Final Project Evaluation Report

We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF format**. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Complete the form in English and be as concise as you can. Note that the information may be edited before posting on our website.

Please email this report to jane@rufford.org.

Your Details	
Full Name	Chandrasekaran Kumar
Project Title	Awareness, survey and conservation of Rays in Indian coast lines
Application ID	19485-1
Grant Amount	£ 4946
Email Address	marinebiokumar@gmail.com
Date of this Report	30.06.2017

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Identification of rays, collection methods and comparison with IUCN status				Different rays have been identified using FAO standard guidelines and the catching methods used for different rays were recorded. Identified species were compared with IUCN red listed rays.
To study the species diversity and abundance of ray species				Month-wise species specific and abundance data of the rays were recorded.
Preparation of easy identification chart of ray species				The simple easy identification chart for IUCN and Wild Life Protection Act (1972) listed rays were prepared. The common name as well as scientific name and their status also included for the better understanding of fisherman community.
Creating awareness among fishermen community				Awareness programme was conducted among the fisherman community at four major landing centres such as Chennai, Nagapattinam, Tuticorin and Colachel. The prepared rays identification chart in local language has distributed to the fisherman community to know the importance conservation of rays

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

N/A

3. Briefly describe the three most important outcomes of your project.

a) Diversity of rays in Southeast Coast of India

Identification of ray species was done by Food and Agricultural Organisation (FAO) and IUCN guidelines. The species specific diversity of rays were recorded from the major fish landing centres such as Chennai, Tuticorin, Nagapattinam and Colachel from June 2016 – June 2017. During this period, 26 rays from 5 major families have

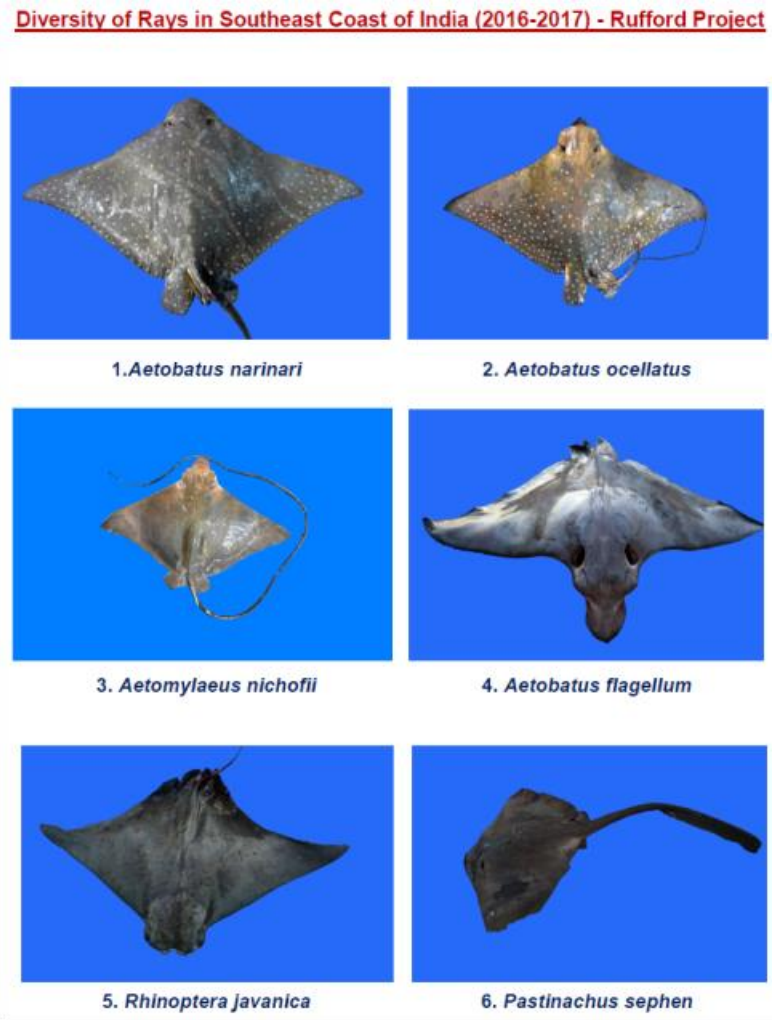
been identified. Unfortunately, most of the ray species landed are vulnerable and in data deficient state. Moreover, most of the juvenile stage ray species were landed in the Tuticorin landing centres at juvenile's stage as this will leads serious threat for their diversity. Among the identified species 23.07% are in near threatened, 34.61% are in data deficient and vulnerable, and 3.84% species are in endangered states. In this study, 57.69% of rays belonged to the family Dasyatidae.

