

# The Great Fiji Butterflyfish Count: A Fiji-wide biodiversity assessment

Helen R Sykes, Chinnamma Reddy, Aaron Jenkins and Ken McKay





# Chaetodons in Fiji

Of the 116 species of Chaetodons across the globe, (including Butterflyfish and Bannerfish), 90% are found in the Indo-Pacific.

In Fiji at least **27 species of Butterflyfish** and **6 Bannerfish** have been recorded. (Sykes, H., Jensen, J)

## Butterflyfish and Banner fish of the Fiji Islands

Butterflyfish are in the family Chaetodontidae. They have deep, compressed bodies and small, pointed mouths, with tiny, brush-like teeth. There are 116 species across the globe, including their close cousins the Bannerfish. Most are found where there are extensive areas of live coral. 90% of Butterflyfish species are found in the Indo-Pacific, and in Fiji at least 27 species of Butterflyfish and 6 Bannerfish can be found.

Vagabond butterfly Chaetodon vagabundus ★★★★	Threadfin butterfly Chaetodon auriga ★★★★	Cheveroned butterfly Chaetodon trifascialis ★★★	Lined butterfly Chaetodon lineolatus ★★	Spot-nape butterfly Chaetodon oxycephalus ★
Blackbacked butterfly Chaetodon melanotus ★★★★	Double-saddled butterfly Chaetodon ulietensis ★★★★	Teardrop butterfly Chaetodon unimaculatus ★★★	Dot and dash butterfly Chaetodon pelewensis ★★★★	Triangle butterfly Chaetodon baronessa ★★★★
Merten's butterfly Chaetodon mertensii ★★★★	Ornate butterfly Chaetodon ornatissimus ★★	Bennetts butterfly Chaetodon bennetti ★★★	Bluespot butterfly Chaetodon plebeius ★★	Redfin butterfly Chaetodon lunulatus ★★★★
Latticed butterfly Chaetodon rafflessi ★★★	Dotted butterfly Chaetodon semeion ★★	Speckled butterfly Chaetodon citrinellus ★★★★	Raccoon butterfly Chaetodon lunula ★★	Fourspot butterfly Chaetodon quadrimaculatus ★
Klein's butterfly Chaetodon kleinii ★★★★	Reticulated butterfly Chaetodon reticulatus ★★★	Black butterfly Chaetodon flavivostrius ★★	Saddled butterfly Chaetodon ephippium ★★★	Pyramid butterfly Hemitaurichthys polylepis ★★★
Forceps butterfly Forcipiger flavissimus ★★★★	Long-nosed butterfly Forcipiger longirostris ★★	<p>Stars = Relative Commonness in the Fiji Islands</p> <p>★ Very uncommon</p> <p>★★ Uncommon or common in certain regions only</p> <p>★★★ Common across the Fiji Islands</p> <p>Data from the Great Fiji Butterflyfish Count 2008, <a href="http://www.fiji.butterflyfishcount.com">www.fiji.butterflyfishcount.com</a> courtesy of Helen Sykes and Chinnamma Reddy, <a href="http://www.marineecologyfiji.com">www.marineecologyfiji.com</a></p> <p>Photographs by Stuart Gow of Resort Support Fiji (<a href="http://www.resortsupportfiji.com">www.resortsupportfiji.com</a>) and by JE Randall, H Tanaka and DC Cook (<a href="http://www.Fishbase.org">www.Fishbase.org</a>)</p>		

Humphead bannerfish Heniochus varius ★★★★	Pennant bannerfish Heniochus chrysostomus ★★★★	Masked bannerfish Heniochus monoceros ★★★	Singular bannerfish Heniochus singularius ★★★	Longfin bannerfish Heniochus acuminatus ★★	Schooling bannerfish Heniochus diphreutes ★
<p>★ The Schooling Bannerfish looks very similar to the Longfin Bannerfish, but is found in large schools off steep walls facing deep water.</p>					

