

# NAPOLEON WRASSE

(*Cheilinus undulatus*) “Mameng”

PHILIPPINE STATUS REPORT AND NATIONAL PLAN OF ACTION  
2017-2022

SPECIAL ISSUE OF THE PHILIPPINE JOURNAL OF FISHERIES

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On behalf of

 Federal Ministry for the  
Environment, Nature Conservation,  
Building and Nuclear Safety

of the Federal Republic of Germany



Bureau of Fisheries and Aquatic Resources  
National Fisheries Research and Development Institute,  
Corporate 101 Mo. Ignacia Ave. South Triangle, Quezon  
City, Philippines, 1103

Telefax: (+632) 3725063  
Email Address: fisheriesjournal@nfrdi.da.gov.ph  
journal.nfrdi@gmail.com

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Editors:  
Mudjekeewis Santos  
Francisco Torres Jr.  
Victor Marius Tumilba  
Franca Sprong

Cover Photo:  
Troy Mayne  
*Danjungan Island, Philippines*

Design and Layout:  
J.K. Dionisio

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# MESSAGE

Greetings!

First, I would like to commend the hard work and inspiring dedication of the noble men of Science from the National Fisheries Research and Development Institute, Bureau of Fisheries and Aquatic Resources, the academe and partner organizations which composed the NPOA-Technical Working Group. It is through your perseverance that we have arrived at a milestone in the conservation and protection of Sharks, Rays and Napoleon Wrasse.



The alarming rate at which these three important marine species has been decreasing in number enacted a regional concern, which the Philippines is now strongly committed on taking part of The National Plan of Action for Sharks, Rays, and Napoleon Wrasse comes at an opportune time when the Bureau is strengthening and beefing up its law enforcement capabilities across Philippine waters as part of our intensive campaign against illegal, unreported and unregulated (IUU) fishing. With the creation of this NPOA, we can be assured of a Science-based, collaborative and systematic management approach for these species.

We are grateful to the Sulu-Sulawesi Seascape Project and the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH for being instrumental to the realization of this project. May our partnership continue for the conservation and sustainable development of our shared marine resources.

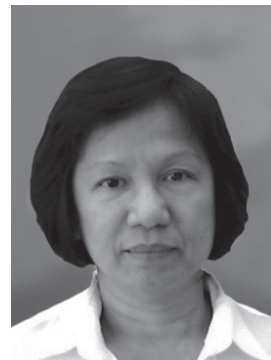
*Mabuhay Tayong Lahat!*

  
COMMODORE EDUARDO B. GONGONA, PG (RET.)  
BFAR National Director



## MESSAGE

We would like to commend the research staff as well as our partners from the different institutions and organizations who worked together in coming up with the National Plan of Action (NPOA) for Sharks, Rays, and Napoleon Wrasse. Likewise, our appreciation goes to the Sulu-Sulawesi Seascape Project and the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH for supporting this undertaking.



This book serves as a critical guidepost for succeeding initiatives that we will be carrying out in order to properly manage our marine resources. The baseline it provides are significant in crafting appropriate policies that will protect endangered marine species. We hope that through this instrument, we will be able to successfully comply with our global and regional commitments, and implement the NPOA on Sharks, Rays, and Napoleon Wrasse more effectively.

*Mabuhay at maraming salamat!*

A handwritten signature in black ink, appearing to read 'D. E. Bayate'.

**DRUSILA ESTHER E. BAYATE, CESO IV**

Interim Executive Director

National Fisheries Research and Development Institute

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# FOREWORD

Sharks and related species such as skates, rays and chimaeras are important fishery resources of the Philippines. Shark fins, meat and other body parts and internal organs, are used for food and sustenance in many coastal communities. The Global demand for shark and shark products has been increasing over the past 40 years. Global assessments on shark fisheries have shown that an increasing number of species are facing threats of extinction. These are a combination of factors such as unsustainable fishing practices, degradation of nursery and breeding grounds and other important habitats, unregulated coastal development, pollution and other anthropogenic activities. These species are also vulnerable to the effects of climate change such as ocean warming and acidification.

The increase in shark fishery and utilization triggered worldwide concerns for conservation and management of shark populations. A number of globally threatened species is also reported to occur in Philippine waters which is a cause for concern. However, there are limitations on the shark knowledge base such as shark catches and fishing practices, trade and utilization, and important biological parameters of many shark species.

Government programs such as the National Stock Assessment Program initiated by the Bureau of Fisheries and Aquatic Resources, in collaboration with the National Fisheries Research and Development Institute, can respond to the need of improving our knowledge on the state of shark stocks and facilitate the collection of necessary information to aid policy formulation for the management of shark resources in the Philippines.

The review and updating of the Philippine National Plan of Action for the Conservation and Management of Sharks in the Philippines-2009 (Philippine NPOA-Sharks) is timely for supporting programs for improving national policies on fisheries resource management. The “Sharks and Rays “Pating” at “Pagi” Philippine Status Report and National Plan of Action 2017-2022” is a response to Republic Act 10654 (An Act to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, Amending Republic Act No. 8550, Otherwise Known as “The Philippine Fisheries Code of 1998,” and for Other Purposes) which states “...formulation and implementation of rules and regulations for the conservation and management of straddling fish stocks, highly migratory fish stocks and threatened living marine resources such as sharks, rays and ludong...”

Through this publication, the Bureau balances fishing efforts and resource exploitation with conservation and management to attain sustainability of shark fisheries and “conserve, protect and sustain management of the country’s fishery and aquatic resources” for the benefit of our people.



