



# Citizen science as a research tool for monitoring ecological change in the marine environment



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## What's on the move in Tasmanian waters?



### Mahi mahi


Also known as dolphin fish, this species is very bright with colourful blues and yellows which fade quickly upon death. Older male fish have a steep forehead, like a lump (hump headed). Log this species wherever it is spotted in Tasmanian waters.

No. of sightings: 1

Latest sighting: Law fish

Location: Fishing Block 6H4

FIND OUT MORE 

Check it out on the map 



### WHAT IS REDMAP?

FIND OUT MORE 

Redmap, a new and interactive website, invites the Tasmanian community to spot, log and map marine species that are uncommon in Tasmania, or along particular parts of our coast.

### PHOTO GALLERY



Send us your photos!

### TEACHER RESOURCES

Welcome educators! In our teaching resources section we have provided some interesting worksheets and lesson ideas to help inspire your students. Please read the background information provided, it tells the story of how Tasmanian scientists are addressing the challenges of climate change and contributing to science on a global scale.

### LATEST NEWS

\* Win a \$50 voucher from Mures [Lower Deck!](#)

\* [Redmap is now live!](#)

\* [The Redmap launch](#)

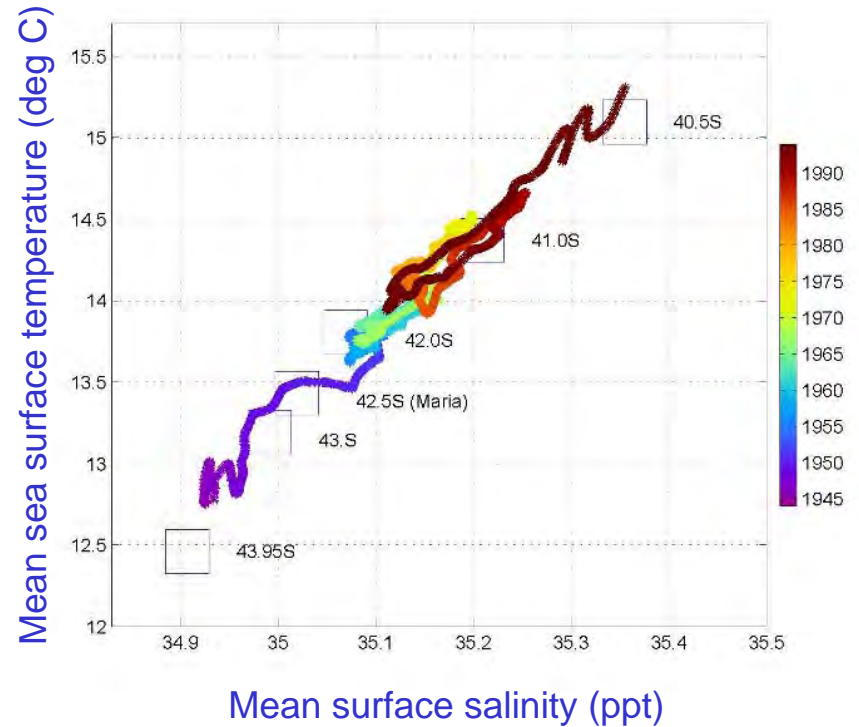
Find out more...

### LOG YOUR SIGHTING



# Reasons for Redmap?

- Tasmania is situated within a 'hotspot' for marine climate change (past and future) - warming 3.8x global average
- 5000km of coastline to monitor for changes - large-scale/long-term monitoring programs difficult to fund
- Low awareness of potential and current marine climate change impacts in the fishing industry & community