Common name	Scientific name	Hard Coral	Soft Corals	Benthic Invertebrate	Algae	Zooplankton
Bennetts butterfly	<i>Chaetodon bennetti</i>	X				
Bluespot butterfly	<i>Chaetodon plebeius</i>	X				
Fourspot butterfly	<i>Chaetodon quadrimaculatus</i>	X				
Ornate butterfly	<i>Chaetodon ornatissimus</i>	X				
<b>Redfin butterfly</b>	<i>Chaetodon lunulatus</i>	<b>X</b>				
Reticulated butterfly	<i>Chaetodon reticulatus</i>	X				
<b>Triangle butterfly</b>	<i>Chaetodon baronessa</i>	<b>X</b>				
Cheveroned butterfly	<i>Chaetodon trifascialis</i>	X			X	
Blackbacked butterfly	<i>Chaetodon melannotus</i>	X	X			
Dot and dash butterfly	<i>Chaetodon pelewensis</i>	X		X		
Black butterfly	<i>Chaetodon flavirostris</i>	X		X	X	
Spot-nape butterfly	<i>Chaetodon oxycephalus</i>		X			
Lined butterfly	<i>Chaetodon linoelatus</i>		X	X	X	
Dotted butterfly	<i>Chaetodon semeion</i>			X	X	
Double-saddled butterfly	<i>Chaetodon ulietensis</i>			X	X	
Merten's butterfly	<i>Chaetodon mertensii</i>			X	X	
Klein's butterfly	<i>Chaetodon kleinii</i>			X		X
Forceps butterfly	<i>Forcipiger flavissimus</i>			X		
Long-nosed butterfly	<i>Forcipiger longirostris</i>			X		
Pyramid butterfly	<i>Hemitaurichthys polylepsis</i>					X
Latticed butterfly	<i>Chaetodon rafflessi</i>	X	X	X	X	X
Racoon butterfly	<i>Chaetodon lunula</i>	X	X	X	X	X
Saddled butterfly	<i>Chaetodon ephippium</i>	X	X	X	X	X
Speckled butterfly	<i>Chaetodon citrinellus</i>	X	X	X	X	X
<b>Teardrop butterfly</b>	<i>Chaetodon unimaculatus</i>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

# Validity of using non-scientific surveyors

Errors which may be made by the use of non-scientific surveyors can be compensated for by the increased numbers of surveys which may be carried out, Deviation is minimised by the number of replicates.

Examples of programmes utilising minimally trained non-scientific surveyors are:

- Reef Check (Indicator fish & invertebrates, substrate cover)
- REEF (Fish biodiversity)
- Coral Health Watch (Coral bleaching levels)



# Scope of 2008 Count

277 counts were recorded from  
200 volunteers over  
10 regions of Fiji:

Beqa Island  
Coral Coast  
Kadavu Island  
Mamanuca Islands  
Savusavu  
South Vanua Levu  
Suva  
Taveuni  
Vatu-i-Ra Passage  
Yasawa Islands

Map of the Fiji Islands



# Comparison of Great Fiji Butterflyfish results with more “Scientific” Studies

Results of the Count were compared with three studies by single specialist surveyors.

1. A set of 23 surveys carried out along measured transects by Dr. Kenneth MacKay of the USP Institute of Marine Resources.
2. A set of 29 surveys carried out along measured transects by Helen Sykes of Marine Ecology Consulting.
3. A set of 67 surveys carried out during “roving diver” timed swims by Helen Sykes of Marine Ecology Consulting

# Results:

## Measured Transects

Chart shows percentage of sites on which each species of butterflyfish was present, in belt transect surveys