**EMMANUEL F. PIÑOL**  
Secretary  
Department of Agriculture

# PREFACE

The Sulu-Sulawesi Seascape, shared by Indonesia, Malaysia and the Philippines, ranks among the most diverse and productive marine ecosystems in the world. Located at the apex of the Coral Triangle, it is known as the world's center of marine biodiversity with the highest numbers of coral, crustacean, and marine plant species and about 3,000 species of fish. It is also home to sharks, skates, rays and chimaeras, here collectively known as “sharks.”

The marine resources in the Sulu-Sulawesi Seascape face major threats such as overfishing, destructive fishing practices, rapid population growth, unsustainable coastal development, and pollution. As a consequence, valuable coastal habitats like mangrove forests, coral reefs, and seagrass beds are at risk of losing their function as breeding, feeding, and nursery grounds for marine organisms including sharks. This situation is exacerbated by the effects of climate change.

The countries of Indonesia, Malaysia, and the Philippines see the need for transboundary cooperation to address these threats and protect the fragile habitat and resources of the seascape. This is carried out under the umbrella of the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF). Designated as a priority seascape under CTI-CFF by the six member countries (Indonesia, Malaysia, Philippines, Papua New Guinea, Solomon Islands, and Timor-Leste), the Sulu-Sulawesi Seascape serves as a geographic focus of investments, actions, conservation, and climate change initiatives under the CTI-CFF Regional Plan of Action (RPOA).

The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) commissioned the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH to implement the Sulu-Sulawesi Seascape Project to support the countries in implementing and coordinating their activities under CTI-CFF's RPOA. The project aims to address the urgent threats faced by the coastal and marine resources of the Coral Triangle by establishing mechanisms for cooperation with the overarching goal of conserving marine biodiversity towards a sustainable management of resources in the Sulu-Sulawesi Seascape. In order to address the various issues, one focal area of implementation is to promote an Ecosystem Approach to Fisheries Management (EAFM) in selected marine managed areas. Under the EAFM framework, the Sulu-Sulawesi Seascape Project supported the Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR) in the development of the “Philippine Sharks Assessment Report (SAR) and National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks) 2017-2022.” By conducting an assessment on the status of sharks in the country, policy recommendations and management actions at the regional and national levels have been identified for the Philippines, which is the main purpose of this publication.

In the Philippines, the project is jointly implemented by the Department of Environment and Natural Resources (DENR) and the DA-BFAR with Conservation International Philippines (CIP) and GIZ. The Sulu-Sulawesi Seascape Project implementing partners acknowledge the contribution of AA Yaptinchay and Jean Utzurum of Marine Wildlife Watch of the Philippines, Vince Cinches of Greenpeace Southeast Asia, and Ms. Moonyeen Alava in her capacity as technical consultant.



# CONTRIBUTORS

Abina, Lilibeth	- NFRDI	Lanzuela, Noemi	- BFAR NSAP 5
Abrenica, Bruna	- BFAR NSAP 7	Laroco, Maureen	- BFAR NSAP 1
Aguila, Roselyn	- NFRDI	Mamalangkap, Macmod	- BFAR NSAP ARMM
Aquino, Ma. Theresa	- MMWP	Mendoza, Kaye Kirsteen	- BFAR IFCU CO
Alava, Moonyeen Nida	- Species Consultant, Sharks	Mendoza, Rachele	- BFAR NSAP 3
Alcantara, Maria Aron	- NFRDI	Mesa, Sheryll	- BFAR NSAP 6
Alcantara, Matt	- BFAR NSAP 8	Morano, Joarlyn	- GIZ
Apacionado, Wyndel	- BFAR MIMAROPA	Munap, Pedling	- BFAR NSAP 9
Arcamo, Sandra Victoria	- BFAR FRMD CO	Nakayama, Lovella	- PENRO Province of Cebu
Baclayo, Joyce	- BFAR NSAP 13	Nañola, Cleto	- UP Mindanao
Belga, Prudencio	- BFAR NSAP 7	Ramos, Maribeth	- BFAR NSAP CALABARZON
Candelario, Myrna	- BFAR NSAP MIMAROPA	Rengel, Davelyn	- CI-P
Castillo, Carlos Alberto	- PCSD	Roldan, Raul	- ADB Reta 7813
Cinches, Vince	- Greenpeace	Romero, Filemon	- Species Consultant, Napoleon Wrasse
Daclan, Marion Antonette	- GIZ	Rosaceña, Ruth	- BFAR NSAP 7
Del Castillo, Ailyn	- BFAR NSAP MIMAROPA	Santos, Mudjekeewis	- NFRDI
Dela Cruz, Raymundo	- BFAR MIMAROPA	Songco, Angelique	- TMO
Donia, Emelyn	- BFAR NSAP 12	Sprong, Franca	- GIZ
Exclamador, Virgelio	- BFAR NSAP 7	Tan, Mercedita	- BFAR FRMD CO
Gado, Vincent Jay	- BFAR MIMAROPA	Torres, Francisco	- NFRDI
Gaerlan, Rosario Segundina	- BFAR NSAP 1	Tuante, Janice	- BFAR FRMD CO
Gallmann, Maria Rachele	- GIZ	Utzurum, Jean Asuncion	- Siliman University
Gapuz, Vianney Anthony	- BFAR NSAP 10	Villanueva, Jose	- BFAR NSAP 11
Gonzales, Lenie	- BFAR NSAP MIMAROPA	Villarao, Melanie	- BFAR NSAP 2
Katada, Nilo	- BFAR FIQD CO	Yaptinchay, Arnel Andrew	- MWWP
Kettemer, Lisa	- GIZ	Yutuc, Romina	- BFAR NSAP 3
Labe, Ludivina	- BFAR FRLD CO		

