

The Australian Wobbegong Shark:

∴ NIGEL MARSH

Right: The yellow skin of this ornate wobbegong is common with wobbies found on shipwrecks; perhaps they absorb the iron into their skin, changing the colour.

Wonderful Wobbies

Below: An ornate, in detail.

The family Orectolobidae is represented by six described and several undescribed species. The only described species not found off Australia is the Japanese *Orectolobus japonicus* which looks very similar to the ornate wobbegong. They're easily identified by their flattened bodies, colourful camouflage skin patterns, their dermal lobes – those distinctive shaggy beards – and wide mouth with very effective long sharp teeth.

Wobbegongs can be found in very shallow water right out to the continental shelf in depths from a metre to 100 metres amongst rocky reefs or coral gardens and even man-made structures such as shipwrecks. Most prefer to shelter in ledges and caves, but larger wobbies also happily lie out in the open. In many parts of Australia most dives include a wobbegong. Six recognized species of wobbegong are found around Australia, five of which are described.

Tasselled Wobbegong – *Eucrossorhinus dasygogon*

This one has the most cryptic camouflage; it has a flatter body than any other species and its sandy brown colour blends perfectly with coral rubble and hard corals. It also has the most elaborate dermal lobes. Found in northern tropical waters from Queensland into Western Australia, plus in Papua New Guinea and Indonesia, it's reported to grow to three metres in length, but up to two metres is the usual. I've always found them quite docile, but many divers give them a wide berth. The tasselled wobbegong seems to be solitary; rarely is more than one found sharing a cave, but I did see six together at a coral bommie off Fairfax Island east of Gladstone. Though supposedly common on the Great Barrier Reef, I've found them to be most abundant in the Capricorn and Bunker Groups.

Spotted Wobbegong – *Orectolobus maculatus*

One of the top predators on southern Australia's rocky reefs with a maximum length of 3.2 metres, it's found from central Western

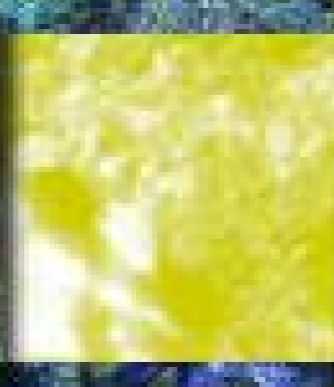
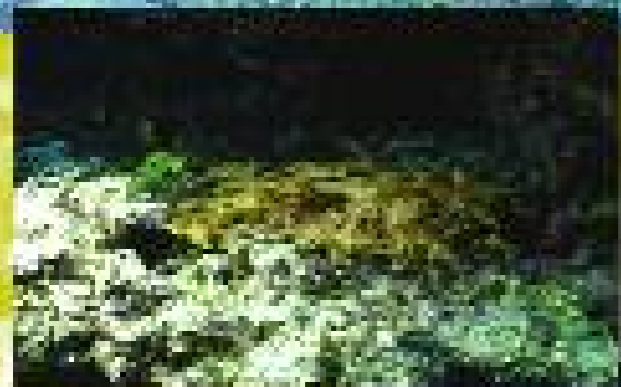
Australia to southern Queensland, excluding Tasmania, though it seems to be most common off New South Wales. Colour varies from sandy brown to dark chocolate with lighter rings and spots. I've seen whiteish ones out on the sand, even yellow and orange ones on shipwrecks – they tend to pick a bottom similar to their own body colour. Large specimens have quite prominent darker bands and colouration, leading to confusion with the ornate wobbegong. The best way to distinguish between the two is to count the dermal lobes – the ornate has around 14, the spotted around 20 including two closely-grouped clumps of lobes on each side of the head. Even after taking hundreds of photos of both, I can still get confused. The darker colour and bands only seem to occur on sharks over two metres long, so they may colour metamorphosise once they reach a certain length.