### Most common:

- Vagabond
- Speckled
- Redfin
- Double Saddled
- Triangle

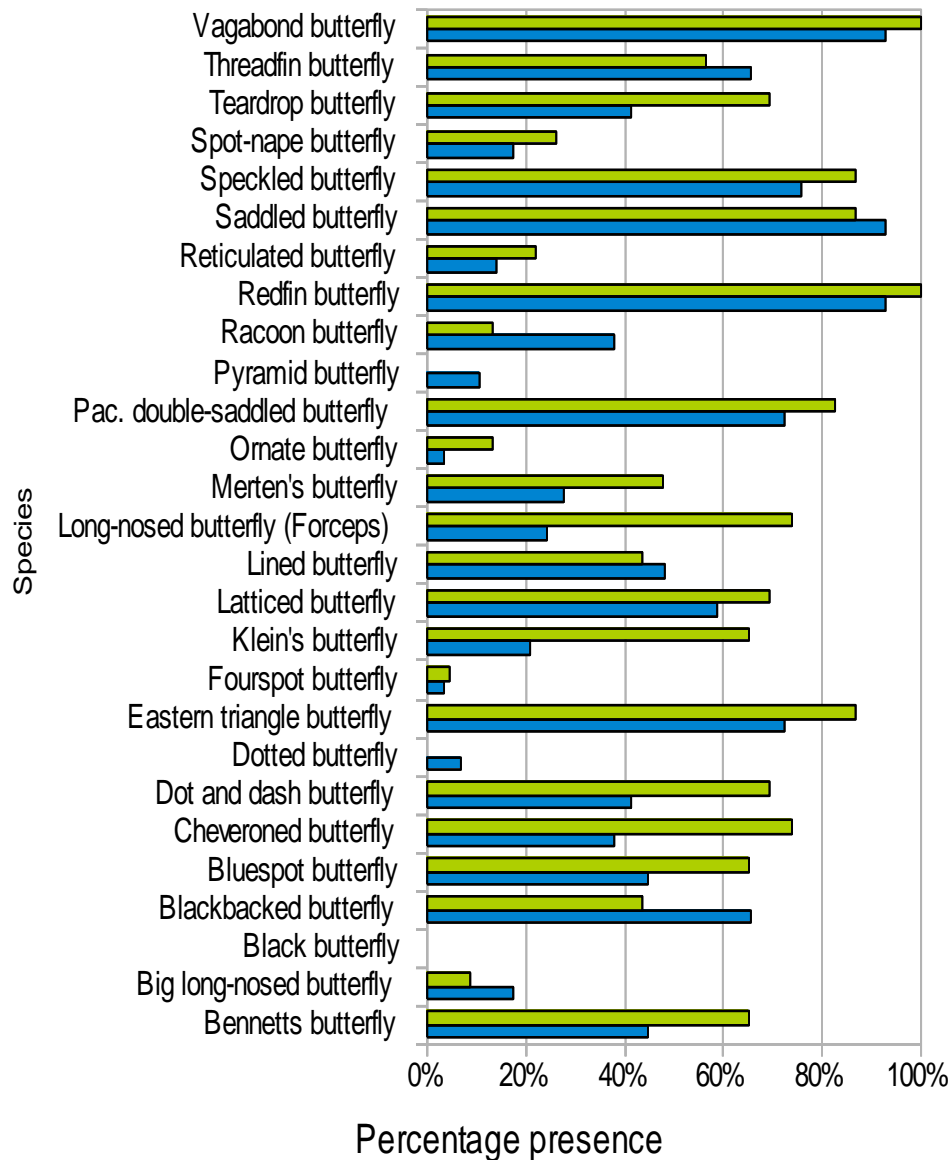
### Least Common:

- Pyramid
- Ornate
- Four-spotted
- Dotted
- Black

## Prevalence of each species on measured transects

Percentage presence over all sites surveyed

■ H Sykes ■ K MacKay



# Results:

## Timed swims

Chart shows percentage of sites on which each species of butterflyfish was present, in timed swim surveys,