# ACRONYMS

<b>ARMM</b>	- Autonomous Region in Muslim Mindanao	<b>LGU</b>	- Local Government Unit
<b>BFAR</b>	- Bureau of Fisheries and Aquatic Resources	<b>MMAA</b>	- Muslim Mindanao Autonomy Act
<b>BMUB</b>	- German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety	<b>MPA</b>	- Marine Protected Area
<b>CITES</b>	- Convention on International Trade in Endangered Species of Wild Fauna and Flora	<b>MPAMB</b>	- Marine Protected Area Management Board
<b>CSO</b>	- Civil Society Organizations	<b>MSU</b>	- Mindanao State University
<b>GAA</b>	- General Appropriations Act	<b>NFRDI</b>	- National Fisheries Research and Development Institute
<b>GIZ</b>	- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	<b>NLECC</b>	- National Law Enforcement Coordinating Committee
<b>DENR</b>	- Department of Environment and Natural Resources	<b>NPOA</b>	- National Plan of Action
<b>EAFM</b>	- Ecosystem Approach to Fisheries Management	<b>NSAP</b>	- National Stock Assessment Program
<b>FAO</b>	- Fisheries Administrative Order	<b>NW</b>	- Napoleon Wrasse
<b>FARMC</b>	- Fisheries and Aquatic Resources Management Councils	<b>NGO</b>	- Nongovernment Organizations
<b>FL</b>	- Fork Length	<b>PNP</b>	- Philippine National Police
<b>FVC</b>	- Fish Visual Census	<b>PO</b>	- People's Organization
<b>H&amp;L</b>	- Hook and Line	<b>RA</b>	- Republic Act
<b>HP</b>	- Horse power	<b>RFU</b>	- Regional Field Unit
<b>IEC</b>	- Information, Education, and Communication	<b>RLECC</b>	- Regional Law Enforcement Coordinating Committee
<b>IUCN</b>	- International Union for the Conservation of Nature	<b>SCUBA</b>	- Self-Contained Underwater Breathing Apparatus
		<b>SG</b>	- Spear Gun
		<b>SSME</b>	- Sulu-Sulawesi Marine Ecoregion
		<b>TL</b>	- Total Length

# EXECUTIVE SUMMARY

The Napoleon wrasse (*Cheilinus undulatus*) is listed as endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species and is included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2004. The categorization on the IUCN Red List and CITES is in order to regulate the exploitation and trade of this endangered species and to reduce the threats from overfishing, destructive fishing, habitat destruction and others. The Napoleon wrasse is a species of wrasse mainly found in Indonesia, Malaysia, and the Philippines. These countries comprise the Sulu-Sulawesi Marine Ecoregion (SSME) which is a priority seascape of the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF).

The overall objective of the “Napoleon Wrasse (*Cheilinus undulatus*) ‘Mameng’ Philippine Status Report and National Plan of Action 2017-2022” is to provide the Philippines with management action and policy recommendations towards sustainable management of the Napoleon wrasse. In order to be able to provide recommendations, it was necessary to appraise existing knowledge on Napoleon wrasse with regards to its biology, ecology, and economics of international trade. Of equal importance was to determine the distribution range and occurrence of the species within the Philippine waters. Local knowledge was used to determine the impacts of existing conservation measures as well as to further assess threats to the species to be able to provide appropriate national and regional policy recommendations presented in this publication.

The management actions and policy recommendations are based on the outputs of two consultative workshops. The first workshop focused on establishing the current status of the Napoleon wrasse in the Philippines while the second workshop tackled the development of the National Plan of Action (NPOA) to address identified threats and issues affecting the species. The recommended actions covers eight priority areas: 1) National Administration, 2) Local Administration, 3) Research, 4) Law Enforcement, 5) Capacity Building and Community Mobilization, 6) Species Identification, 7) Management Measures, and 8) Knowledge Management. Under the National Administration priority area, recommended actions include issuance of a memorandum to prioritize Napoleon wrasse-related activities under the Bureau of Fisheries and Aquatic Resources (BFAR), submission of Napoleon wrasse project proposals in the BFAR annual national and regional

budgets, creation of a national and regional BFAR Aquatic Wildlife Technical Working Group, and development and implementation of an aquatic wildlife traceability system. Regarding Local Administration, recommended actions consists of developing and implementing Napoleon wrasse management and conservation communication plans for the local government units (LGUs). Recommended actions for Research focus on adopting and implementing a standard module for fish visual census (FVC), conducting capacity building of BFAR Regional Fisheries Units (RFUs) on FVC, and developing of a FVC database. On Law Enforcement, recommended actions are to develop and implement law enforcement training and communication plans. Capacity Building and Community Mobilization recommended actions include Napoleon wrasse information, education and communication (IEC) campaigns, assessment of Napoleon wrasse through the National Stock Assessment Program (NSAP), and issuance of Service Order/ Fisheries Office Order for the creation of the adjudication committee. For Species Identification, it is recommended to conduct species identification trainings, procure materials used in length and weight measurements, conduct FVC on Napoleon wrasse areas, and validate ongoing high-value species (HVS) culture. Management Measures recommended actions covers participatory approach in identifying appropriate management measures, preparation of country status reports to help identify gaps in implementation, strengthening capacities of marine protected area (MPA) management boards and other habitat management bodies, and data sharing to support management measures. Knowledge Management actions include conducting non-detriment finding (NDF), genetic and connectivity, reproduction and spawning aggregation studies. Other recommended actions under Knowledge Management deal with monitoring and data collection, knowledge sharing, completing NSAP data collection, and improving information on Napoleon wrasse market flow.

Partner agencies essential to the implementation of the NPOA are the BFAR, Philippine National Police-Maritime Group, Philippine Coast Guard, Department of Environment and Natural Resources, Bantay Dagat, LGUs, civil society organizations, people’s organizations, nongovernment organizations and academe. These partner agencies have to ensure strong private and public participation together with the Fisheries and Aquatic Resources Management Councils (FARMCs), Marine Protected Area Management Board (MPAMB) and the media.