Little is known about spotted wobbegong behaviour, but I think they have a home range – diving the same patch of reef over time, the same wobbies appear to be in the same caves. They're quite social and up to a dozen can be found packed into a space, even lying on top of each other and also share with ornate wobbegongs, Port Jackson sharks and brown banded catsharks. Divers see the greatest numbers of spotted wobbegongs off the northern New South Wales coastline. Julian Rocks off Byron Bay has to be the best place to observe and photograph spotted wobbegongs. Every dive there's a couple of dozen and some of them reach 2.5 metres.

Ornate Wobbegong – *Orectolobus ornatus*

Found in much the same area as the spotted wobbegong, but their range extends right along the Queensland coast and into Papua New Guinea and Indonesia. They seem to be most prolific off northern New South Wales and southern Queensland – dozens can be found on some reefs. They have very decorated skin, the brown base colour patterned with corrugated bands and greyish reticulation. Ornate

Above: Spotted or ornate? The colour pattern says ornate, the dermal lobes indicate spotted, but who knows? Is it possible that these two species inter-breed?



wobbegongs grow to 2.9 metres in length, but are rarely seen over 2 metres. Like spotted wobbegong, they are quite social and share caves and ledges.

I've noted quite a difference between ornate wobbegongs in southern and northern Australia and suspect there may be two separate sub-species. The northerners I've seen and photographed have more elaborate skin patterns and rarely exceed 1.5 metres. The southern species are much more drab in colour and generally grow larger. According to scientists this species doesn't reach sexual maturity until 1.8 metres long, but I've observed mature males and pregnant females less than a metre long. I also suspect that ornate and spotted wobbegongs may interbreed, as some I've seen have features from both species, but until further research my theory can't be proven.

Western Wobbegong - *Orectolobus sp.*
Easily confused with the ornate, this wobbegong reaches 2 metres only and has fewer and shorter dermal lobes. Colour varies from brown to yellowish-brown with darker corrugated bands. It's only found in Western Australia between Ningaloo Reef and Cape Leeuwin, where it appears to be the most abundant member of the family. Though known for many years, the western wobbegong is still undescribed. Research on this species conducted by Justin Chidlow from the Western Australian Department of Fisheries suggests males and females reach sexual maturity when 1.1 metres, with the females only breeding every two to three years.

Northern Wobbegong - *Orectolobus wardi*
Maximum length is 1 metre, though around 60 centimetres is more common. It's easily identified by its size and the limited dermal lobes. Its colouration is the least elaborate, a mottled brownish colour with darker bands. Though found off Queensland, Northern Territory and Western Australia, it appears to be most common in north Western Australia where divers find them around Ningaloo

Top left: Helen Rose moves in close to inspect a spotted wobbegong at Shag Rock, Brisbane.
Top centre: Typically, a tasselled wobbegong is found either sheltering under plate coral or wedged under a ledge.
Above: With a flat body and perfect camouflage, tasselled wobbegongs blend into their surroundings and are often overlooked by divers.
Centre left: Tasselled wobbegongs have the most complex and elaborate dermal lobes of all.

Reef. It spends most of its time in shallow water, but little is known about its biology.

Cobbler Wobbegong - *Sutorectus tentacilatus*
Easily distinguished by the rows of tubercles (wart like bumps) along the back and head. Reaching a maximum of 90 centimetres, this one is found off South and Western Australia from Adelaide to Geraldton. It has short dermal lobes with two very long front ones. The cobbler has a brownish base colour with lighter bands and spots.

DIET - FACT AND FICTION?
Wobbegongs feed on fish, octopus, squid, small rays and other sharks such as blind sharks, Port Jackson sharks and even other wobbegongs. Forster diver Denis Kemp told me about a big spotted wobbie he found in a cave at Taurus Reef off Forster in New South Wales – the huge shark had a small grey nurse shark in its mouth, which it slowly swallowed.
It's been thought wobbegongs also eat crabs and crayfish, but a study of their diet by Justin Chidlow (Western Australia) found no evidence of crustaceans. A number of divers I've spoken to believe there's a close link between wobbegongs and crayfish. Wobbies are occasionally found sharing a cave with crayfish, the favourite food of octopus. The overfishing of wobbegongs in New South Wales is thought to have caused a decrease in crayfish numbers, but an increase in octopus. Wobbegongs are ambush predators and when they're after food they lift their head off the

Above: A pregnant ornate wobbegong rubbing her side and belly on the sandy bottom at Julian Rocks, Byron Bay. Note the swollen cloaca, which I first thought was a pair of claspers.

bottom. While sometimes feeding during the day, they mainly feed at night and may actively stalk the bottom for prey.

