WORDS **LISA SOUTHGATE**

HOW WE KEEP THE REEF GREAT

Climate change is affecting the Great Barrier Reef, but researchers, government authorities and tourism operators are cooperating to protect Australia's greatest natural asset.

Clownfish on an anemone, Great Barrier Reef

GREAT BARRIER REEF, CLOWNFISH PHOTOGRAPHY: GETTY IMAGES

A TRIP TO THE GREAT BARRIER REEF is not undertaken lightly. It is usually a two-hour boat trip each way, the expense in direct proportion to the number of passengers. Weather doesn't always cooperate and viewing quality often depends on the tides. But these hurdles have helped preserve the condition of the reef – by keeping humans at bay. Along with global warming, people pose its greatest threat.

"To kill a coral reef is simple," says Professor Terry Hughes, director of the ARC Centre of Excellence for Coral Reef Studies. "Pollute it and take away fish that eat the seaweed. You're fertilising it and removing the lawnmowers."

Nutrient run-off from nearby catchments and the loss of fish and marine mammals that graze on seagrass are decreasing the ability of coral to withstand threats like global warming. Warmer water causes coral to eject the organisms that give the coral its pigment – coral bleaching. Not every piece of bleached coral will die, but if it's not resilient, it probably will. One third of the world's reefs have degraded in the past 30 years – that means they're of little use for tourism and fisheries.

The Great Barrier Reef is in better shape than any of the world's other reefs, partly because much of it is far from population centres. Neither does Australia systematically harvest its herbivores. But its list of grievances is considerable. Commercial harvest of sharks and rays has increased fourfold since 1993; in 40 years the numbers of nesting turtles have plummeted 50 to 80 per cent; coastal Queensland's dugong population has dwindled to three per cent of the 1960s figure; nutrient and sediment discharge has quadrupled over the last century. In 1998 and 2002, the reef suffered its two worst coral bleaching episodes during record hot summers. The 2002 event triggered declines of 50 to 90 per cent of coral cover on some inshore reefs.

Scientists expect more of the same. "It's too late to stop global warming," Hughes says. "The world is committed to future climate change. It's not a distant thing, it's happening now. Bleaching is definitely happening."

The Australian Research Council (ARC) Centre of Excellence for Coral Reef Studies is based at Townsville's James Cook University (JCU). It encompasses researchers and support from JCU, the University of Queensland, the Australian National University, the Australian Institute ›

The Great Barrier Reef stretches some 2300km

Undersea Explorer **divers, Osprey Reef**

Diver meets coral

The study's lead author, Dr Maria Dornelas, says protected areas need to be close enough for marine life, including coral spawn, to flow freely between them. This gives the corals the best chance of preserving their biodiversity as the environment changes. The research team has called for worldwide networking of tropical marine parks and protected areas to limit the risk of large-scale extinctions due to global change.

Professor Hughes says, "Most Marine Protected Areas around the world are too small and isolated to preserve the links between populations on different reefs. This increases the risk that a rare group of animals could become extinct

> Researchers have discovered that location and environment are critical in determining what sorts of corals settle and flourish

of Marine Science and the Great Barrier Reef Marine Park Authority (GBRMPA). Researchers come from more than 120 countries – and they are coming up with some rather interesting discoveries.

One research team set up an experiment and found that uncontrolled fishing of weed-eaters such as parrotfish and surgeonfish hurts the reef, leading to the coral quickly becoming smothered by weed. "Remove them and you as good as remove the reef itself," says Centre of Excellence researcher Professor David Bellwood.