Most of the ray species are having long gestation period more than 12 months and a low fecundity rate. Rays produces less number of offspring during their life cycle. Hence, continuous exploitation of this species an unregulated fishing practices leads to vulnerability of the ray resource. Moreover, the gill rakers of mobula and manta ray species were exported from Indian coast lines due to their increasing demand in the domestic and international market. The landed ray's scientific name, common name and their IUCN status was given in Table 1. And the species specific landing status of rays during survey are tabulated in a table 3.

Table1. Diversity of rays landed at southeast coast of India

S. No	Family Name	Scientific Name	Common Name	IUCN Status
1.	Myliobatidae	*Aetobatus narinari*	Spotted eagle ray	Near Threatened (NT)
		Aetobatus ocellatus	Spotted eagle ray	Vulnerable (VU)
		Aetomylaeus nichofii	Banded eagle ray	Vulnerable (VU)
		Aetobatus flagellum	Longhead eagle ray	Endangered (EN)
2.	Rhinopteridae	*Rhinoptera javanica*	Javanese cownose ray	Vulnerable (VU)
		Pastinachus sephen	Cowtail stingray	Data deficient (DD)
		Rhinoptera bonasus	Cownose ray	Near Threatened (NT)
		Rhinoptera jayakari	Oman cownose ray	Near Threatened (NT)
3.	Mobulidae	*Mobula japonica*	Spine tail devilray	Near Threatened (NT)
4.	Dasyatidae	*Hemitrygon bennettii*	Bennet's stingray	Data deficient (DD)
		Hypanus guttata	Longnose stingray	Data deficient (DD)
		Bathytoshia centroura	Rough tail stingray	Least concern (LC)
		Dasyatis kuhlii	Blue spotted stingray	Data deficient (DD)
		Megatrygon microps	Small eye stingray	Data deficient (DD)
		Dasyatis pastinaca	Common sting ray	Data deficient (DD)
		Himantura walga	Dwarft whipray	Near Threatened

				(NT)
4.	Dasyatidae Cont.	*Himantura fai*	Pink whipray	Vulnerable (VU)
		Himantura imbricata	Scaly whipray	Data deficient (DD)
		Himantura leopard	Leopard whipray	Vulnerable (VU)
		Himantura pastinacoides	Round whipray	Vulnerable (VU)
		Himantura uarnak	Reticulate whipray	Vulnerable (VU)
		Himantura undulate	Leopard whipray	Vulnerable (VU)
		Maculabatis gerradi	White spotted whipray	Vulnerable (VU)
		Himantura marginata	Blackedge whipray	Data deficient(DD)
5.	Gymnuridae	*Gymnura Poecilura*	Long tail butterfly ray	Near Threatened (NT)
		Gymnura japonica	Butterfly ray	Data deficient (DD)