Justin Chidlow found that many wobbegongs he examined had empty stomachs and has suggested that once a wobbegong feeds it rests for a long period to aid digestion. Rob Carraro, studying ornate wobbegongs at Port Stephens, noticed that once a wobbegong had fed it appeared to stay in one spot for up to five days.

REPRODUCTION
All wobbegongs are ovoviparous, they give birth to live young. Mating has been observed in captivity and the wild. The male bites the female around the gill area, lies parallel, then inserts one clasper. Research on the western wobbegong by Justin Chidlow, found that the sharks mate over winter and the females may delay their pregnancy by storing sperm for up to six months.

Simon Hartley of Southern Cross University observed and photographed mating ornate wobbegongs at Byron Bay in August 1998 – a 84cm male and 86cm female, much less than the 1.8m they were thought to attain before sexual maturity. The wobbies were already mating when Simon began watching and remained in an embrace for over 20 minutes. After parting Simon noticed that the male's clasper was bent at the end to anchor it in the female's cloaca. For more on wobby mating check the Southern Cross University website;

www.scu.edu.au/schools/rsm/staff/pages/shartley/projects/wobbies/mating.html.

I've never seen wobbegongs mating, but have observed hundreds of pregnant females, some looking ready to explode. Byron Bay in winter is great to observe pregnant wobbies and once I saw a pregnant ornate wobbegong swimming on the bottom rubbing her belly along the sand and thought 'this is it, I'm going to see a birth!' For several minutes as she changed from side to side but eventually she settled on the bottom and that was that. The unusual behaviour may have been due labour pains, as she appeared to have a swollen cloaca. Rob Carraro's research at Port Stephens included several seemingly pregnant ornate wobbegongs arching their backs and lifting their tails.

Gestation period is thought to be between nine to eleven months, with litters varying from one to 40. Recently England's Blackpool Sea Life Centre had a captive wobbegong give birth – two pups emerged every 24 hours. This time delay may give the young a better chance of survival, allowing them to disperse over a wider area away from predators. The young are around 20 centimetres long at birth and usually hide in crevasses to avoid larger wobbegongs and other predators.

Rob Carraro observed a number of apparently pregnant females when studying ornate wobbegongs at Port Stephens. When watching one expectant mother, a larger male wobbegong swam into the crevasse beside the female and proceeded to nudge her stomach. The female gave a shudder and then the male snapped at something several times before



A juvenile ornate wobbegong looking for a meal with its head held high, photographed at night at Fly Point, Port Stephens.

it swam off. The whole incident lasted less than a minute and Rob is almost certain a pup emerged and was eaten by the male!

Wobbegongs are born ready to fend for themselves and should never be underestimated. A few years ago at Byron Bay Tony Little and I found a 25cm long wobbegong pup. Tony had a macro set-up and decided to get some close-ups of its head, stuck the framer in the wobby's face and it promptly bit the framer with all its might. After grappling with the framer for a few seconds the pup took off under a ledge. After the dive, Tony's steel macro framer had a series of small indentations from the little pup's teeth!

ATTACKS

I'm pretty certain wobbegongs are responsible for more diver 'shark attacks' in Australia than any other shark species. The International Shark Attack File only lists 18 attacks by wobbegongs, but most attacks must go unreported, as the diver is either too embarrassed, uninjured or couldn't be bothered to report it.

Wobbegongs reportedly can bite their own tail, but I wouldn't recommend pulling a tail to find out! Wobbies move a lot quicker than expected. Wobbegong attacks can be unprovoked, but I believe most bites are diver-provoked, willingly or otherwise. If it's head is raised off the bottom, it's looking for food, so if a divers hand, especially ungloved, moves near its head, it will attempt to bite it. Wobbegongs are thought to have poor eye sight and are attracted to movement rather than shape. Also, if you spearfish near a wobbegong, expect some attention. They're known to leave the bottom following a speared fish and diver right to the surface!