# CHAPTER 1: INTRODUCTION

The Napoleon wrasse or Humphead wrasse (*Cheilinus undulatus*) is the largest member of the wrasse family, Labridae, and one of the largest reef associated fish in the world. It is one of the most expensive live food fish and has been heavily exploited for the live reef fish trade throughout its core range in Southeastern Asia (Sadovy, Donaldson, et al., 2003). Among the reef fishes, it is a desired species not only as a traditional source of protein in the Western Pacific countries but also as a favored reef fish in the menu of affluent families in China and neighboring countries. Over the last two decades, the demand has been increasing as part of the live food fish trade in the wealthy countries of Asia and it is predicted to increase in the luxury international trade due to increasing wealth within the region (Sadovy, 2005). Available fishery-dependent and trade-related data suggest at least a tenfold decline in its population over the last 10 to 15 years in heavily exploited areas such as Indonesia, Malaysia, and the Philippines. Much of the catch for the live fish trade in these source countries is of small, juvenile fish (Russell & Buga, 2001).

Because of the overexploitation, the Napoleon wrasse was listed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species, initially as Vulnerable in 1996 and then as Endangered in 2004. It was also listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2004. This means Napoleon wrasse, although not necessarily currently threatened with extinction, may become so unless its trade is subject to strict regulation in order to avoid utilization incompatible with the health of the stock and the survival of the species.

Since the main source of Napoleon wrasse are within the Sulu-Sulawesi Seascape, i.e., Indonesia, Malaysia, and the Philippines, there is a need to adopt measures for its management and conservation within the region. The Philippine government, through the Department of Agriculture–Bureau of Fisheries and Aquatic Resources (DA-BFAR), with support from the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety through Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, carries out the “Designing and Implementing an Ecosystem Approach to Fisheries Management (EAFM) Regime for Selected Marine-Managed Areas in the Sulu-Sulawesi Seascape Project.” One of the four measures of the EAFM is the development of the “Napoleon Wrasse (*Cheilinus undulatus*) ‘Mameng’ Philippine Status Report and National Plan of Action 2017-2022” in order to address one of the priority issues identified in the

Comprehensive Action Plans of the Sulu-Sulawesi Marine Ecoregion (SSME) and eventually contribute to the development of an assessment within the region. The specific objectives are:

- a. Appraise existing knowledge on the biology and ecology, habitat, growth and mortality fisheries, and trade of Napoleon wrasse in the Philippines;
- b. Present the distribution range and occurrence of this species in many regions of the country based on the National Stock Assessment Program (NSAP) regional reports and other sources;
- c. Identify the threats affecting this species and the problems, issues, concerns related to the conservation and management of this species;
- d. Identify the existing conservation measures and recommend some policies at the regional and national levels;
- e. Recommend strategies for sustainable management of Napoleon wrasse in the Philippines, institutional arrangements for such actions, and allocation of resources towards the formation of a National Plan of Action (NPOA) for the conservation and management of Napoleon wrasse; and
- f. Promote the use of the NPOA as guide in the conservation and management of Napoleon wrasse in the country.

Two workshops were conducted to develop this document. The first workshop focused on the status of the Napoleon wrasse, while the second tackled the development of the NPOA, including the strategies to address the identified threats and issues affecting the species. The first workshop was held in Hagnaya Beach Resort, San Remigio, Province of Cebu on August 21–27, 2016, while the second was held in Dolce Vita Hotel, Puerto Princesa City, Palawan on October 2–8, 2016. Participants were the technical staff of the Sulu-Sulawesi Seascape Project, key officials of BFAR and the National Fisheries Research and Development Institute (NFRDI), regional coordinators of the BFAR National Stock Assessment Program (NSAP), nongovernment organization (NGO) representatives, and experts on Napoleon wrasse and sharks.

# CHAPTER 2: BIOLOGY AND ECOLOGY

## 2.1. TAXONOMY

The Napoleon wrasse, *Cheilinus undulatus* (Rüppell, 1835), of the order Perciformes, is the largest member of the family Labridae (Sadovy, Kulbicki, et al., 2003). Common names are Humphead wrasse, Giant maori wrasse, Giant wrasse, and Napoleon wrasse. Philippine local names include Balaki (Ilokano), Bankilan (Tagalog), Batu (Malay), Mameng (Chavacano), Maming (Tagalog), Maml (Palauan), Mamming (Maranao/Samal/Tao Sug), Mul-mul (Davawenyoy), Tul-ungan (Mapun).

The Napoleon wrasse is one of the largest bony fishes occurring in coral reefs (Colin, 2010). Found throughout the Indo-Pacific Ocean, the Napoleon wrasse is distinguished from other reef fishes, including other wrasses. This wrasse can be as colorful as it is large and exhibit shades of green, blue, and even purple, and some Chinese believe that its coloration pattern resembles that of a mythical dragon. It changes in both body form and coloration throughout its lifetime. They can be easily recognized by the bulbous hump on the forehead of larger individuals of both sexes, large fleshy lips (Myers, 1999), and intricate markings around the eyes (Bagnis, Mazellier, Bennett, & Christian, 1972; Marshall, 1966; Sadovy, Donaldson, et al., 2003). The development of the cephalic hump is related to body size (i.e., can be much larger for adult males) and is visible at 37 cm total length (TL), with all individuals  $\geq 75$  cm TL exhibiting a distinctive hump, irrespective of sex (Liu & Sadovy de Mitcheson, 2011). Therefore, *C. undulatus* does not show obvious sexual dimorphism of the forehead extension, meaning that it is not a reliable criterion for differentiating males and females. The species has 9 dorsal fin spines, 10 dorsal fin rays, 3 anal fin spines, and 8 anal soft rays (Sadovy, Donaldson, et al., 2003). Juveniles are pale greenish with elongate dark spots on scales tending to form bars; two black lines posteriorly from the eye.