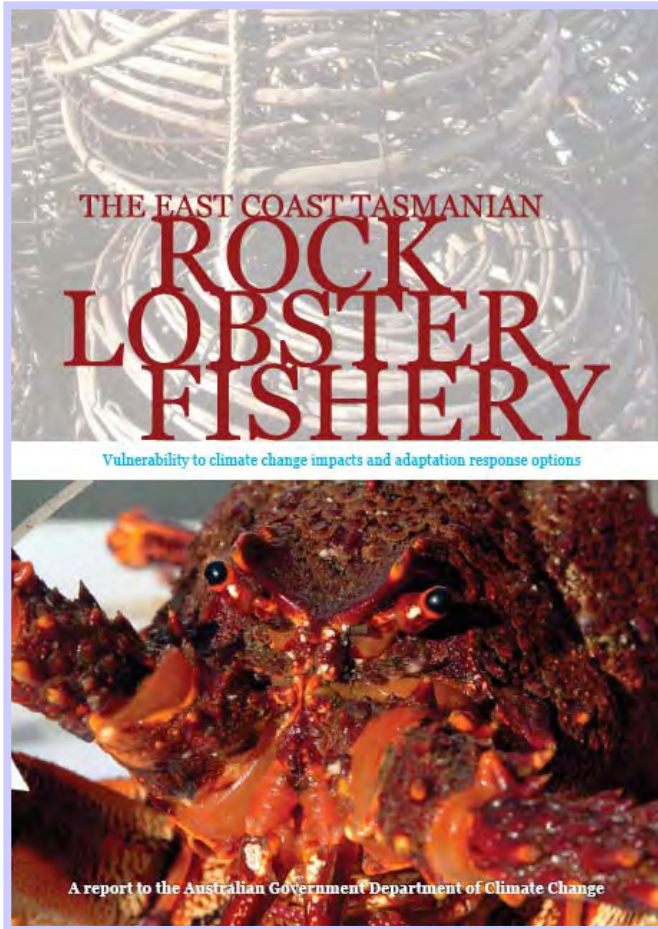
*In situ* observations from Maria Island, east coast of Tasmania, Hill *et al.* 2007



[WWW.REDMAP.ORG.AU](http://WWW.REDMAP.ORG.AU)



# Industry perceptions of climate change



Fishers have varying perceptions on reality of climate change

- 80% believe cc is not happening or the jury is out
- 20% believe cc is either happening or that 'something is up'

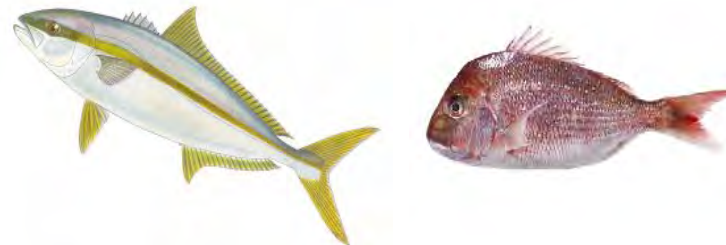
Fishers acknowledge changes BUT NOT climate change (see conference poster, Nursey-Bray et al)

Assessing vulnerability is not just about stock projections or understanding biological impacts- vulnerabilities in the human system also!

# Several dozen new and range-extending species in Tasmania (since 1970)



Half banded sea perch



Blue Groper

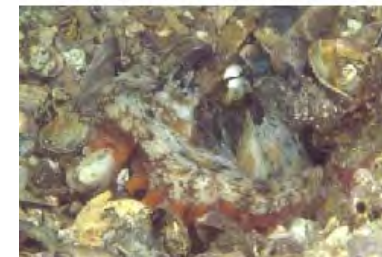


Tiger Shark



Zebra Fish

Gloomy Octopus - *Octopus tetricus*



Last P, White W, Gledhill D, Hobday A, Brown R, Edgar G, Pecl G (accepted 29/3/2010). Long-term shifts in abundance and distribution of a temperate fish fauna: a response to climate change and fishing practices *Global Ecology and Biogeography*



