redmap

SPOT. LOG. MAP.

REDMAP TASMANIA REPORT CARD

LOG YOUR SIGHTING

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Are marine species moving further south?

Waters off the east coast of Tasmania are warming almost four times faster than the global average. Redmap Tasmania is gathering and assessing information on a number of species that could be shifting (or to be more specific, extending) their southern range boundaries further south in response to warming seas.

Since 2009 the Tasmanian community has been logging sightings on Redmap and sharing stories such as:

1. King George whiting (*Sillaginodes punctata*) is usually a popular catch on the mainland but Tasmanian fishers like Bill Smedley are telling us they are regularly finding them as far south as Boomer Bay, Dunalley.
2. "During the summer you often see the odd thing that's uncommon like morwong (*Nemadactylus douglasii*)" says Phil Malkin, a dive instructor and avid fisherman on Tasmania's east coast.
3. Yellowtail kingfish (*Seriola lalandi*) are being caught south of their usual range. This one was caught and logged (on Redmap) by Scott Johnston off the Tasman Peninsula.

1

Image: B. Smedley

2

Image: R. Stuart-Smith

3

Image: S. Johnston

WHY DO WE CARE ABOUT SPECIES RANGE SHIFTS?

Shifts in species ranges deliver both challenges and opportunities. For example, an unwelcome red algae (*Noctiluca scintillans*) species has been extending its range down the eastern coast of Tasmania resulting in closures and significant profit loss for farmed and wild fisheries. On the other hand, the extension of snapper (*Pagrus auratus*), yellowtail kingfish (*Seriola lalandi*) and striped marlin (*Tetrapturus audax*) provide welcome opportunities for recreational anglers.

Snapper (*Pagrus auratus*)

Image: P. Gouldthorpe

Image: A. Slotwinski

Red algae (*Noctiluca scintillans*)

Map of Southern reference points

Key

DIVER(S)

FISHER(S)

CONFIDENCE IN THE SOUTHERN REFERENCE POINT

The southern reference point is the location on the east coast of Tasmania that Redmap used to represent the southern edge of a species' range as known in 2009. This point was established using information from scientific sources, in conjunction with geographical landmarks that were easy for fishers and divers to recognise in the field without a GPS (e.g. towns such as St. Helens). Confidence in the southern reference point for each species was classified as 'high', 'medium' or 'low' based on whether the species was well studied and the range was well documented.

This was formally assessed using a qualitative decision tree process (for additional information see redmap.org.au)

HIGH	The species was well studied and the range well documented
MEDIUM	The species was well studied, but there was limited (or conflicting) documentation on the range
LOW	The species was not well studied and the range was not well documented

1 Spotted in Bass Strait

	SPECIES	MOSTLY SEEN BY	REFERENCE POINT CONFIDENCE	EVIDENCE OF RANGE SHIFT	OVERALL CONFIDENCE
 1	**Gloomy octopus** *(Octopus tetricus)*	Fisher	High	High	High
 1	**Crimsonband wrasse** *(Notolabrus gymnogenis)*	Diver	High	High	High
 6	**Rock cale** *(Aplodactylus lophodon)*	Diver	High	High	High
 2	**Southern Maori wrasse** *(Ophthalmolepis lineolatus)*	Diver	Medium	High	Medium
 2	**Onespot puller** *(Chromis hypsilepis)*	Diver	Medium	High	Medium
 3	**Eastern rock lobster** *(Sagmariasus verreauxi)*	Fisher	Medium	High	Medium
 4	**Grey morwong** *(Nemadactylus douglasii)*	Diver	Medium	High	Medium
 5	**Frigate mackerel** *(Auxis thazard)*	Fisher	Medium	Medium	Medium
 7	**Eastern blue groper** *(Achoerodus viridis)*	Diver	Medium	Low	Low
 6	**Snakeskin wrasse** *(Eupetrichthys angustipes)*	Diver	Medium	Low	Low

2 Spotted South of Flinders Island

	SPECIES	MOSTLY SEEN BY	REFERENCE POINT CONFIDENCE	EVIDENCE OF RANGE SHIFT	OVERALL CONFIDENCE
 4	**Zebrafish** *(Girella zebra)*	Diver	Medium	High	High
 1	**Sergeant baker** *(Aulopus purpurissatus)*	Diver	High	Low	Low

Image credits (1) R. Stuart-Smith, (2) E. Schologl, (3) A. Cooper, (4) D. Maynard, (5) N. Stinger, (6) G. Edgar, (7) NSW DPI, (8) P. Gouldthorpe, (9) CSIRO, (10) H. Pederson, (11) S. Ling

STRENGTH OF EVIDENCE FOR A POTENTIAL RANGE SHIFT

Strength of evidence was based on an assessment of three years of monitoring data and the detectability of different species that supported a potential range shift. When classifying strength of evidence as 'strong', 'moderate' or 'weak', we only used out of range sightings on the east coast of Tasmania. Consideration was given to factors such as whether species had been sighted over winter and/or in multiple years and; how difficult species were to spot (or detect) when diving or fishing.