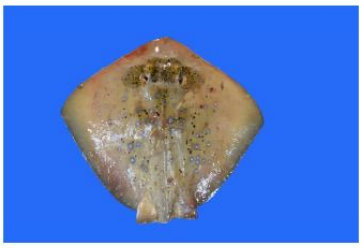


7. *Rhinoptera bonasus*

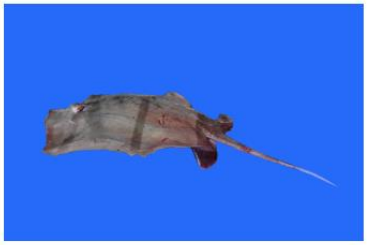
8. *Rhinoptera jayakari*

9. *Mobula japonica*

10. *Dasyatis bennettii*

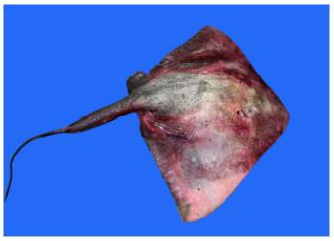


11. *Dasyatis guttata*



12. *Dasyatis centroura*

13. *Dasyatis kuhlii*



14. *Dasyatis microps*

15. *Himantura walga*

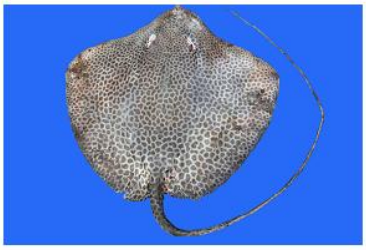
16. *Dasyatis pastinaca*

17. *Himantura fai*

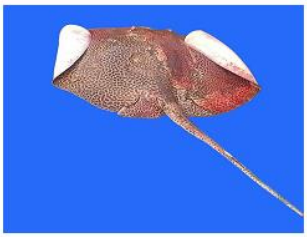
18. *Himantura imbricata*

19. *Himantura leoparda*

20. *Himantura pastinacoides*

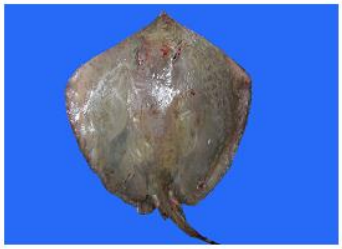


21. *Himantura uarnak*

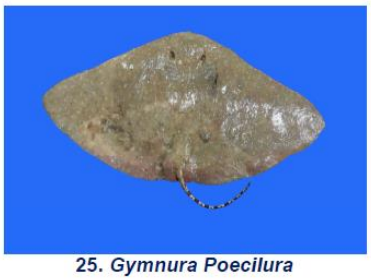


22. *Himantura undulata*

23. *Maculabatis gerradi*



24. *Himantura marginata*



25. *Gymnura Poecilura*

26. *Gymnura japonica*

b). Gear used for collection of ray fish in different fish landing centres

Maximum exploitation of ray species in the southeast coast is done by mechanised trawl, gill and line gear operations. Some ray species are targeted for their gill rakers as people in countries like china believe the myth that they have medicinal values. Manta ray species are caught using long line and trawl nets. Mobula rays are caught using gill nets. Eagle rays and cow nose ray species are caught using bottom trawl and bottom set gill nets. Stingray and whipray species are caught using bottom line trawl, longline and gillnets. Fishing gears used in different fish landing centres are

tabulated in table 2 and also the mean value of disc width and length along with their weight are listed in table 4.

Table 2.Gears used for exploitation of ray species in the Southeast coast of India

S. No	Scientific Name	Common Name	Gears used for Exploitation
1.	*Aetobatus narinari*	Spotted eagle ray	Bottom trawl and gill nets
	Aetobatus ocellatus	Spotted eagle ray	Bottom trawl and gill nets
	Aetomylaeus nichofii	Banded eagle ray	Gill nets and bottom trawl
	Aetobatus flagellum	Longhead eagle ray	Gill nets and bottom trawl
2.	*Rhinoptera javanica*	Javanese cownose ray	Bottom trawl and gill nets
	Pastinachus sephen	Cowtail stingray	Hook and line, bottom trawl
	Rhinoptera bonasus	Cownose ray	Bottom trawl and gill net
	Rhinoptera jayakari	Oman cownose ray	Bottom trawl and gill nets
3.	*Mobula japonica*	Spine tail devilray	Gill net
4.	*Hemitrygon bennettii*	Bennet's stingray	Bottom trawl
	Hypanus guttata	Longnose stingray	Bottom trawl
	Bathytoshia centroura	Rough tail stingray	Bottom trawl, long line and gill nets
	Dasyatis kuhlii	Blue Spotted stingray	Bottom trawl, long line and gill nets
	Megatrygon microps	Small eye stingray	Bottom trawl, long line and gill nets
	Dasyatis pastinaca	Common stingray	Bottom trawl
	Himantura walga	Dwarft whipray	Bottom trawl
	Himantura fai	Pink whipray	Bottom trawl and long line, gill nets
	Himantura imbricate	Scaly whipray	Bottom trawl and gill nets
	Himantura leopard	Leopard whipray	Bottom trawl and long line, gill nets
	Himantura pastinacoides	Round whipray	Bottom trawl and long line, gill nets
	Himantura uarnak	Reticulate whipray	Bottom trawl and long line, gill nets
	Himantura undulate	Leopard whipray	Bottom trawl and long line, gill nets
	Maculabatis gerradi	White spotted whipray	Bottom trawl and gill net
	Himantura marginata	Blackedge whipray	Gill net and bottom trawl
5.	*Gymnura Poecilura*	Long tail butterfly ray	Bottom trawl, gill nets and trammel net
	Gymnura japonica	Butterfly ray	Bottom trawl and long line, gill nets