## 2.2. HABITAT

This is purely a marine tropical species found within the latitudinal range between 30°N - 23°S. It is reef associated and predominantly lives at a depth range of up to 100 m deep. Juveniles (35–50 cm) occur in coral-rich areas of lagoon reefs in association with live staghorn *Acropora* corals (Figures 1 and 2), in coral reef lagoons, in seagrass beds, and in mangrove areas. Juveniles are all sexually immature and take about five years to reach 35–50 cm in total length and attain sexual maturation. They move into deeper portions of the reef as they grow older and larger.



Figure 1. Juvenile Mameng shot in Tongehat Halo, Sibutu, Tawi-Tawi. Photo Source: Study of the Mameng (Humphead wrasse, *Cheilinus undulatus*) fishery in Sitangkai and Sibutu, Tawi-Tawi, SCRFA



Figure 2. A shot of juvenile Mameng taken in the reef off Sipangkot Island, Sitangkai, Tawi-Tawi. Photo Source: Study of the Mameng (Humphead wrasse, *Cheilinus undulatus*) fishery in Sitangkai and Sibutu, Tawi-Tawi, SCRFA

Since they move to deeper areas as they mature, adults are more common offshore than inshore. Their preferred habitats are steep outer reef slopes, reef drop-offs, and lagoon reefs at least 100 m as shown in Figures 3 and 4. They are usually found in well-developed coral reefs, and individuals have been documented along the stretch of Mussah Reef in Sanga-Sanga, Bongao and another in a particular cave which is called the Langkawit Cave in Sibutu, Tawi-Tawi. They are somewhat “residential,” staying in a reef area for extended periods of time, which makes them a favorite species of some SCUBA divers.



Figure 3. Mature Napoleon wrasse amidst other reef fishes in the reef area in Tando Owak, Sibutu, Tawi-Tawi. Photo Source: Study of the Mameng (Humphead wrasse, *Cheilinus undulatus*) fishery in Sitangkai and Sibutu, Tawi-Tawi, SCREFA



Figure 4. Mature Napoleon wrasse taken in Tandu Tokkeh, Sibutu, Tawi-Tawi. Photo Source: Study of the Mameng (Humphead wrasse, *Cheilinus undulatus*) fishery in Sitangkai and Sibutu, Tawi-Tawi, SCREFA

### 2.3. POPULATION AND ECOLOGY

The Napoleon wrasse population densities are usually low even in preferred habitats. For example, in unfished or lightly fished areas, adult fish densities may range from 2 to 20 (but rarely >10) individuals per 10,000 m<sup>2</sup> of reef. This is very low for a commercially targeted reef species and is more akin to densities of large terrestrial animals. In heavily fished areas, the numbers can drop to at least ten times less than in unfished areas. In some countries, the species has become rare due to overfishing. Abundance estimates on Northern Queensland (Australia) reefs are 2.5–3.5 adults per 8000 m<sup>2</sup> (Choat, Davies, Ackerman, & Mapstone, 2006). Because of heavy fishing pressure to meet the demands of the international market, it has been noted that its population in the Philippines is decreasing. This has been indicated in the Lavides study (Lavides et al., 2016) wherein fishermen reported that 59 coral reef species, including the Napoleon wrasse, had gone missing from catches since the 1950s.

The Napoleon wrasse has an important ecological role in protecting corals by controlling the population of *Acanthaster planci*, the Crown of thorns starfish, which is a voracious eater of coral polyps

### 2.4. MOVEMENT AND BEHAVIOR

Underwater visual census surveys in New Caledonia suggest that recruitment is into shallow coastal areas that have heavy cover provided by branching corals; gradual movement out to more exposed reef likely occurs as the fish grows. Typically, they are solitary or paired, but have also been noted in groups of 3–7 individuals. They appear to be somewhat sedentary in that the same individuals, identifiable by distinct natural markings, may be seen along the same stretch of reef for extended periods (Gillett, 2010).

### 2.5. AGE AND GROWTH

A size-at-age plot of 164 individuals showed that males grew significantly faster than females, achieving a size of 140 cm fork length (FL). Male growth trajectories were essentially linear. Maximum ages recorded were 25 years for males and 30 years for females. Estimates of annual total mortality ranged from 0.10 to 0.14. The age distribution of males suggests protogyny with male recruitment into the population commencing at 9 years at a size threshold of 70 cm (Choat et al., 2006). Demographic analysis of *C. undulatus* and of large labrid fishes demonstrates that they share a dynamic demography with fast indeterminate growth rates and relatively short life spans.

In Tawi-Tawi, if the species is sexually mature, it is called Pehakan referring to a female. When it has reached very large size with a prominent bump on the head which is usually a male, it is called Langkawit. It is considered to be a protogynous hermaphrodite (i.e. adults can change sex from female to male).

### 2.6. LIFESPAN

Initial growth rates in Napoleon wrasse are relatively rapid resulting in a size of 50 cm at approximately 7 years. The size-at-age plots demonstrate that sizes in the order of 100 cm are achieved in males after 16 years, a relatively short time period for many coral reef fishes. The total life span is modest with a maximum of 30 years for females and only 25 years for males. The annual total mortality estimates of 0.10 to 0.14, suggest that less than 3.5% of the individuals from the study population live beyond 30 years. It is considered to have a low productivity which contributes to its low capacity to replenish population, making it vulnerable to overharvesting.

