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## *ICES Zooplankton Status Report 2010/2011*

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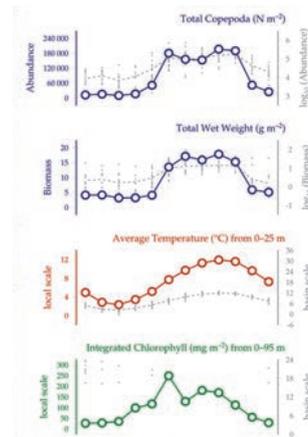
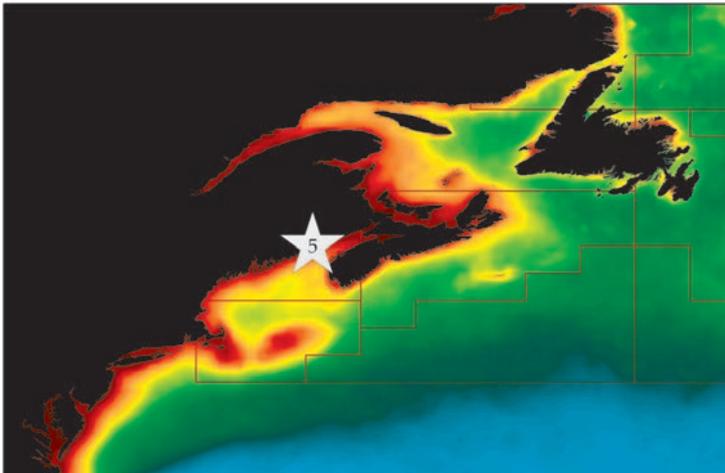


The time-series analyses and figures used in this report were created using COPEPODITE:

<http://www.st.nmfs.noaa.gov/copepodite>

## 3.2 Prince 5, Bay of Fundy (Site 5)

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**Figure 3.2.1**  
Location of the Prince 5 monitoring area (Site 5) on a map of average chlorophyll concentration, and its corresponding seasonal summary plot (see Section 2.2.1).

Zooplankton have been sampled by Fisheries and Oceans Canada's (DFO's) Atlantic Zone Monitoring Program (AZMP) semi-monthly (1999 to 2003) or monthly at Prince 5, which is a 100 m deep station located just off Campobello Island in the northwest of the Bay of Fundy, approximately 6 km offshore from St Andrews, New Brunswick (Figure 3.2.1). Zooplankton are sampled at Prince 5 using vertical ring-net tows (0.75 m diameter, 200  $\mu$ m mesh) from near-bottom to surface. A small vessel is used as the sampling platform. Conductivity, temperature, and depth (CTD) profiles are recorded, and water samples are collected in Niskin bottles for measuring phytoplankton, nutrients, and extracted chlorophyll. Zooplankton samples are split and one-half is used for size fractionated (< 10 mm and > 10 mm) wet and dry weight determination. The other half is subsampled for taxonomic identification and enumeration. Biomass of the dominant groups is also calculated using individually determined dry weights and abundance data for the dominant species groups (*Calanus*, *Oithona*, *Pseudocalanus*, and *Metridia*). The data are entered into the "BioChem" database at DFO. An ecosystem status report on the state of phytoplankton and zooplankton in Canadian Atlantic waters is prepared every year; the report for 2009/2010 is available at [http://www.dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2012/2012\\_071-eng.pdf](http://www.dfo-mpo.gc.ca/Csas-sccs/publications/resdocs-docrech/2012/2012_071-eng.pdf).

### Seasonal and interannual trends (Figure 3.2.2)

The Prince 5 station is tidally well-mixed year-round. Non-living suspended matter has a strong effect on light attenuation at this station, and the phytoplankton growth cycle is typically characterized by an early summer peak with secondary peaks in late summer or autumn (Figure 3.2.1). Monthly average abundance of total copepods is variable (Figure 3.2.1), but values are generally lowest during winter (January–April) and highest in summer to early autumn (June–October). The zooplankton community at this station includes both nearshore and central Gulf of Maine species.