c). Creating awareness among fishermen and boat owners.

To create awareness among fishermen we need a working action plan that will lead to conservation of endangered species. Creating a complete database or guideline on the rays landed across the southeast coast of India is essential. In this study, the endangered, vulnerable and near threatened species are categorised based on IUCN. A chart has been prepared in local language for the better understanding of fishermen about the importance of conservation of endangered ray species. Local name as well as scientific name along with its conservation status (IUCN) were included in the chart and distributed. Fishermen and other stakeholders has shown a great interest to know about the biological information like lifespan, gestation age, fecundity value and maturity period of various ray species. The awareness is been created by reaching the fishermen community at their workplace i.e. landing centres. There we distribute and explain the conservation status of the ray species.

Table 3.Species wise counting of rays landed at southeast coast of India (collective data of four landing centres) during the period of survey.

S. No	Common Name	Scientific Name	2016							2017					
			Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1.	Spotted eagle ray	*Aetobatus narinari*	78	55	64	40	31	10	5	9	14	10	13	Annual fishing Ban period 15th April to 14th June 2017 (61 Days)	Awareness programme 26th to 29th June 2017
2.	Spotted eagle ray	*Aetobatus ocellatus*	123	94	81	64	52	17	9	12	24	41	35		
3.	Banded eagle ray	*Aetomylaeus nichofii*	168	73	46	52	45	16	7	17	23	15	13		
4.	Longhead eagle ray	*Aetobatus flagellum*	109	86	41	25	13	9	5	15	21	14	8		
5.	Javanese cownose ray	*Rhinoptera javanica*	72	66	22	25	29	16	12	9	14	8	15		
6.	Cowtail stingray	*Pastinachus sephen*	51	42	31	42	25	17	12	14	9	14	13		
7.	Cownose ray	*Rhinoptera bonasus*	40	49	51	24	25	18	12	9	8	14	3		
8.	Oman cownose ray	*Rhinoptera jayakari*	31	28	14	17	12	14	13	8	9	4	7		
9.	Spine tail devil ray	*Mobula japonica*	15	9	12	7	4	3	5	4	5	10	3		
10.	Bennet's stingray	*Dasyatis bennettii*	208	186	197	124	56	62	57	49	124	113	57		
11.	Longnose stingray	*Dasyatis guttata*	219	248	176	49	86	54	42	38	46	57	35		
12.	Rough tail stingray	*Dasyatis centroura*	41	24	19	24	16	22	12	10	9	7	11		
13.	Blue spotted stingray	*Dasyatis kuhlii*	78	53	48	52	40	19	13	16	24	19	6		
14.	Small eye stingray	*Dasyatis microps*	49	15	17	10	16	13	9	6	12	15	4		
15.	Common stingray	*Dasyatis pastinaca*	54	38	27	12	18	13	16	8	12	18	20		
16.	Dwarft whipray	*Himantura walga*	127	97	64	58	35	29	24	17	20	34	21		
17.	Pink whipray	*Himantura fai*	104	45	36	27	19	17	8	12	6	19	13		
18.	Scaly whipray	*Himantura imbricata*	187	134	86	45	32	14	12	15	19	23	16		
19.	Leopard whipray	*Himantura leopard*	64	82	76	42	19	22	15	8	6	15	10		
20.	Round whipray	*Himantura pastinacoides*	78	42	37	19	14	8	10	11	7	12	13		
21.	Reticulate whipray	*Himantura uarnak*	51	37	29	12	14	18	17	5	16	21	10		
22.	Leopard whipray	*Himantura undulate*	146	133	77	65	34	21	14	13	17	12	9		
23.	White spotted whipray	*Maculabatis gerradi*	72	45	38	29	18	22	14	7	24	16	19		