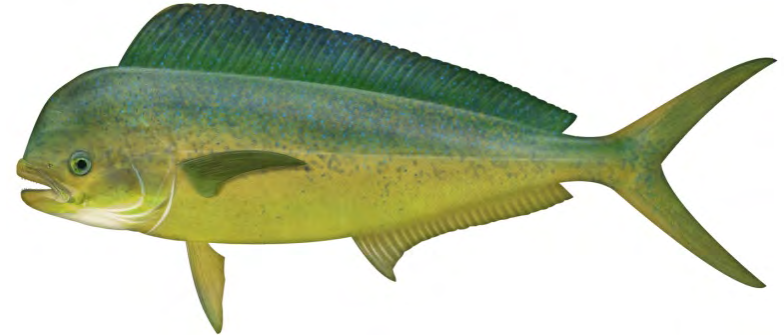
## Range Extension Database and Mapping Project - objectives

- Ecological monitoring of coastal waters for observations of species shifting their geographical range
- Provide a database with mapping facilities where industry and the general public can generate maps displaying how our species are shifting their ranges
- Engage, inform and educate our marine industries and communities (using their own data) about marine climate change impacts and issues
- Increase awareness of climate change among our marine industries, indirectly improving adaptive capacity to respond constructively to climate change impacts

**REDMAP - 'citizen science' as ecological monitoring & improved communication**



Blue Groper



Dolphin Fish or Mahi Mahi

- REDMAP is a two-way knowledge exchange between community/industry and scientists.
- Gaps in knowledge being addressed *in partnership* with fishers & community
- Leads to better communication between all parties
- REDMAP - Tasmania is a 'pilot project' currently being developed as a National project (REDMAP Australia)



# Species of interest highlighted on the website



## Crimsonband wrasse

*Notolabrus gymnogenis*

Males have a green body and white tail with the namesake red band across the body and red fins. Females are coloured red to red-brown with many rows of white dots horizontally along the body. Juveniles are green with white spots. Log this species wherever it is spotted in Tasmanian waters.

[MORE INFORMATION](#)

[TASMANIAN SIGHTINGS](#)

[LOG YOUR SIGHTING](#)



## Eastern blue groper

*Achoerodus viridis*

Males have fleshy lips and are a blue or blue-green colour. Females are brown with random light spotting/blotches. Juveniles are grey with similar blotches. Log this species wherever it is spotted in Tasmanian waters.

[MORE INFORMATION](#)

[TASMANIAN SIGHTINGS](#)

[LOG YOUR SIGHTING](#)



## Eastern rock lobster

*Jasus verreauxi*

Very similar to southern rock lobster but the body is green and it has orange-brown legs. Occurs intermittently in Tasmania and is expected to be more common on the east coast. Log this species wherever it is spotted in Tasmanian waters.

[MORE INFORMATION](#)

