# Monitoring of saltwater crocodiles in the Kimberley

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Over the past 30 years, considerable research has been conducted on saltwater crocodile (*Crocodylus porosus*) biology, population dynamics and recovery from hunting, (DEC 2009). However, the geographic focus has been the Northern Territory (NT) with only the Cambridge Gulf region in Western Australia receiving any attention.

The last broad scale surveys conducted on saltwater crocodile populations in the greater West Kimberley region were done over 25 years ago by Messel et al. (1987). At this time total population numbers were estimated at ~ 2,500 adults and represented a population slowly recovering from the excessive harvesting that was ended by the WA Government in 1969 (Semeniuk et al. 2011). The research conducted on saltwater crocodiles in the NT concluded that their populations had fully recovered by 2000 (Webb et al. 2000). However, the only conclusions that can be drawn from the paucity of data on WA populations are that saltwater crocodiles likely currently occupy their historical ranges and are not under any known local pressures. Climate change does, however, have the capacity to cause regional-scale impacts on crocodile breeding and sex-ratios while warming oceans are also likely to increase southward incursions of crocodiles down the Kimberley and Pilbara coastlines.

With respect to *C. porosus* habitat, the Kimberley region differs from the NT in that it has far less appropriate habitat for nesting/breeding. River systems that pass landwards into savannah supratidal flats and savannah floodplains provide the most productive environments for crocodiles, allowing for significant nesting (Semeniuk et al. 2011). Apart from the Cambridge Gulf region there is much less of this type of seascape/landscape available throughout the greater Kimberley Region. In the western Kimberley, the largest *C. porosus* populations occur in the Prince Regent and Roe River systems (Semeniuk et al. 2011) where appropriate nesting habitat is most abundant. This restricted distribution of appropriate nesting habitat is an advantage from a monitoring perspective in that fewer areas need be targeted to gain effective insights into the "health" of *C. porosus* populations in the greater Kimberley region.

Fortuitously, these systems are also adjacent to each other which enables resources to be concentrated in the one area. Utilising night time spotlight surveys, which are standard practice in the Northern Territory and were used by Messel et al. during the 1987 surveys, we shall be undertaking detailed counts of saltwater crocodile populations in the Prince Regent and Roe Rivers systems in August 2015. This data will be used to draw direct inferences with the Messel et al. surveys to ascertain the changes that have occurred in the crocodile populations of the greater Kimberley over the past 25+ years. Because surveys of the entire Kimberley Region are not practical it is also intended to build a predictive capacity through modelling of the data collected from the targeted surveys. Modelling work on NT *C. porosus* populations has identified a suite of environmental parameters that correlate well with the abundance of saltwater crocodiles (Fukuda et al. 2007). This combination of targeted surveys and modelling of saltwater crocodile abundances in the greater Kimberley region will provide a significant update to our understanding of current baseline conditions of *C. porosus* populations, enabling managers to formulate plans based on current rather than historic data.

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