Who'd blame a wobby for biting any diver that pulled its tail, knelt on its head, patted its back or tried to hold it. Fortunately, most wobbegongs either ignore them, swim off or give a warning snap or bark as a warning to back off. I've had dozens of wobbies snap when I'm too close and I always take the advice. But the most spectacular snap I ever witnessed was at Byron Bay. Local guide Pete Murphy at Julian Rocks was guiding us around Cod Hole. Swimming over a gutter we spotted a monster 3 metre spotted wobby, its head close to a metre wide. Pete wanted to pat it. As he reached his hand out the wobby quickly turned at him, opened its mouth wide and snapped its jaw shut millimetres from Pete's mask. It could have engulfed Pete's head and half his torso! Pete backed off very fast.

When wobbegongs bite, they hang on. Those long dagger-like teeth are for gripping prey, so they tend to hold onto larger victims until they die and can be swallowed whole. Unlucky divers discover a wobbegong can be difficult to dislodge; stories go round of divers returning to a dive boat with a wobby attached to their arm, leg – even buttocks. A wobbegong usually releases its grip once it realises you and your tank are too big mouthful, but sometimes patience is called for – if a wobby really hangs on you have to wait for it to get bored or readjust its grip. When it does, move fast!

There's little chance of dying from a wobbegong attack, bites can be quite nasty especially if a diver isn't wearing a wetsuit. The best advice? Don't harass wobbies!

Wobbegongs have been one of the most common sharks seen around Australia and I really hope that continues. But if uncontrolled commercial fishing pursues current catch quotas, our encounters with these fabulous bearded creatures will become so rare our grandchildren may think wobbies are just another 'old folk' fantasy like the bunyip.

WOBEGONGS UNDER THREAT

Lacking bones, wobby flesh is commonly sold through fish & chip outlets as 'fish pieces' or 'fish cocktails'. They're also taken for their skin; those elaborate skin patterns and colouration are tanned for a range of leather products.

Until recently there was no major wobbegong fishery in Australia; they were generally bycatch (just as ugly) from other fisheries. Around 40 tonnes annually were taken in the southern and west coast gill-net shark fisheries alone. In 1988 professional New South Wales fishermen began targeting wobbegongs with set and unattended droplines with a maximum of six baited hooks, sometimes only checked once a day, which soon became very popular in New South Wales as a supplement to other forms of fishing (wobbies are also captured in commercial ocean fish traps).

Being fairly static, many wobbegong populations were soon decimated. In 1990/1991, 120 tonnes were landed in New South Wales. By 1999/2000 the catch had fallen to 40 tonnes. Not only were wobbegongs being wiped out, protected grey nurse shark was also caught, most of which were reportedly killed to get rid of 'unwanted competition'. In many areas like Seal Rocks divers rarely saw one during a dive. Calls to ban droplining were waived by New South Wales Government, though proper species devastation data was on file.

Drop-lining continues; overfishing and greed has decimated wobbegong populations and that fishery is now reported to be uneconomical. David Harasti, Conservation Manager of the New South Wales Fisheries Threatened Species Unit informed me that a large dropline fishery for wobbegongs continues off Narooma and between South West Rocks and Seal Rocks.

Early 2002 New South Wales Fisheries released a discussion paper on management of wobbegongs in that state which reviewed wobbegong biology, listed all current threats to the species, plus a number of management options to conserve the species such as bag limits, minimum and maximum sizes, protected habitats and seasonal closures. NSW Fisheries received 75 submissions, most supporting protecting critical habitat areas and size limits. None of the recommendations of the discussion paper have been implemented to my knowledge, though a number of shared wobbegong sites are now protected from commercial fishing with the declaration of 10 grey nurse shark critical habitat zones. At the time of writing, management of the New South Wales wobbegong fishery was being reviewed by the Ocean Trap and Line Fisheries Management Strategy.