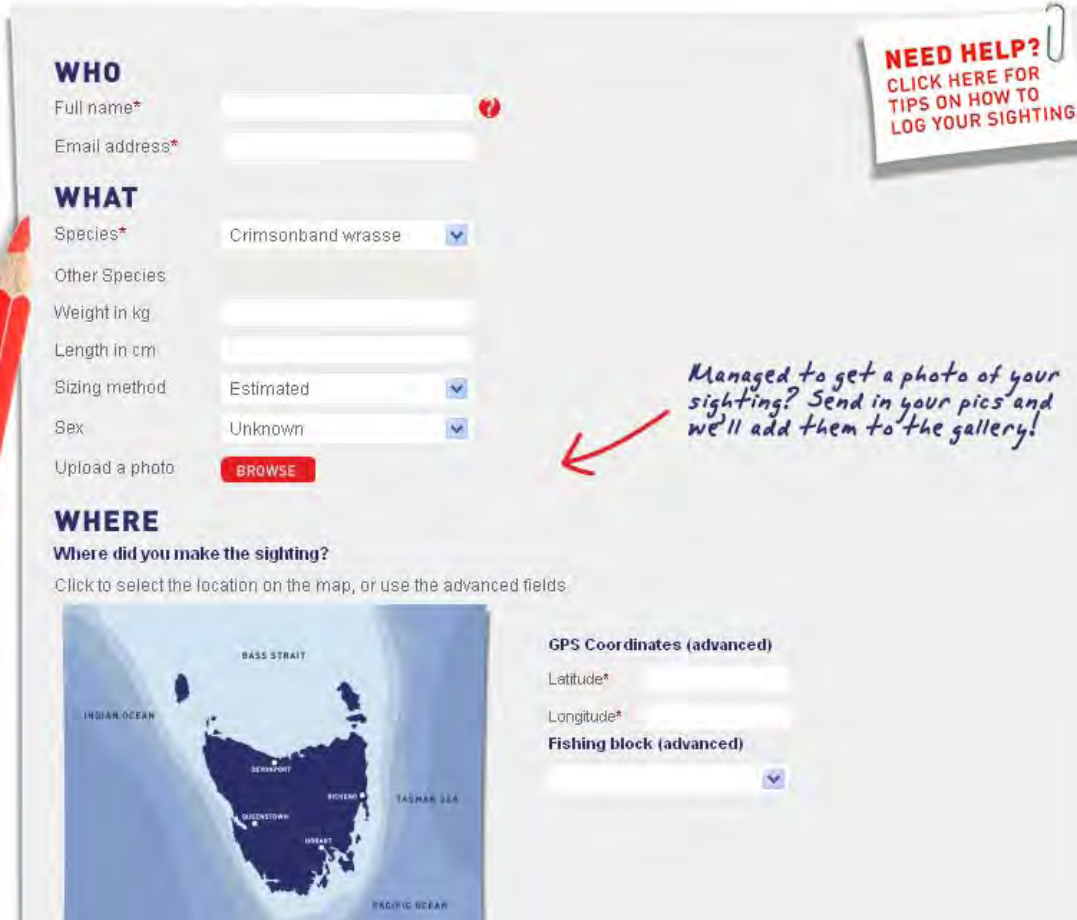
[TASMANIAN SIGHTINGS](#)

[LOG YOUR SIGHTING](#)





# Logging a sighting is easy



**WHO**  
Full name\*   
Email address\*

**WHAT**  
Species\*   
Other Species   
Weight in kg   
Length in cm   
Sizing method   
Sex   
Upload a photo

**WHERE**  
Where did you make the sighting?  
Click to select the location on the map, or use the advanced fields

**GPS Coordinates (advanced)**  
Latitude\*   
Longitude\*   
**Fishing block (advanced)**

**NEED HELP?**  
CLICK HERE FOR TIPS ON HOW TO LOG YOUR SIGHTING

*Managed to get a photo of your sighting? Send in your pics and we'll add them to the gallery!*

- Community sightings
- Photo sightings (verified by scientists)
- 'Expert' users (scientists, trained people)
- Can submit sightings of ANY species suspected or known to be unusual



# Redmap data is available for anyone to display

You are here: [Home](#) [What's been spotted lately](#)

## What's been spotted lately?

All species spotted and logged by the community on the REDMAP site can be viewed on our interactive map.

[BROWSE SPECIES](#) →

[BROWSE GROUPS](#) →



## Make your own map

The map enables you to search for sightings by species, location, number of sightings and date. You can just click on the map or use the filter options below.

### Filter sightings by:

Species	<input type="text" value="- Show all -"/>
Count by	<input type="text" value="Number of sightings in area"/>
Show	<input type="text" value="All sightings"/>
Username	<input type="text"/>
From	<input type="text"/>
To	<input type="text"/>

[UPDATE MAP](#) →

# Many resources on the site...



## Fishing in Tasmania

Find out more about who fishes, where they fish and what they catch. [Learn more >](#)

- [Commercial Fishing](#) The Tasmanian commercial fishing industry supplies 26 per cent of Australian seafood.
- [Recreational Fishing](#) - Coming Soon!



## Tasmania's marine environment

The Tasmanian marine environment is recognised for the global significance of its marine biodiversity, with 60 per cent of marine species endemic (unique) to the state. Read more about the habitats and ecosystems of the Tasmanian marine environment. [Learn more >](#)

- [Tasmania's Marine Habitats](#) Did you know that a lot of Tasmania's inshore areas have been mapped?
- [Major Currents that influence Tasmania](#) Tasmania has three major currents systems which influence its coastal waters the Eastern Australian Current (EAC), the Leeuwin (and Zeehan) Current, and the Global Conveyor Belt.