### Most common:

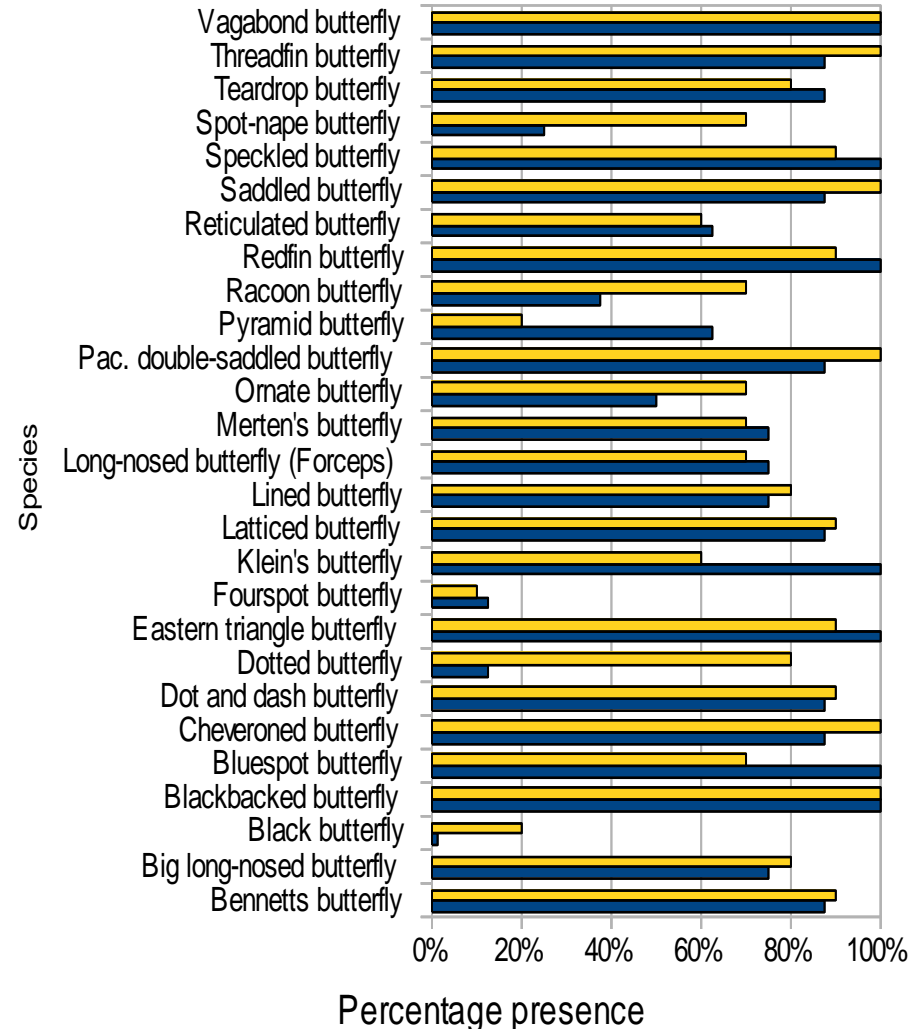
- Vagabond
- Threadfin
- Speckled
- Redfin
- Double Saddled
- Klein's
- Triangle
- Chevroned
- Bluespot
- Blackbacked

### Least Common:

- Four-spotted
- Black

## Prevalence of each species on timed swims

Percentage presence over all sites surveyed





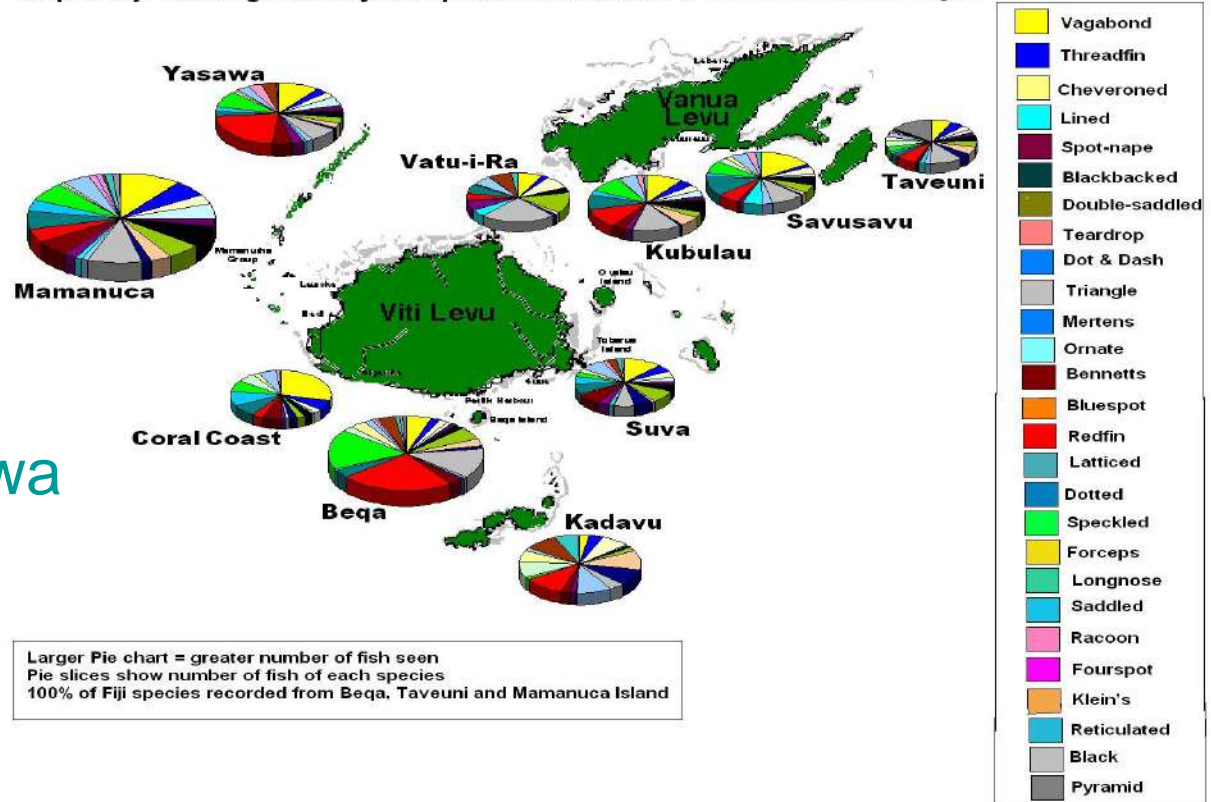
# Most and least common species by each method

