As well as examining the dorsal spines of dogfish species, Deakin University PhD student Sarah Irvine gets to explore the biology of other shark species delivered to CSIRO Marine Research by interested fishers. In this picture Irvine and colleague Stephen Leporati dissect a giant Pacific sleeper shark. The sleeper shark, appropriately called *Somniosus pacificus*, is a poorly known species that occurs off south-east Tasmania and is sometimes caught in orange roughy trawls. It grows to a length of six metres.

Do spine rings tell tales of recovery?

TO HELP identify appropriate conservation measures for dogfish, CSIRO scientist Ross Daley, needs to know how long different dogfish species take to recover from overfishing.

Deakin University PhD student Sarah Irvine is hoping to address this issue using ageing techniques. If she can work out how long dogfish live and at what age they mature, she can correlate this information with the number of pups born during a shark's lifespan, and determine their ability to recover.

To age dogfish, Irvine is examining the dorsal spines of six species of dogfish caught by trawlers, for growth rings – much like those of a tree. The dorsal spines occur just in front of the two dorsal fins and are made of dentine surrounded by a thin coat of enamel.

Cut in cross section, dorsal spines exhibit a series of rings surrounding a central pulp cavity. Like other sharks – whose growth rings appear in their vertebrae – the pups of at least one dogfish species are born with a single growth ring, and new ones are layed down each year. Irvine has recently discovered growth rings on the spines' outer enamel, which will be compared to those in the inner dentine.

To confirm that the spine rings really do represent growth, Irvine will also examine vertebrae for the presence of growth bands.

'The spines grow independently of the vertebrae. But if they lay down the same number of bands, we can assume they are laid down at the same time,' she says.

By plotting the number of growth rings against the length of the shark, and accounting for reproductive characteristics such as gonad weight and development, Irvine will be able to determine the age at which female sharks mature. In male dogfish, maturity is apparent when the claspers – used to transfer sperm to the female – have calcified.