There has been no trend in annual average total copepod abundance anomalies over the 12-year time-series. The highest anomalies were observed in 2001 and 2010 and the lowest in 2002 and 2005 (Figure 3.2.2). In years of low abundance, i.e. years with negative annual abundance anomalies, the summer/autumn high abundance period was often weaker and/or of shorter duration. In addition to copepod abundance, co-sampled time-series of zooplankton wet weight, individual species abundances, integrated chlorophyll, and integrated temperature data are reported for the site (Figure 3.2.2). Although the seasonal cycles of copepod abundance and small (<10 mm) organisms wet weight are similar, their annual anomalies were not correlated, and while late stages of *Calanus finmarchicus* are the biomass dominants in the small organisms wet weight fraction at Prince 5, only abundance anomalies of adult male *C. finmarchicus* were correlated with small organism wet weight.

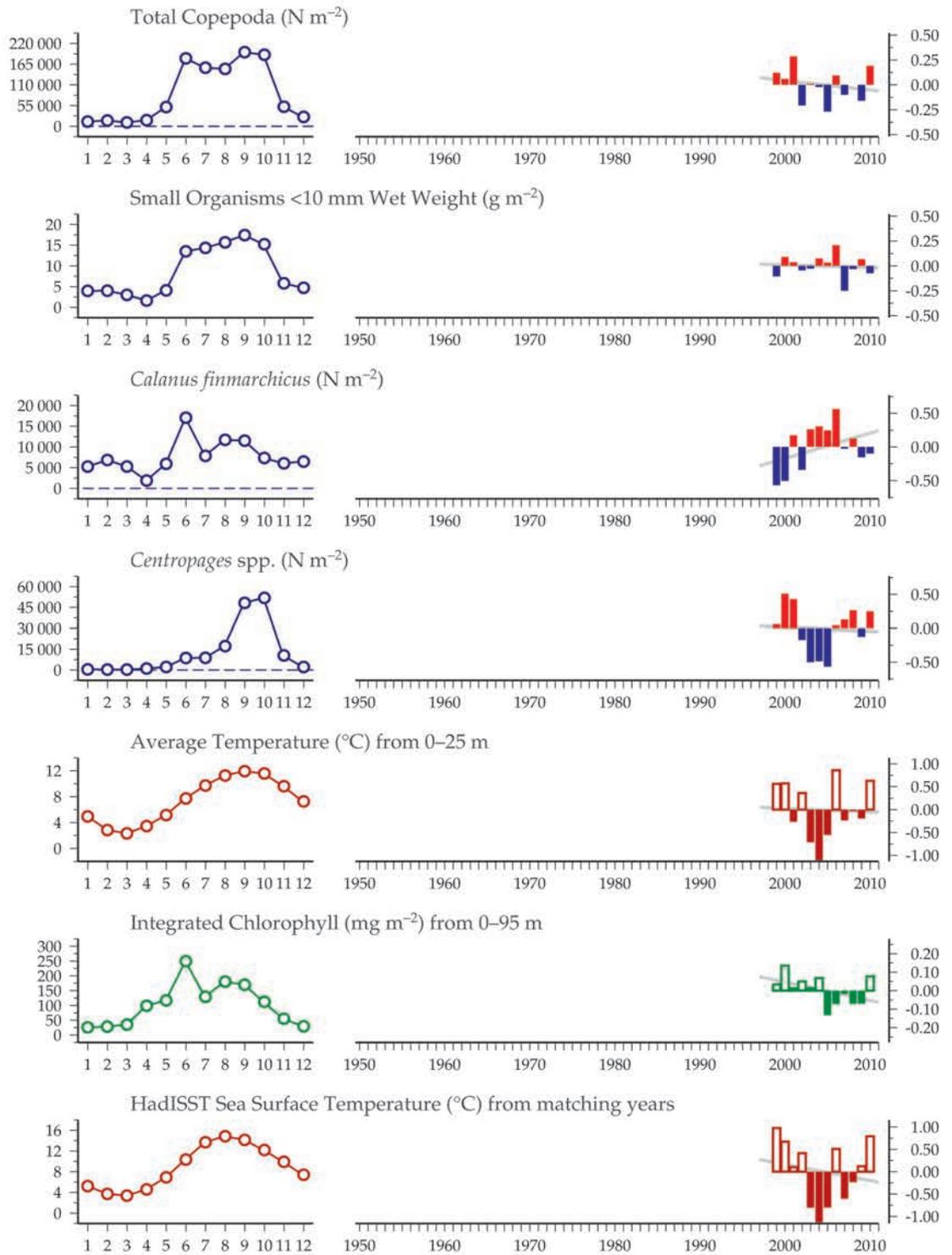
Average temperature sampled at Prince 5 and Hadley SST show similar interannual increases and decreases during 1999 to 2010, with primarily positive anomalies in 1999 to 2002 and in 2006 and 2010 (Figure 3.2.2). The SST values are at the high end of an approximately 50-year multi-decadal trend. *C. finmarchicus* abundance had a significant negative relationship with Hadley SST in 1999–2010, while the warm water copepod *Centropages* spp. had a positive relationship with Hadley SST and average temperature (0–25 m) measured at the site. At Prince 5, cool years appear to favour *C. finmarchicus*, which is a winter/spring coldwater species, while warm years favour *Centropages* spp., which are warm-associated in this region. Chlorophyll anomalies at the site were positive for the first six years of the series, then negative until 2010 when they returned to positive values. Chlorophyll annual anomalies were not correlated with anomalies of any of the zooplankton groups at Prince 5 over 1999–2010.