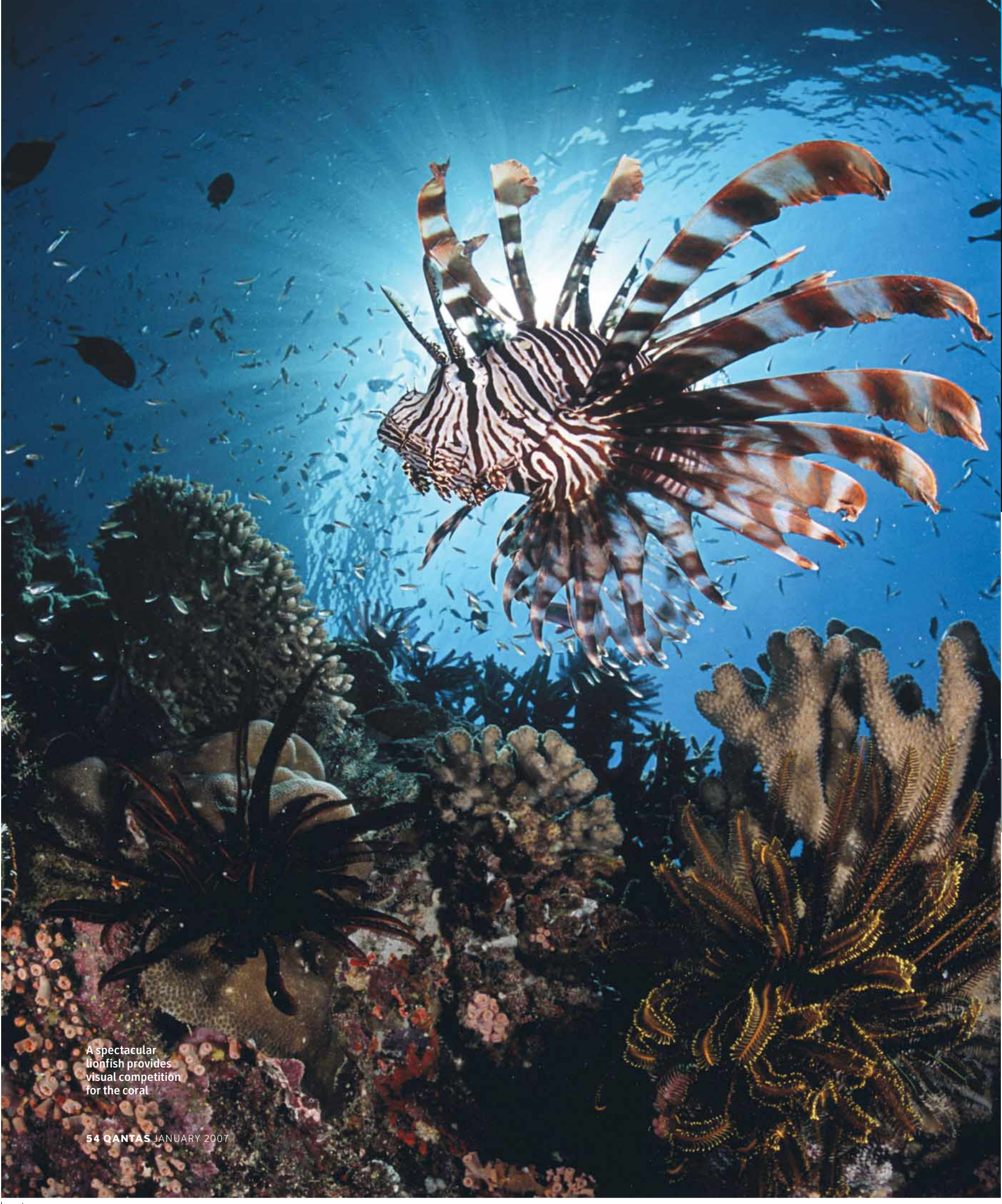
Another team debunked the current neutral theory of reef biodiversity (that coral species randomly colonise reefs). It discovered that location and environment are critical in determining what sorts of corals settle and flourish.

unless they colonise a more favourable reef." While Hughes says that trying to change care of our reefs is like "turning around a supertanker", he is ultimately optimistic: "There's a lot of gloom and doom about reefs. They are changing. I don't think they'll be dead in 30 years, but they'll be different. The danger with the message is that people will throw up their hands and do nothing."

One step in the right direction was the rezoning of the reef in 2004 by GBRMPA to make more than 30 per cent a "no-take" area – compared to the 4.6 per cent that was protected previously.

And the tourism industry has been deputised to help preserve its cash cow. Operators monitor their patch and provide information essential to the management of the ›

LIONFISH PHOTOGRAPHY: GETTY IMAGES;
DIVE PHOTOGRAPHY: COURTESY *UNDERSEA EXPLORER*



A spectacular lionfish provides visual competition for the coral

Ecotourism rules

The fragility of our coral reefs has spawned a new generation of reef tourism experiences.

More tourism operators are offering an experience that engages with marine science and conservation. Guests can help tag and measure sharks, observe turtles, dive with minke whales and watch the reef nightlife from underwater observatories.

"The expectation has changed very dramatically over the last 10 years," Daniel Gschwind says. "It's certainly what the market wants. Anybody who hasn't been on the reef in the past 10 years would be astounded at the quality of experience they get today."

Undersea Explorer takes guests down among reef sharks with the researchers. "It's totally safe. We don't feed them, so there is no feeding frenzy," manager John Rumney says. "We take the scent of the food in a box, the sharks swim up to sniff it and swim away. A grey ballet really is the best way to describe it."

This "experiential tourism" is the fast-growing niche in Australian inbound tourism, says Stephen Pahl, chief executive officer of Ecotourism Australia, the nonprofit body that oversees the eco-accreditation process. "People aren't satisfied sitting inside a coach with someone prattling at them. They want a meaningful experience."

The spread of eco-accreditation, although not compulsory, has been a strong factor in raising the standard of reef experiences, operators say.