		Method	Measured Transect		Timed Swim	
		Surveyor(s)	H Sykes	K MacKay	H Sykes	Fiji Count
# Surveys			29	23	67	277
Most Common (85%+)						
C. bennetti	Bennetts				X	X
C. flavirostris	Blackbacked				X	X
C. plebeius	Bluespot				X	
C. trifascialis	Chevroned				X	X
C. pelewensis	Dot and dash				X	X
C. baronessa	Triangle				X	X
C. kleinii	Kleins				X	
C. rafflessi	Latticed				X	X
C. ulietensis	Double saddled				X	X
C. lunulatus	Redfin		X	X	X	X
C. citrinellus	Speckled				X	X
C. auriga	Threadfin				X	X
C. vagabundus	Vagabond		X	X	X	X
Least Common (15%-)						
F. longirostris	Big long-nosed			X		
C. flavirostris	Black		X	X	X	
C. semeion	Dotted		X	X	X	
C. quadrimaculatus	Fourspot		X	X	X	X
C. ornatissimus	Ornate		X	X		
H. polyleptis	Pyramid		X	X		
C. lunula	Raccoon			X		
C. reticulatus	Reticulated		X			

# Results of Butterflyfish Count: Abundance and Species Richness

Volunteers in the Mamanuca Islands recorded the highest number of fish, followed by Beqa, Kadavu, Yasawa Islands and South Vanua Levu

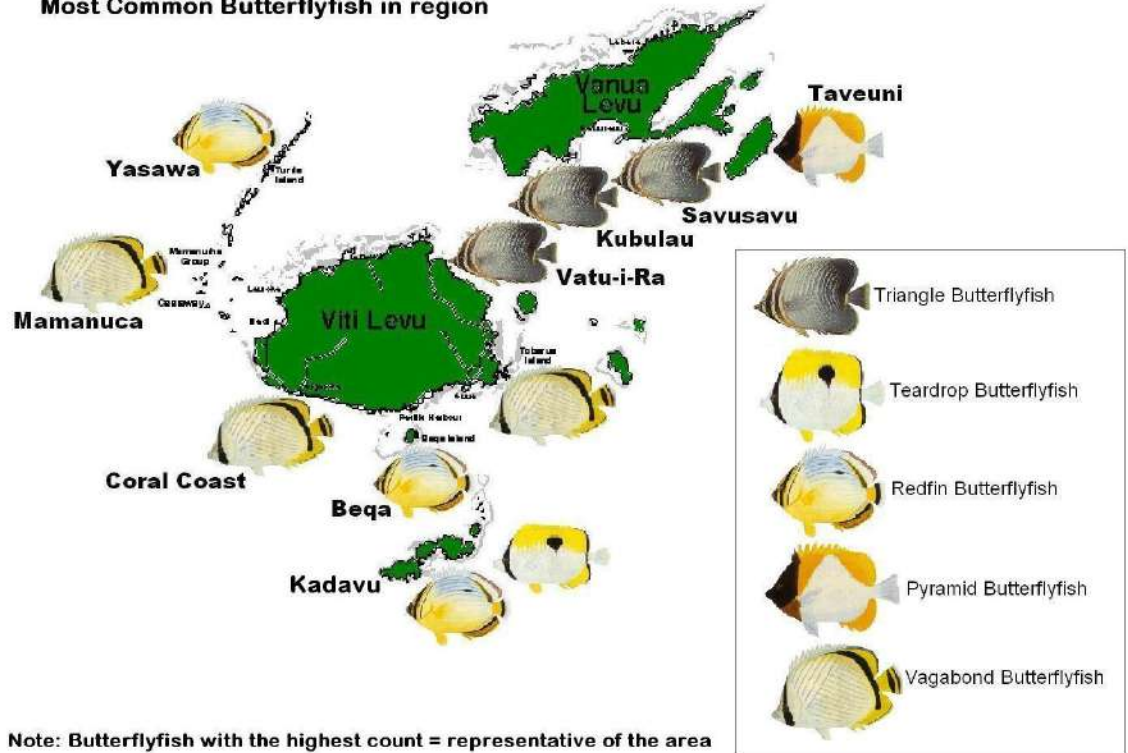
Map of Fiji showing Butterflyfish species distribution & numbers across regions