## FISHING IN TASMANIA

- Commercial fishing
- Recreational fishing

## TASMANIAN MARINE ENVIRONMENT

- Marine Habitats
- Major currents that influence Tasmania
- Diving in Tasmania

## CLIMATE CHANGE AND THE MARINE ENVIRONMENT

- What is climate change?
- Ocean temperature
- Rise in sea level
- Ocean acidification?
- Downwelling and upwelling in the ocean

## IMPACT OF CLIMATE CHANGE ON MARINE SPECIES

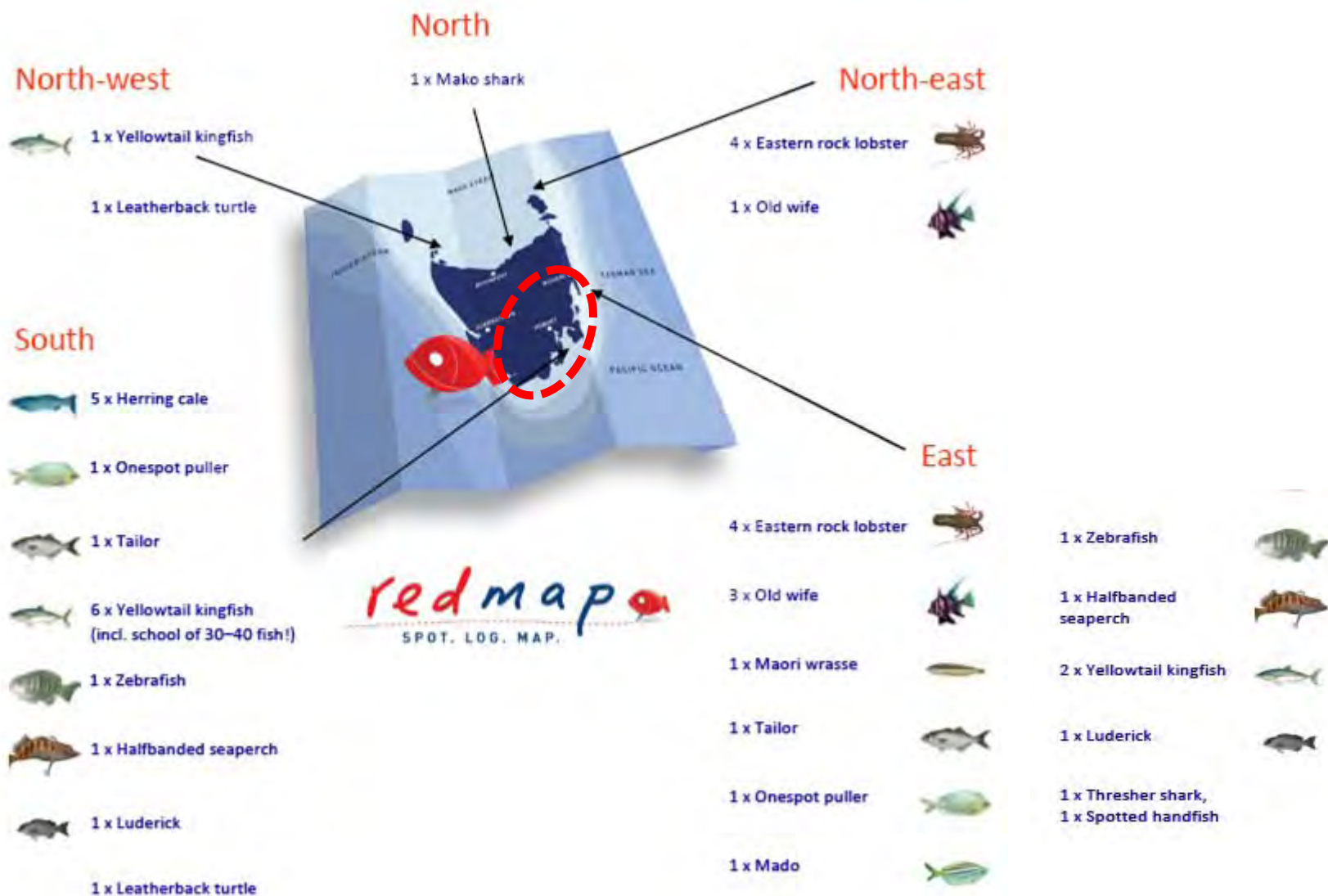
- Changes to the range or distribution of species
- Changes to phenology and physiology
- Changes to the structure and dynamics of communities