Age and growth studies using the sagittal otoliths (ear stones) and length data suggest longevity of at least 32 years for females and 25 for males, if the growth checks in otoliths are deposited annually. In the Great Barrier Reef of Australia, fish attain about 1 m in total length in about 28 years and sexual maturity in about 5 years. Nothing is known of the natural mortality of the Napoleon wrasse. The longevity of the species, however, and our limited knowledge of reef fish biology, in



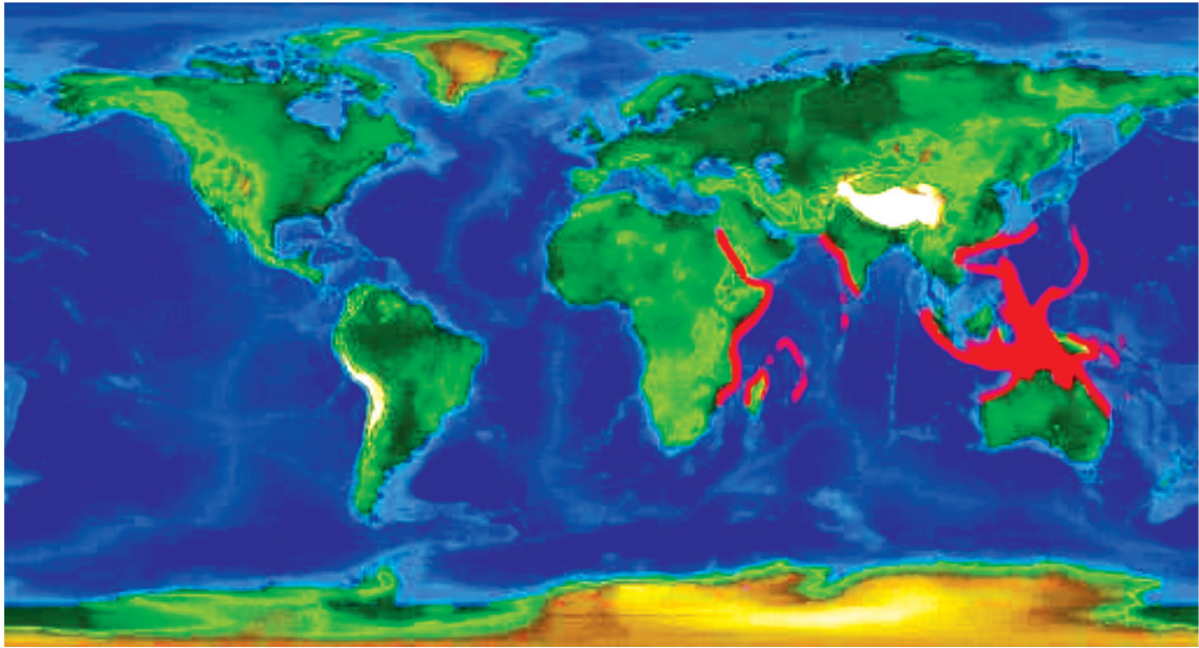


Figure 5. Global distribution of the Napoleon wrasse  
 Source: Florida Museum of Natural History Ichthyology at the Florida Museum Biological Profile

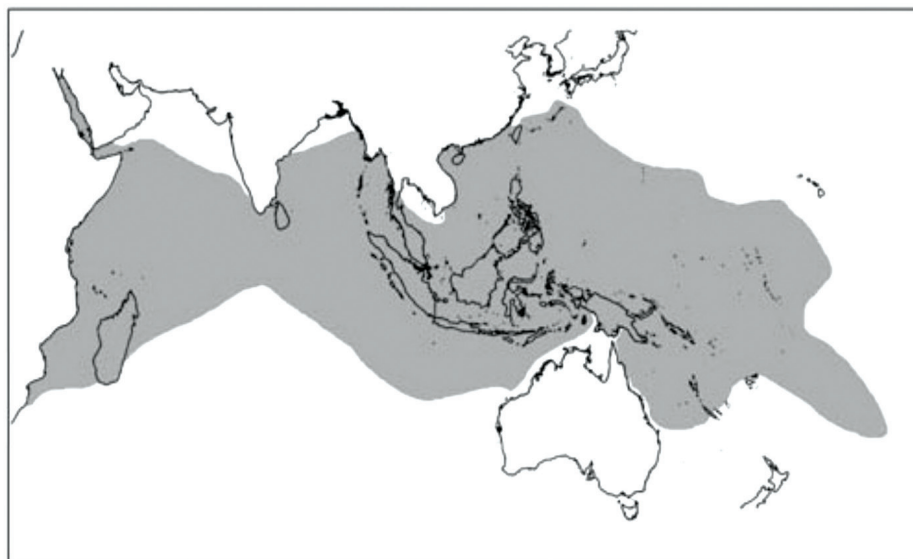


Figure 6. Distribution of the Napoleon wrasse in the Indo-Pacific Photo: Russell, B. (Grouper & Wrasse Specialist Group). 2004. *Cheilinus undulatus*. The IUCN Red List of Threatened Species 2004.

general, suggest that adult mortality is low. It is likely, following the early post-settlement period typically associated with high mortality levels in fishes, that natural mortality drops rapidly after fish settle out from the plankton (Sadovy, 2002).

## 2.7. RECRUITMENT

Detailed information on the recruitment of the Napoleon wrasse is not available. In the estimation of sustainable fishing rates by the use of a newly developed model (Sadovy et al., 2007), the relationship between stock and recruitment remains the major uncertainty. Some accounts suggest that recruitment is sporadic, a pattern common to long-lived fishes in which populations tend to be dominated by relatively few year classes.

This means that heavy pressure on pulses of recruits during infrequent productive years could have particularly severe long-term impacts.