"You have to offer a high level of reef interpretation," says Carolynne Staines of Wavelength Reef Charter, pointing out that the documents are 170 pages long.

Craig Turner, marketing and sales director at Fantasea Cruises, says, "The beauty of eco-certification is that it actually means something. You must apply it through your business in a 365-day operation. Our policy is we take only photographs and leave only footprints."

Voyages Heron Island

reef – such as areas of coral bleaching, population and movements of marine fauna, reproductive behaviour and changes in behaviour – to the Marine Park Authority.

People have to see and understand the reef to know what is worth preserving. "We have an obligation to present the reef to visitors and without the industry we could never have taken that on," says Daniel Gschwind, chief executive of the Queensland Tourism Industry Council. "The average person doesn't have their own private yacht to see [the reef] whenever they want."

> Operators offer an experience that engages with conservation... people have to understand the reef to know what is worth preserving

Hughes agrees. "The tourism industry takes the responsibility very seriously. They collect the so-called 'reef tax' [environmental management charge] – the user-pays system – and the tax is given to the Great Barrier Reef Marine Park Authority and used to fund research."

The GBRMPA is also encouraging tourism operators to go for a high level of accreditation with ecotourism certification. While tourism operators must initially seek a marine permit – jointly awarded by the Queensland Parks and Wildlife Service and GBRMPA – this can be long- or short-term. New operators are usually granted a one-year permit, followed by a six-year permit. If operators go for high levels of eco-certification they are eligible to apply for a 15-year permit.

Also under consideration is a range of criteria such as onboard waste disposal, recycling and composting, and cooperation with local communities. ›

Snorkelling with Fantasea Cruises at Reefworld

REEF FACTS

The Great Barrier Reef is more than 2300km long and 348,000sq km – bigger than New Zealand, roughly the same size as Japan.

It is comprised of some 2900 coral reefs and 400 species of coral.

It runs from the northern tip of Bundaberg to the northern tip of Cape York.

The Belize Barrier Reef in the Caribbean is, at 290km, a distant second.

About 30 species of whale and dolphin live on the reef.

Six of the world's seven marine turtle species live in Barrier Reef waters.

Of some 1500 fish species, the whale shark is the biggest at 12m.

UNDERSEA EXPLORER

Princes Wharf, Dixie Street, Port Douglas. (07) 4099 5911. www.undersea.com.au

Divers are taken on research and adventure expeditions, lasting six to nine days, to such places as the Ribbon Reefs and Osprey Reef, communing with sharks and whales. The Osprey Reef Shark Encounter is a six-day excursion where guests can dive with researchers working with sharks. Share the ride with 20 passengers and two researchers, plus crew and onboard chef on a 25m steel motor vessel. $2600 a person during high season (January, June-July and October-December); $2100 during low season (March-May). Undersea also offers a dwarf minke whale excursion: six days interacting with minke whales, diving and snorkelling among coral gardens and pinnacles. Experts in whale and coral reef biology help guests interpret their experiences and learn about the reef. Available only in minke whale season (six weeks, June-July). About $2600 a person.

FANTASEA CRUISES

11 Shute Harbour Road, Airlie Beach. (07) 4946 5111. www.fantasea.com.au

This long-standing operator offers Reefsleep where, after participating in guided scuba dives during the day,

Valerie Taylor with shark scientists on *Undersea Explorer*

Voyages Heron Island

a maximum of six guests and a reef host spends the night on the reef on Reefworld, Fantasea's big floating platform. The pontoon offers a choice of honeymoon suite or multi-share accommodation and features an underwater viewing chamber, slide presentation and informative talk; enjoy your meals and wine under the stars. $395 a person for multi-share; $495 for a room.

VOYAGES HERON ISLAND

Via Gladstone. 1300 134 044. www.heronisland.com

Voyages resort on Heron Island, a coral cay 82km off the coast of Gladstone, offers diving and snorkelling activities and a complimentary guided reef walk. At low tide, a guide with a background in marine biology takes small groups 200m out on the reef flat for a two-hour interpretive walk. People learn to distinguish camouflaged fauna, are taught about things they may encounter scuba diving, and are given various corals and shells to hold, observe – and put back.

WAVELENGTH REEF CHARTER

Shop 2, 38-42 Wharf Street, Port Douglas. (07) 4099 5031. www.wavelength-reef.com.au

Wavelength made a conscious decision some years ago to specialise in snorkelling rather than diving because it believes it is gentler on the reef. Guests depart Port Douglas with a small group (30 maximum) on a guided snorkelling tour with a qualified marine biologist and a reef ecology presentation. $165 adult; $115 children; $503 family.

For airfares call Qantas on 13 13 13 or visit qantas.com. For holiday packages to Queensland call Qantas Holidays on 13 14 15.