Stu Innes Award Winner and Best Doctoral Talk: Charmaine Hamilton

Title:
Impacts of sea-ice declines on a pinnacle Arctic predator-prey relationship: Habitat, behaviour and spatial overlap between coastal polar bears and ringed seals

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Abstract:
Changing environmental conditions in the Arctic are differentially impacting species, causing alterations in biological interactions. In 2006, a large shift in the sea-ice regime occurred in Svalbard, Norway. Among other changes, the amount of land-fast ice sharply declined. Polar bears (*Ursus maritimus*) and ringed seals (*Pusa hispida*) are Arctic endemic, sea-ice obligate species. Ringed seals are the primary prey of polar bears with successful predation being dependent on the presence of sea ice. These two species have two movement strategies in Svalbard; they either remain coastal in association with tidal glacier fronts or they travel to the offshore sea ice in the Barents Sea. Polar bears and ringed seals in Svalbard were equipped with biotelemetry devices before (2002-2004) and after (2010-2012) the collapse in the sea-ice conditions occurred. This study quantified how the habitat, space use, movement patterns and spatial overlap between coastal polar bears and ringed seals were impacted by the sea-ice decline. After the sea-ice collapse, polar bears spent similar amounts of time near tidal glacier fronts in the spring but significantly less time in the summer and autumn. Ringed seals did not alter the amount of time spent near tidal glacier fronts nor the amount of time spent hauled out (i.e. vulnerable to polar bear predation). This differential response to changing sea-ice conditions led to a large decrease in spatial overlap between these two species in the summer. After the sea-ice collapse, polar bears moved greater distances daily and spent more time near ground-nesting bird colonies. The decline in land-fast ice is likely making it more difficult for polar bears to hunt ringed seals, which are now hauling out on glacier ice pieces. Changes in predator-prey interactions will likely become increasingly common as environmental changes continue, resulting in a range of impacts on the wider ecosystem.