



P.O. Box 630
NARRABEEN
NSW 2101

6th November 2005

The Honourable Ian MacDonald, MLC
Minister for Primary Industries
Level 30 Governor Macquarie Tower
1 Farrer Place
Sydney, NSW, 2000

Dear Minister,

Re: Genetic Diversity of the Grey Nurse Shark Population

The NSW Legislative Council Hansard for 7th June 2005 has recorded you, in answering a question from Tony Catanzaritti, making the following two statements concerning the population decline of the grey nurse shark along the NSW coast:

"The population of grey nurse sharks off the east coast of Australia, has reached such a critical level that, in combination with their extremely low fecundity, some form of human intervention is required to boost the grey nurse population."

And:

"...extra protection through restrictions to fishing, while important, tends to slow the decline. In order to rebuild the population, we need to increase the wild population."

This basically states that the grey nurse population is on a self-destruct course, and fishing restrictions will only slow this decline.

This then raises the question of the genetic pool, with the population being so critical will there be enough to sustain genetic diversity to counter the effects of inbreeding and to counter the loss of genetic variation through genetic drift, and any bottleneck effects?

The questions are:

- Other than Rob Harcourt's work (Macquarie University) what genetic studies have been done on the east coast population of the grey nurse shark?
- Were indications of genetic deformities such as instances of scoliosis included in the aims of the dive surveys by DPI Fisheries or were these surveys merely for the purpose of population counts and to note the presence of hooks? If yes, then what are the results? Of not, then why not?
- What is the effective population size to counter the effects of inbreeding in the east coast grey nurse shark population?
- What is the effective population size to counter the effects of genetic drift in the east coast grey nurse shark population?
- Is there any evidence for populations losing heterozygosity, ie evidence for the genetic divergence of isolated populations in the east coast grey nurse shark population?
- What distances need to be traveled for various levels of genetic mixing to counter the effects of inbreeding of isolated populations in the distribution of the east coast grey nurse sharks?
- What percentage of the genetic diversity may be lost over, say, 10, 20, and 50 generations in the east coast grey nurse shark population?
- Were genetics and genetic diversity considered in the proposed IVF program for the grey nurse shark? If not, then why not?

Maintaining genetic variation is important in any population as reduced genetic variation means a population may not be able to adapt to new selection processes such as climatic change or a shift in available resources. Any attempts to save the east coast grey nurse shark population may be doomed for genetic reasons, and these deleterious effects on the grey nurse population may well have come about in their period of rapid decline in the 1960's and 1970's. To give the east coast population of the grey nurse shark the best chance to survive there must be an understanding of the various processes such as bottlenecks and genetic drift that affects their genetic diversity. The population may have already reached such a critical level that a lack of genetic variation in population may mean the population is not able to adapt to environmental or other changes such as global warming. This may explain why the population "has reached such a critical level that, in combination with their extremely low fecundity, some form of human intervention is required to boost the grey nurse population", and

if this is the case then human intervention must take genetics and genetic variation into consideration. Possibly translocation from other areas or populations should be considered?

Yours sincerely

Phillip Ingram

President
Anglers Action Group (Sydney Northside) Inc.

CC Duncan Gay MLC