## TEACHING RESOURCES

- A little bit of science

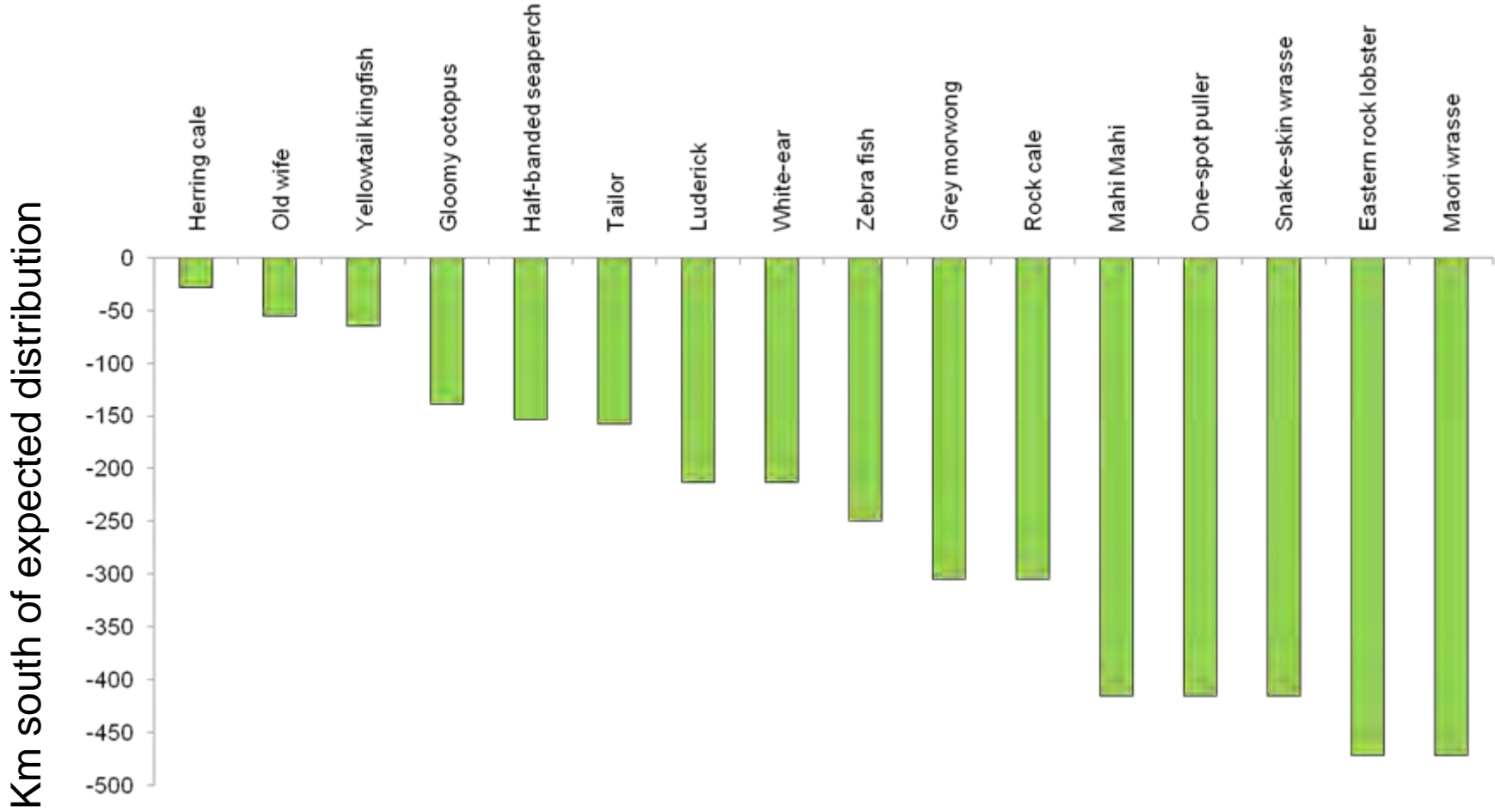


# In 4 months - approx 150 sightings



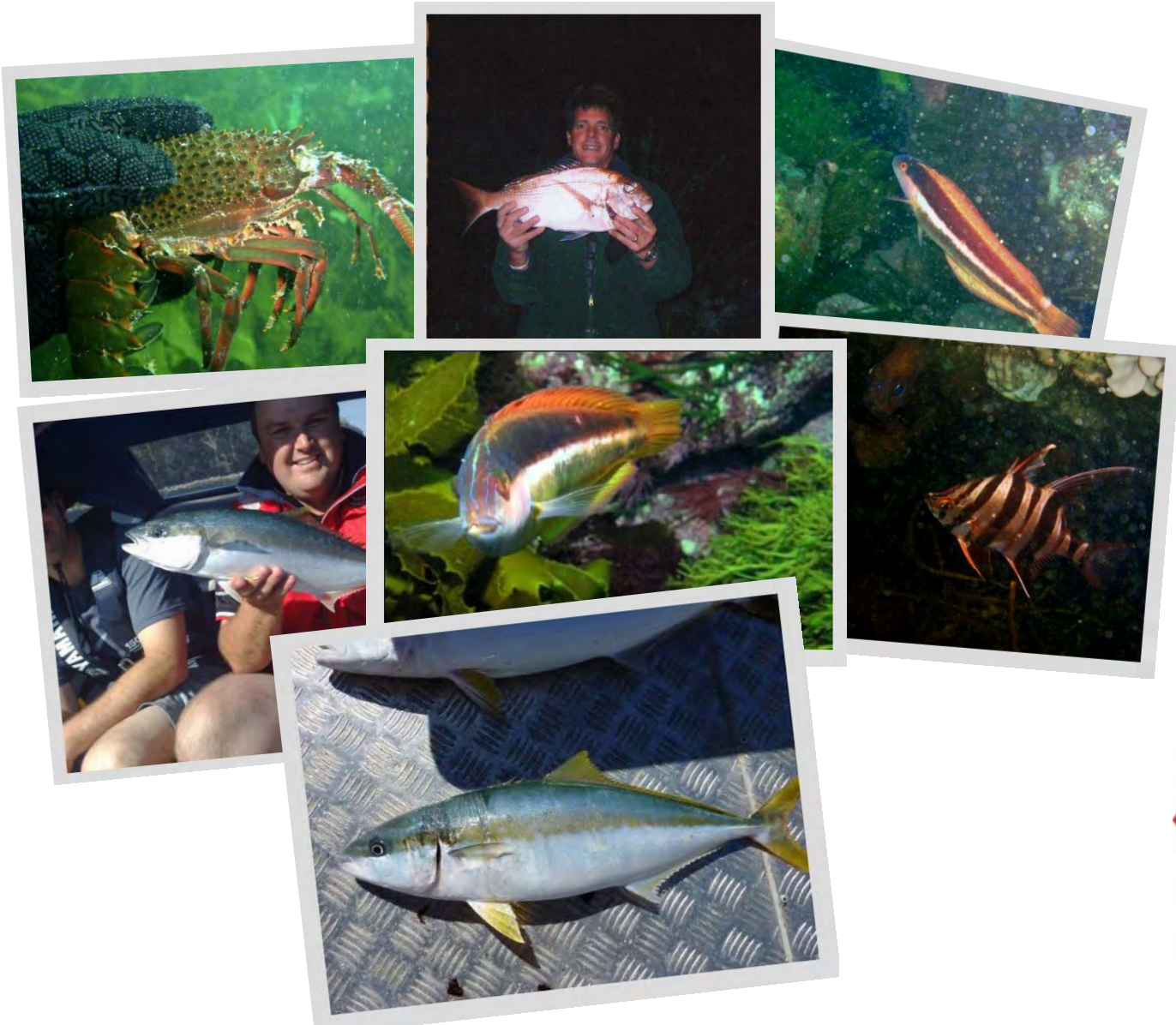


# Species sightings

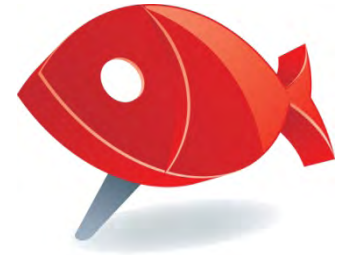


# Great photos submitted to 'verify' sightings

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# Sightings data



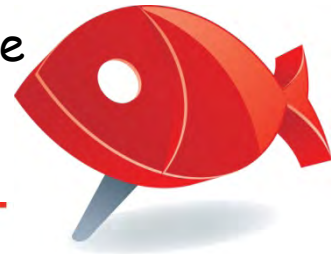
- 150 sightings (4 months, Tas has small population)
- 2/3 sightings are of 'REDMAP' species (1/3 with photos)
- 1/3 sightings are non-REDMAP species (1/2 photos)
- Reports of 6 'new' species - 3 with photos (fish, starfish, intertidal slugs, 25-250km further south than previously reported)
- Challenges!!
  - Reporting at range boundaries only
  - Varying amounts of sampling effort along the coast
  - Presence only data
  - Tas waters warming for last 60 years - no clear historical baseline!BUT quantity of verified data will still allow good indication of range shifts





# Success so far...

- Over 8,000 hits on the site
- 42,000 page downloads
- Visits from 90 countries
- Several hundred 'members'
