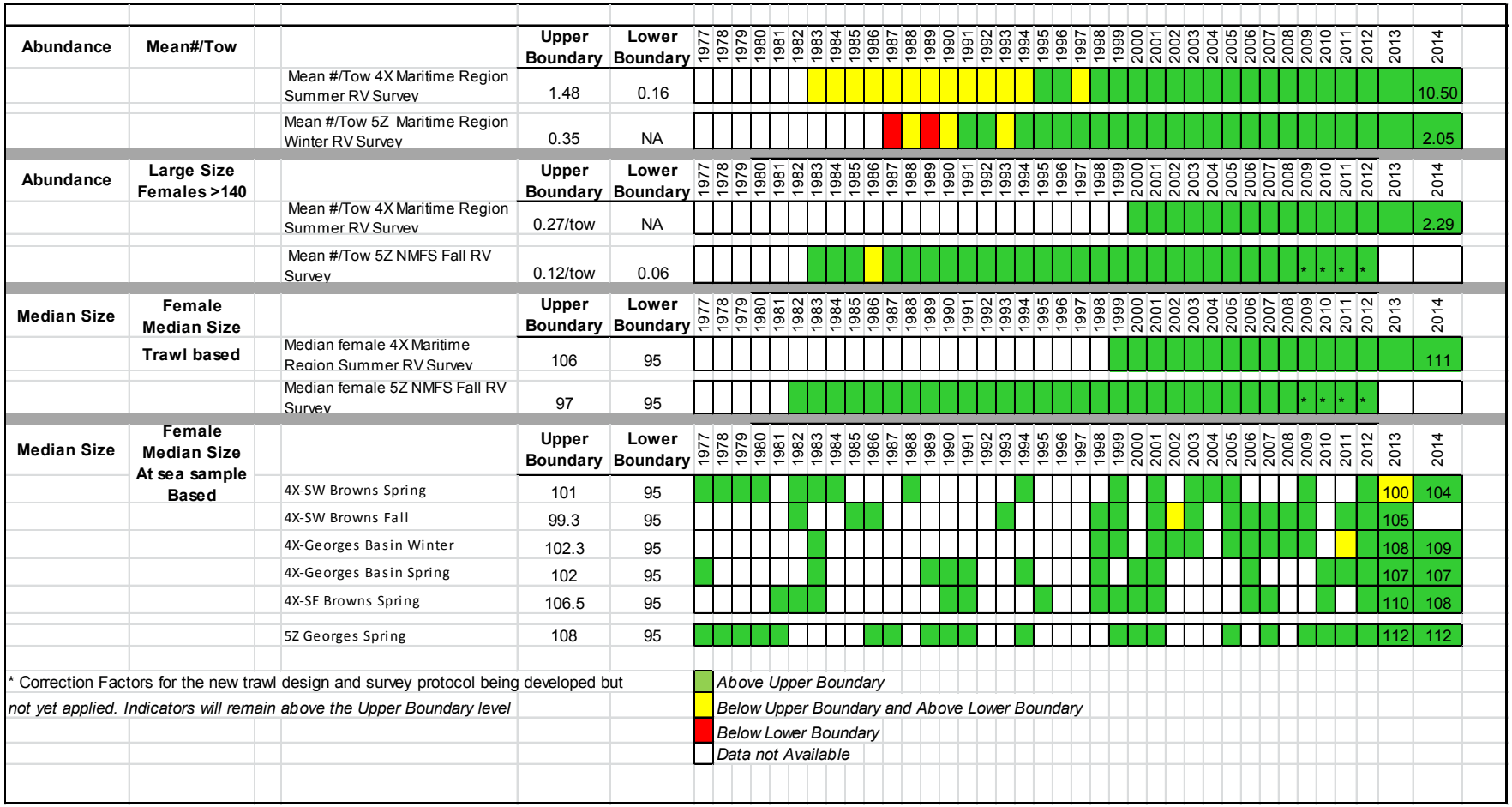

Figure 4. Primary indicators in the offshore lobster (LFA 41) fishery. Annual values for survey-based indicators are 3-year moving averages; indicators based on at-sea samples are annual values.

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Sources of Information

DFO. 2014. Assessment of Lobster (*Homarus americanus*) in Lobster Fishing Area 41 (4X + 5Zc). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2014/034 (Revised).

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