## 2.8. DISTRIBUTION AND GEOGRAPHIC RANGE

### 2.8.1. Global Distribution of the Napoleon Wrasse

The Napoleon wrasse is found throughout the Indo-Pacific Region from the Red Sea to South Africa and to the Tuamotu Islands, north to the Ryukyu Islands, and south to New Caledonia (Figures 5 and 6).

## 2.8.2. Distribution of Napoleon Wrasse in the Philippines

The main information used in determining the distribution of the Napoleon wrasse in the country is from the Bureau of Fisheries and Aquatic Resources (BFAR) and the National Fisheries Research and Development Institute (NFRDI) National Stock Assessment Program (NSAP). The information was taken from the reports of the NSAP coordinators from all regions, collected during the first and second workshops of the “2016 Country Status Report on Napoleon Wrasse and Sharks” under the Sulu-Sulawesi Seascape Project. The NSAP is an important source of information for the NPOA since it monitors commercial and municipal landings at strategic major and minor ports in 13 fishing grounds nationwide.



Figure 7. Survey sampling sites for the *Cheilinus undulatus* in the Philippines (Nañola, 2012)

Napoleon wrasse is found in major fishing grounds in all regions of the country based on landed catch, actual sightings, and key informant interviews, except in Region 9 where there were no data in landed catch or sightings. The gear used were mostly spear gun and hook and line. More information came from the Caraga Region but the most dominant data on this species came from the Autonomous Region in Muslim Mindanao (ARMM) Region, particularly from Tawi-Tawi where

there is an ongoing culture of this species in cages and pens to meet the demand of the export trade.

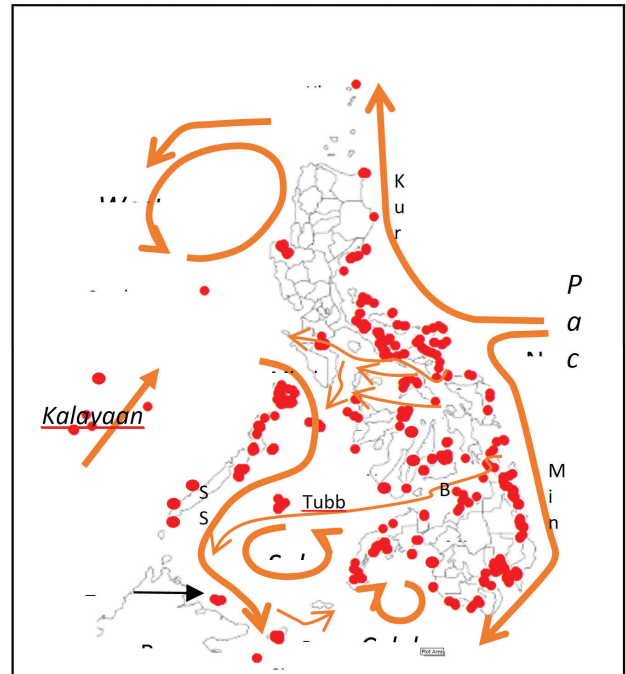


Figure 8. Location of the transects in the Napoleon wrasse surveys from 1991 to 2012 (Nañola, 2012)

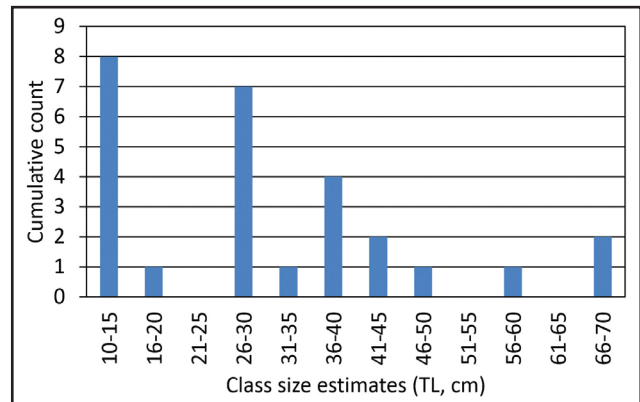


Figure 9. Cumulative count versus class size estimates of Napoleon wrasse observed (Nañola, 2012)

Another source of information was a 2012 study on the Napoleon wrasse’s distribution in the Philippines (Nañola, 2012). Underwater fish visual census surveys using transects with 500 m<sup>2</sup> span were done from the fore reef (15 ft to 20 ft) to the lower fore reef (30 ft to 40 ft) which sometimes went down to as deep as >40 ft. These were done in predetermined sampling areas in the country as shown in Figure 7. Total number of transects covered from 1991 to 2008 were 1,517 transects. From 2009 to 2012, a total of 420 transects were covered, as shown in Figure 8. Results indicated that only a total of 27 individuals were documented out of 1,937 transects. The size ranged from 10 cm to 70 cm TL in selected places as shown in Figure 9. The large individuals (>30cm TL) were recorded in Kiamba, Tubbataha, and Culion. In Tubbataha Reef, varied size of this species ranges from TL 30 to 67 cm. (Table 2).