Figure 3.2.2

Multiple-variable comparison plot (see Section 2.2.2) showing the seasonal and interannual properties of select cosampled variables at the Prince 5 monitoring area.

Additional variables are available online at: <http://WGZE.net/time-series>.

### Prince 5, Bay of Fundy



### 50-year trends in the Prince 5 / Bay of Fundy region

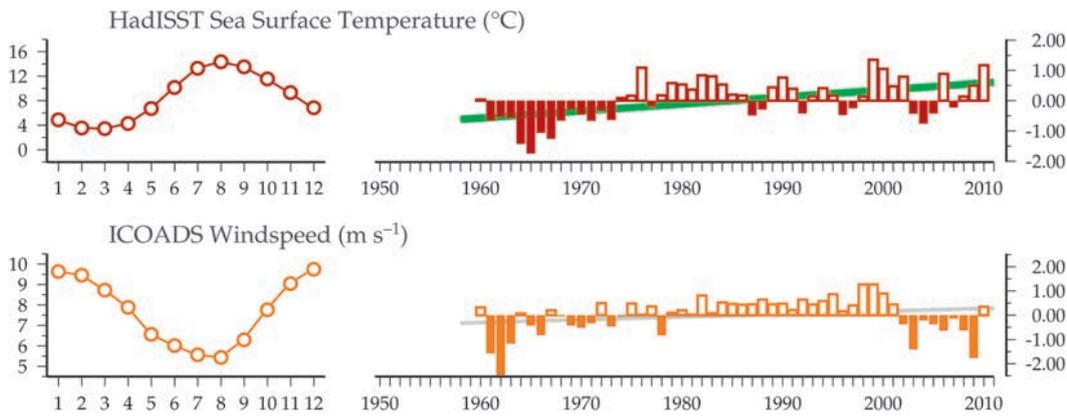


Figure 3.2.3  
Regional overview plot  
(see Section 2.2.3) showing  
long-term sea surface  
temperatures and wind  
speeds in the general region  
surrounding the Prince 5  
monitoring area.

### 100-year trends in the Prince 5 / Bay of Fundy region