24.	Black edge whipray	*Himantura marginata*	95	70	65	53	49	24	15	12	22	19	13		
25.	Long tail butterfly ray	*Gymnura Poecilura*	262	197	120	134	120	87	96	45	102	76	25		
26.	Butterfly ray	*Gymnura japonica*	97	82	76	43	38	24	19	24	16	22	37		
TOTAL			**2619**	**2030**	**1550**	**1094**	**860**	**589**	**454**	**393**	**609**	**628**	**429**		

Table4. Disc Width (DW), and Weight of rays landed at Southeast Coast of India

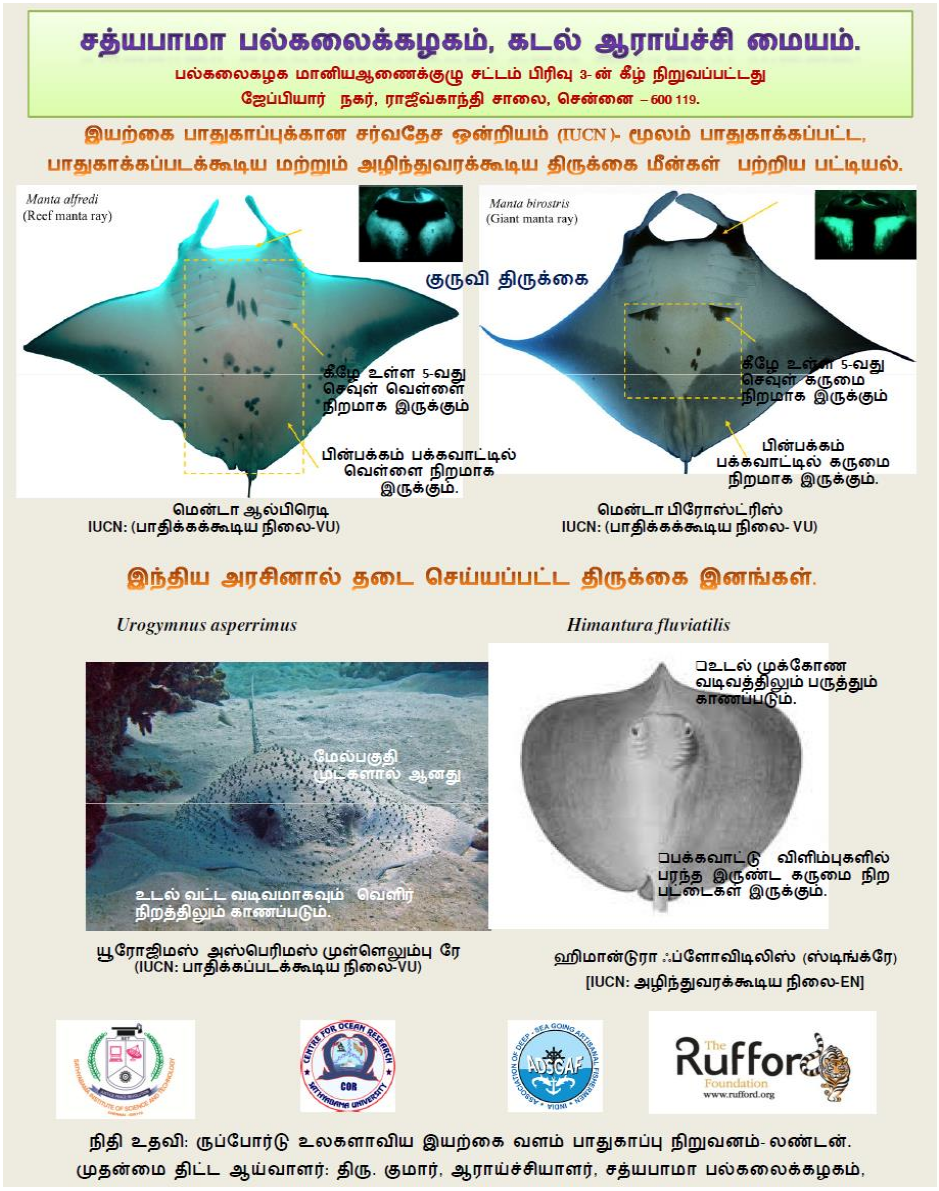
S. No	**Common Name**	**Disc Width in meters(DW)**	**Weight in Kg (W)**
1.	Spotted eagle ray	2	56
2.	Spotted eagle ray	0.9	25
3.	Banded eagle ray	0.4	18
4.	Longhead eagle ray	0.3	20
5.	Javanese cownose ray	0.8	28
6.	Cowtail stingray	0.6	32
7.	Cownose ray	1.2	40
8.	Oman cownose ray	0.75	56
9.	Spine tail devil ray	2.3	150
10.	Bennet's stingray	0.5	25
11.	Longnose stingray	2.7	120
12.	Rough tail stingray	1.8	120
13.	Blue Spotted stingray	0.2	12
14.	Small eye stingray	0.5	15
15.	Common stingray	0.15	8
16.	Dwarf whipray	0.2	5
17.	Pink whipray	0.9	25
18.	Scaly whipray	0.15	16
19.	Leopard whipray	1	30
20.	Round whipray	0.25	27
21.	Reticulate whipray	0.7	30
22.	Leopard whipray	1.2	45
23.	White spotted whipray	0.4	8
24.	Black edge whipray	1	17
25.	Long tail butterfly ray	0.6	12
26.	Butterfly ray	0.9	14