This was formally assessed using a qualitative decision tree process (for additional information see redmap.org.au)

STRONG — The species was sighted out of range consistently over multiple years and seasons*

MODERATE — The species was NOT sighted out of range consistently over multiple years and seasons*, but it is also relatively HARD to spot. This means we would not expect regular sightings, even if it was consistently present

WEAK — The species was NOT sighted out of range consistently over multiple years and seasons*, but it is also relatively EASY to spot. This means we would have expected sightings more regularly had it been consistently present

*the criteria of seasonal sightings does not apply to migratory species because they commonly make seasonal migrations, so even if they were shifting their range we would not expect them to be present over multiple seasons

Interpreting the overall confidence in a potential range shift

The overall confidence in a potential range shift combines evidence for a shift with confidence in the southern reference point. We adopted a conservative approach so the lowest classification of either the reference point confidence or the strength of evidence formed the overall confidence. For example south of Bass Strait there is strong evidence that Southern Maori wrasse (*Opthalmolepsis lineolatus*) could be shifting its range, but because we only have a "medium" level of confidence in its southern reference point, it reduces our overall confidence in a potential range shift from "high" to "medium".

HIGH MEDIUM LOW

3 Spotted South of St Helens

	SPECIES	MOSTLY SEEN BY	REFERENCE POINT CONFIDENCE	EVIDENCE OF RANGE SHIFT	OVERALL CONFIDENCE
 6	**Halfbanded seaperch** *(Hypoplectrodes maccullochi)*				
 6	**White ear** *(Parma microlepis)*				
 8	**Luderick** *(Girella tricuspidata)*				
 1	**Eastern wirrah** *(Acanthistius ocellatus)*				
 7	**Rock blackfish** *(Girella elevata)*				
 9	**King George whiting** *(Sillaginodes punctata)*				
 6	**Firebrick seastar** *(Asterodiscides truncatus)*				
 7	**Tailor** *(Pomatomus saltatrix)*				

4 Spotted South of Maria Island

	SPECIES	MOSTLY SEEN BY	REFERENCE POINT CONFIDENCE	EVIDENCE OF RANGE SHIFT	OVERALL CONFIDENCE
 2	**Rainbow cale** *(Heteroscarus acroptilus)*				
 8	**Yellowtail kingfish** *(Seriola lalandi)*				
 10	**Old wife** *(Enoplosus armatus)*				
 4	**Herring cale** *(Olisthops cyanomelas)*				
 11	**Longspine sea urchin** *(Centrostephanus rodgersii)*				
 8	**Snapper** *(Pagrus auratus)*				

What is Redmap?

Redmap (Range Extension Database and Mapping Project) is a citizen science project that invites members of the community to spot marine species that are outside of their usual range (or distribution) at various points around Australia. In collecting this information Redmap is generating a database of 'out of range' sightings to assess which species are shifting their ranges and whether these shifts are consistent with warming waters.

Redmap is hosted by the Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania (UTAS).

ABOUT THE REDMAP REPORT CARD

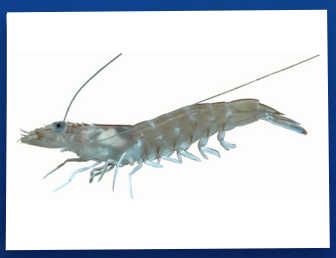
Redmap sightings from 2009-2012 that were submitted with a photo and verified by scientists were assessed, along with data from scientific surveys conducted by Reef Life Survey (reeflifesurvey.com), IMAS, surveys and commercial fisheries catch data from the same time period. This assessment was limited to the east coast of Tasmania.

The purpose of the report card is to let the community know what their data are showing so far and to increase awareness of potential range shifting species. For more information on the methods used in this report card please go to: **redmap.org.au**

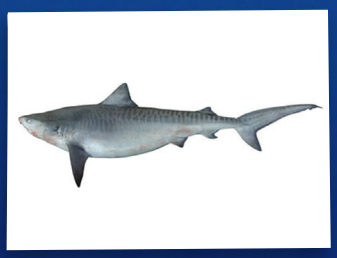
HAVE YOU SPOTTED AND PHOTOGRAPHED THESE SPECIES? *(see supporting information online for a full list)*

e.g.

Silver drummer
(Kyphosus sydneyanus)



Eastern king prawn
(Melicertus plebejus)



Tiger shark
(Galeocerdo cuvier)

Loggerhead turtle
(Caretta caretta)

Green moray eel
(Gymnothorax prasinus)

Stiped marlin
(Tetrapturus audax)

Eastern fiddler ray
(Trygonorrhina fasciata)

Mosaic leatherjacket
(Eubalichthys mosaicus)

Image credits Top row L-R: D. Maynard, G. Edgar, W. White, D. Harasti, Botton row L-R: J. Keane, NSW DPI, R. Stuart-Smith, G. Edgar

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While we have found there is strong overall confidence that some species are potentially shifting their ranges south, our evaluation was only based on three years of data (2009-2012). To be able to quantify how far species ranges have shifted and whether "out of range" observations are part of a longer-term pattern we need more observations over time. Further monitoring and future assessments of species classed as having "moderate" or "weak" overall confidence will allow us to determine if these species are more likely to be shifting in the future, or whether they remain as visitors that are occasionally spotted further south.

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Tasmanian Government

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