- Bulletin boards & digests around the world
- Radio, tv, print media
- Many emails requesting more stuff!
- Impacts of cc on marine species - 3<sup>rd</sup> most visited section of site





# Why does Redmap work?

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We believe this demonstrated success is due to several factors:

- An engaging website with clear project branding
- Immediate display of most community and fisher reported data
- Individual feedback provided for sightings with photos
- Recognition of contributions on website and in project newsletters
- Clear acknowledgement & valuing of industry & community knowledge
- Fishers love talking about what they caught & divers love taking photos!



# Redmap Australia

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Upgrades/improvements on Tasmanian pilot project:

- Greater species information and reporting - benthic, megafauna, sharks
- Capacity to upload videos & multiple photos per sighting
- Increased engagement (ability to add captions on photos, link to Facebook pages)
- Extract geo-referencing information from submitted photos
- iPhone application for SMS reporting
- Automated distribution of sighting records & photos for verification from taxonomic/geographic scientific panel



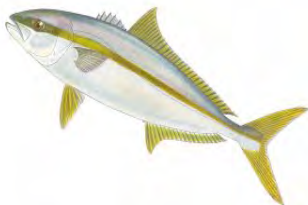
# Long-term benefits of Redmap

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- Ecological monitoring to inform changes in species ranges & ecosystem
- Cost effective way of identifying where research could be targeted
- Promoting awareness within the general community
- Involving and engaging industry in way that acknowledges and values their contribution
- Potential to improve adaptive capacity of marine industries indirectly

## Redmap Australia

- 60,000km and 3.5-4 million fishers & divers!





# Thank you

Many thanks to the scientists, organisations, community & industry groups & 'citizen scientists' that support the REDMAP program

To sign up for the REDMAP quarterly newsletter please visit [www.redmap.org.au](http://www.redmap.org.au)



To join the Marine Adaptation Network please email [Gretta.Pecl@utas.edu.au](mailto:Gretta.Pecl@utas.edu.au)

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