An Incomplete Analysis

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Niles and colleagues (2009) do not present all of the data relevant to the issues they address in the article they wrote for *BioScience*. They reference unnamed sources for pre-1997 horseshoe crab harvest to conclude that recent harvest exceeds historic harvest. In fact, reported landings from New Jersey, Delaware, Maryland, and Virginia in 2006 (352 metric tons [mt]) were between landings in 1989 (365 mt) and 1990 (232 mt) (*www.st.nmfs.noaa.gov/st1/commercial/index.html*), despite nonmandatory reporting coastwide before 1998 (Kreamer and Michels 2009). They present egg densities from New Jersey beaches only. Of the 11 Delaware beaches sampled, eggs in the top 5 centimeters exceeded their monitoring target of 50,000 per square meter at 5 in 2006 and at 6 in 2007 (Kalasz et al. 2008). They rely on the Delaware trawl survey for historic trends. Nine fishery-independent surveys have been used to assess trends in the Delaware Bay region, and several began before 1990 (Smith et al. 2009a).

Niles and colleagues do not consider the full scope of harvest controls that have been implemented. Harvest regulations in Delaware Bay starting in the late 1990s—including harvest quotas, seasonal closures, male-only harvest, use of bait-saving devices, and establishment of a 3885-square-kilometer no-take sanctuary—have been followed by population stabilization and increase (Smith et al. 2009a). Recent data indicate that horseshoe crab abundance has increased from a low reached in 2003–2004 following a pattern that fits the predicted demographics of a recovering population due to sex-specific maturity (Hata and Hallerman 2009, Smith et al. 2009b).

Niles and colleagues overstate the certainty of red knot population estimates by claiming a total count and disregarding uncertainties that arise when sampling birds from aircraft (Laursen et al. 2008). While we do not dispute red knot decline, we question assumptions underlying Niles and colleagues' confidence in its magnitude. In recent years approximately 7000 red knots staged their migration on the coastal islands of Virginia, where they fed largely on *Donax* (Cohen et al. 2009).

Complete understanding of the red knot decline could be undercut by the embrace of a ruling theory that decreased horseshoe crab eggs during the Delaware Bay stopover explains everything. Niles and colleagues do not acknowledge the possibility that horseshoe crab populations could increase, but not those of the red knots. They do not mention that climate change could affect Arctic-nesting species.

Niles and colleagues propose as a temporary measure an ad hoc management action: small or no harvest until "it is clear that horseshoe crab populations are recovering and likely to reach their target." They fail to acknowledge the progress of the ongoing adaptive management process for horseshoe crabs and red knots supported by the National Fish and Wildlife Foundation, US Geological Survey, US Fish and Wildlife Service, and Atlantic States Marine Fisheries Commission (Breese et al. 2007). That adaptive management process is focused on finding optimal iterative decisions among a set of management actions, which have been identified through good-faith stakeholder input.

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Response from Niles and colleagues

These crab harvest data confirm the scenario we described, though the increase started earlier (1989, not 1991). Mean annual landings on the US Atlantic coast from 1970 to 1988 (211 metric tons [mt]) were less than 2006 landings in four states (352 mt), indicating that recent harvest exceeds historic harvest. However, pre-1998 data may be underestimates because of nonmandatory reporting.

We presented egg-density data for New Jersey to show the long-term trend. Data for Delaware are not sufficiently long term to