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

The involvement of local community fishermen is highly appreciable as they shown a great interest to know about the biological facts about ray species. The bitter truth is the fishermen community aren't aware of the conservation status of rays. They only catch them for their commercial value.

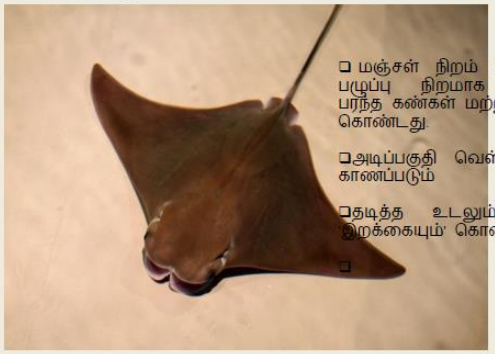
An easy identification chart has been prepared in local language to make fishermen aware of the red listed species and their importance in the eco system. And also, the effects of natural and man-made (unregulated catch, pollution, etc.) effects were also explained to fishermen and stakeholders. Fishermen and stakeholders are encouraged to have an updated knowledge about the causes and consequences of the unregulated catch of ray species by continuous monitoring the population and improved identification of ray species is essential conservation. The fishermen confessed to conserve the diversity of species and they are ready to join hands to improve research and data collection on rays.

Fig1: Species Identification Chart Prepared in local languages (Tamil) and distributed to Fishermen of proposed landing centres



இயற்கை பாதுகாப்புக்கான சர்வதேச ஒன்றியம் (IUCN)- மூலம் பாதுகாக்கப்பட்ட, பாதுகாக்கப்படக்கூடிய மற்றும் அழிந்துவரக்கூடிய திருக்கை மீன்கள் பற்றிய பட்டியல்.

Rhinoptera bonasus (Cownose ray)



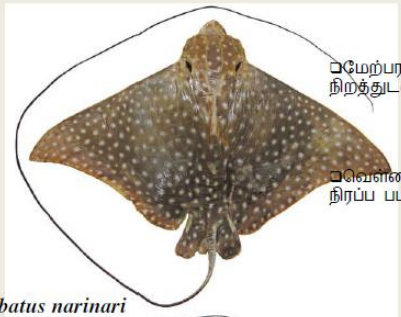
❑ மஞ்சள் நிறம் (அ) வெளிரிய பழுப்பு நிறமாக காணப்படும். பரந்த கண்கள் மற்றும் தலையை கொண்டது.

❑அடிப்பகுதி வெள்ளை நிறமாக காணப்படும்

❑தடித்த உடலும் முக்கோண இறக்கையும் கொண்டது.