WOBEGONG RESEARCH

Minimal research has been conducted on wobbegongs or sharks in Australia in general due to low funding for this type of work. However, a number of research projects have been undertaken in the last few years. Justin Chidlow targetted four species of wobbegong captured in commercial shark fishers gillnets in southwest Western Australia for his masters thesis with James Cook University. Between February 1997 and May 1998, Justin collected data to better understand biology of the western, ornate, spotted and cobbler wobbegongs. He looked at their diet, growth rates and reproduction. Though wobbegongs are still considered a bycatch in Western Australia, Justin's research concluded that wobbegongs, like all sharks, would be susceptible to overfishing if targeted in a commercial fishery due to their low reproduction rate, slow growth rate and late sexual maturity.

Simon Hartley of Southern Cross University has been surveying wobbegong populations at Byron Bay dive sites since 1998. With help from undergraduate students he's collated interesting information on spotted and ornate wobbegongs. His preliminary research found that

more females than males were observed throughout the year in both species. The reason for this sexual segregation is still unknown, though Simon speculates it may be linked to water temperature or depth. Simon has also discovered a size difference between the two species. Ornate wobbegongs were most common in the 50cm -100cm length range, while spotted wobbegongs were in the 100cm -150cm range. The two species also preferred different habitats, ornates found resting on corals or algae covered rocks, while spotted preferred sandy bottoms. Simon believes this could be connected to colouration, ornate wobbegongs generally being darker, spotted wobbegongs lighter. For more on this research visit the Southern Cross University website; www.scu.edu.au/schools/rsm/staff/pages/shartley/projects/wobbies

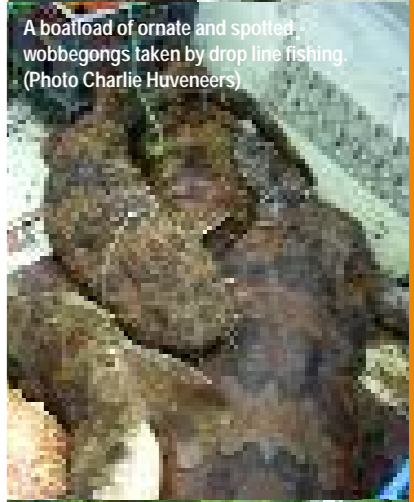
New South Wales' decline in wobbegongs also prompted Rob Carraro's study at Port Stephens. In 2002 and 2003 Rob, for his Newcastle University honours thesis, tagged and photographed ornate wobbies at Fly Point and Halifax Park Aquatic Reserve. Over a 100 day period Rob studied the shark's preferred habitat, sex ratio, size, plus movements within the reserve. The sharks' preferred habitat depended on what was available at the site – sponge gardens at Fly Point, barren rocky terrain at Halifax Park and man-made structures at Little Beach. Unlike Byron Bay, the sex ratio favoured males 2 to 1, except during December when it was 1 to 1. Most sharks observed were less than 1.3m long, including a number of apparently pregnant females, with the area mainly inhabited by juveniles and immature adults.

Rob identified 40 individual ornate wobbegongs, with 133 re-sightings. Most resighted sharks were seen in the same spot or area with little movement between the areas surveyed. Few ornates were found in the surrounding areas outside the reserve, indicating importance of protected areas in conserving wobbegongs. Rob also observed apparent breeding activity in April and May. Rob told me that he'd like to continue this research at Port Stephens, but a lack of available funding would make that difficult.

Charlie Huveneers, a Macquarie University PhD student, was studying ornate and spotted wobbies in New South Wales. His research would investigate biology and ecology of both species. Data collected may contribute to better management of wobbegong fishing in this state. Divers are asked to become involved in this project by surveying wobbegong numbers, like the grey nurse shark surveys. Contact charlie.huveneers@gse.mq.edu.au.



A fisherman lands a spotted wobbegong captured on a drop line. (Photo Charlie Huveneers)



A boatload of ornate and spotted wobbegongs taken by drop line fishing. (Photo Charlie Huveneers)



A catch of wobbegongs at the fish markets. (Photo Charlie Huveneers)