100% of the Fiji Butterflyfish Species were reported in the Mamanuca, Beqa and Taveuni Islands

# Results of Butterflyfish Count: Regions' Commonest Species

Most Common Butterflyfish in region



Note: Butterflyfish with the highest count = representative of the area

The most numerous Butterflyfish species was identified for each region.

Regional Patterns were identified.

Vagabond Butterflyfish (*Chaetodon vagabundus*), a generalist feeder, was the most numerous species on the nearshore coastline of South and Western Viti Levu

Triangle Butterflyfish (*Chaetodon baronessa*) feeds on live hard coral, and was the commonest species seen in South Vanua Levu and the central Vatu-i-Ra passage.

Redfin Butterflyfish (*Chaetodon lunulatus*) feeds on live hard coral, and dominated the outer islands of the Yasawas, Beqa and South Kadavu

# Benefits of Volunteer counts

- More counts (277) allowed a much greater amount of replication than smaller “scientific” surveys (29 or 23), increasing accuracy.
- Dedicated “one family” survey resulted in records of more fish and more species of Butterflyfish on most sites than were found during “all fish” surveys.
- Timed swim search of entire reef area was more effective for recording species presence/absence than using a measured transect area.
- Surveys were sent in from most areas of Fiji, allowing regional comparison across the country.
- Volunteer surveys require considerably less resources and support than those by non-volunteer organisations.





# Awareness raising

Activity raised awareness of fish identification, populations diversity, reef health, and conservation, in local staff and communities as well as visitors.



# Conclusions

- 90% of Fiji's 27 Butterflyfish species can be found in most regions of the country.
- A few species are confined to certain areas only (Black *C. flavirostris*, Fourspot *C. quadrimaculatus*, and Dotted *C. semeion*, in particular).
- Butterflyfish numbers are high in most areas.
- Most volunteer surveys showed an accurate species spread, but more careful identification training is needed.
- It is important to have some scientific surveys of an area to identify likely species identification mistakes

# Future Plans

- To make the survey an annual event.
- To encourage more involvement from education and conservation organisations and local communities as well as tourist operations.
- To print the Butterflyfish Poster for distribution and as an identification aide.
- To compare results with reef type to evaluate Butterflyfish diversity and abundance as an indicator of reef type and health.



An underwater scene featuring a variety of colorful fish, including several butterflyfish with yellow, white, and black patterns, swimming in clear blue water. In the lower portion of the image, there is a coral reef with pinkish and reddish corals. The overall atmosphere is vibrant and marine.

**2009**

## Future Plans

**Fiji Butterflyfish Count this year is October 2009**

**We welcome volunteers to help organise and conduct the activity.**

**Please visit the website for more details and results.**

**Vinaka!**

**[www.fjibutterflyfishcount.com](http://www.fjibutterflyfishcount.com)**