❑

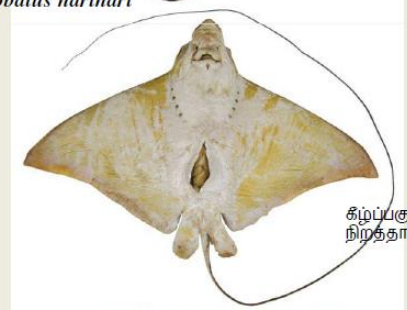
ரினொபெட்ரா போனஸ்ஸஸ்
(அச்சுறுத்தும் நிலை-NT)



❑மேற்பரப்பு வெளிர் கருமை நிறத்துடன் காணப்படும்.

❑வெள்ளை நிற புள்ளிகளால் நிரப்ப பட்டு இருக்கும்.

Aetobatus narinari



கீழ்ப்பகுதி வெண்மை நிறத்தால் ஆனது.

எட்டோபாடாஸ் நரினாரி (கழுகு ரே)
(அச்சுறுத்தும் நிலை-NT)


SATHYABAMA UNIVERSITY
(Established under section 3 of UGC Act, 1956)
Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai-119, Tamil Nadu.
AWARENESS PROGRAMME ON CONSERVATION OF RAYS
(Among Fishermen of Southeast Coast of India)
Date: 26-29th June, 2017
Organized by
Centre for Ocean Research
(Joint with Association of Deep Sea Going Artisanal Fishermen)
Sponsored by
The Rufford Foundation
www.rufford.org

5. Are there any plans to continue this work?

Yes. In order to attain an impact on conservation of rays, continuous monitoring on landing data has to be analysed. Moreover, strengthening the database available about the ray species of southeast coast of India, improving co-ordination between fishermen community with researchers, initiation of awareness, and periodical survey on conservation strategies should be studied in the future for formulating the of effective conservation action plan.

Among the major fish landing centres, we found that Nagapattinam is the major landing centres where high amount of ray species were landed daily. The deep sea fishermen land irrespective of time. So getting deep sea catching information during the weekend survey may inadequate to produce a clear species specific ray's data. Hence, that the daily data collection is must be the effective form of data collection on conservation of ray species. Thus, further study should be continuing for getting daily landing data of rays.

6. How do you plan to share the results of your work with others?

- The final report of Rufford Foundation will be submitted to ADSGAF and State Fisheries to take necessary steps for conservation of ray species.
- The findings and important outcomes will be disseminated by communicating to internationally reputed journal in the form of publication.
- Periodic survey in forthcoming days and comparing the findings with the previous work and share them with both government organisations, NGOs and fishermen community as a part of effective action plan on conservation of rays.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The Rufford grant was utilised for the project from June 2016 to June 2017. Two field assistants were recruited and they were directed to collect the data on landing of rays in weekly basis from June 2016 to June 2017. The annual fish ban period imposed in southeast coast of India from 15th April to 14th June 2017 (61 Days), the awareness programme was conducted 2 months later

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Man power (Field Assistants 2 X 12 Months)	1236	1236	-	-
Equipment (DSLR camera, 1 no)	515	515	-	-
Travel (within India)	1030	1030	-	-
Awareness training program at Chennai, Nagapatinam, Tuticorin and Colachal	1500	1500	-	-
Consumables (Pad, pen, printed materials, hand weighing balance, books, markers, sample bottles, and polythene bags etc.,	200	200	-	-
Contingency	465	465	-	-
TOTAL	4946	**4946**	-	

9. Looking ahead, what do you feel are the important next steps?

- In order to resolve taxonomy related issues DNA sequencing must be done to create DNA referral library for the ray species.

- A complete and user-friendly identification chart for rays should be created and the same has to be distributed among fishermen community and stakeholders.
- Trade regulation of threatened rays should be carried out.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

As a Rufford Small Grants awardee, I have been invited to share my conservation work in the Rufford in-country Conference under the theme of "Let's protect Sri Lankan Biodiversity" held between 14th and 16th November, 2016 at Kandy, Sri Lanka.

http://bcssl.org/wp-content/uploads/2016/11/Lets-protect-Sri-Lankan-Biodiversity.pdf

http://bcssl.org/2016/12/15/highlights-of-rufford-in-country-conference-sri-lanka/

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

12. Any other comments?

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