Table 1. Distribution of the Napoleon wrasse in the Philippines as shown in landed catch and sighting reports from the BFAR-NSAP

Region	Fishing Ground	Landing Center	Gear used	Estimated Weight (kg)	Month/Year	Remarks
Region 1	Pasaleng Bay	BGP (Balao-i, Gaoa, Pagudpud)	SG*	6	May 2001	Market
	Pasaleng Bay	BGP	SG	2.05	July 2009	Market
Region 2	Fuga Island, Camiguin Island., and Calayan Island.	Taggat, Claveria	SG		(March-April)	Interview
Region 3		Sitio Luan, Palauig, Zambales	SG	2.1		
CALABARZON	Tayabas Bay	Dalahican Fish Port, Lucena City	SG	3		
	Palawan	Tubbataha	SG, H&L**	4.5		
MIMAROPA	Imuruan Bay	Brgy. Binga	SG, H&L	4.5		
	Tablas Strait	Romblon	SG, H&L	70 Non-NSAP		Interview
Region 5	MPAs, non-NSAP site					Sighting
Region 6	Pandan Bay	Non-NSAP site				Sighting
Region 7	Hagnaya					Sighting
Region 8	Hinundayan, Southern Leyte					Sighting Actually <i>Cheilinus trilobatus</i> ; anecdotal
Region 9	No data					
Region 10	"Sighting Gingoog Bay Iligan Bay "					Sighting
Region 11	Sighting in Mabini					Sighting
Region 12	Sta. Clara, Kalamansig		SG	7.4	October 2015	
CARAGA	Dinagat Sound	Rizal, Sta. Monica, Surigao del Norte	Drive in net	26.74	April 2016	
	Hinatuan Passage	Brgy. 13, Pob. Dapa, Surigao del Norte	SG with Compressor	5.4	October 2012	Determine individual
	Surigao Strait	Nueva Port, Surigao City	SG with Compressor	"14.51 6.5"	"November 1999 December 1999"	
		Plaridel, Libjo, Philippine Dinagat Islands	SG with Compressor	12	May 2015	
ARMM	"Sitangkai, Sibutu, South Ubian Sapa Gamat, Sapa Langkit"	Bongao, Tawi-Tawi	Nets, traps, H&L			Grow-out culture

\*SG (spear gun) \*\*H&L (hook and line)



Figure 10. A Napoleon wrasse documented in Tubbataha Reef.  
Source: (Nañola, 2012)

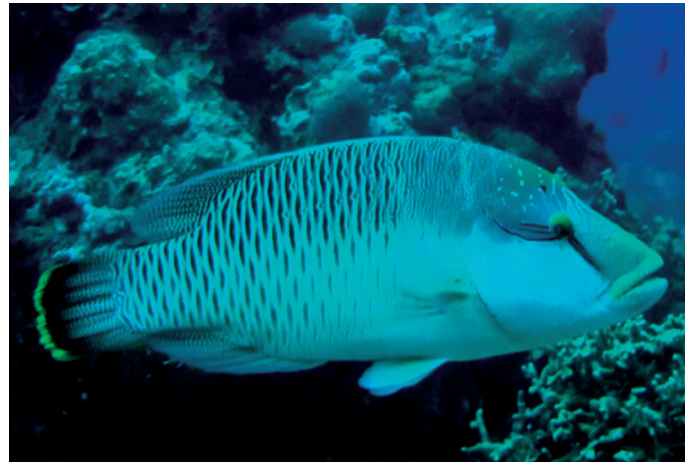


Figure 12. Sogod Bay SCUBA Dive Resort photo of a Napoleon wrasse in Southern Leyte Source: SCUBA Dive Resort



Figure 11. Photo of this largest member of the Labridae family in the Verde Island Passage. Source: (Jimeno, 2015)



Figure 13. Napoleon wrasse in Tubbataha Reefs  
Photo: Dylan Melgazo, WWF

Table 2 shows the counts of Napoleon wrasse in the underwater surveys in the sampling sites in many parts of the country, from Basco in Batanes, Cordova in Cebu, Puerto Galera in Oriental Mindoro, Tubbataha in Palawan, Coron in Palawan, Bakud and Tuka Reefs in Kiamba, Sarangani, and Turtle Islands and Sitangkai in Tawi-Tawi (Nañola, 2012). Table 2 further shows that 27 individual Napoleon wrasse were seen in these sampling sites, with size ranging from 10 cm TL in Turtle Islands to 70 cm TL in Bakud Reef, Kiamba, Sarangani.

Other sources of information come from divers' accounts and assessments conducted in various parts of the country. A winning article at the Foundation for Philippine Environment's Sarihay Awards, published in The Manila Standard (Jimeno, 2015) described that "Verde Island Passage is considered as the center of the center of the world's marine biodiversity, hosting dolphins, sea turtles, Humphead wrasses, giant groupers, giant clams, and some 300 species of corals - considered one of the biggest concentrations of corals in the whole world."

Underwater photographs taken by divers and posted in social media also became sources of information on the presence of the species in some parts of the country. Figure 12 is a diver's photograph taken in the Sogod Bay Dive Resort in Southern Leyte.

This species was also documented by the Haribon Foundation-Darwin Initiative Project 19-020 in Lanuza Bay of Surigao del Sur, in Polilio Island and Bohol (Lavides et al., 2016). Region 1 presented one catch sample from Palauig, Zambales in 2014. Colin (2010) cited the presence of Napoleon wrasse in Layang Layang Atoll in the Spratly area. Figure 13 shows a Napoleon wrasse photo taken in Tubbataha Reefs in 2014 by Dylan Melgazo of WWF Philippines.

## 2.9. NAPOLEON WRASSE FISHERY, TAWI-TAWI AUTONOMOUS REGION IN MUSLIM MINDANAO

Based on the NSAP Report of BFAR ARMM, the most dominant occurrence of Napoleon wrasse is in Tawi-Tawi where active ranching of this species in mariculture pens and cages are documented (Mamalangcap, 2015). In Tawi-Tawi, it is not considered a traditional targeted fishery but mixed with other reef fishery. Napoleon wrasse fishery started in 1987 due to some local demand for live fish from Chinese businessmen in Bongao. It became a targeted species when demand for live species for export to Sabah from mariculture operators grew. Fishing for fingerlings were limited to shallow reef edges and mixed seagrass and coralline substratum. Larger Napoleon wrasse are caught in deeper areas especially in reef channels (*takot*). Higher demand in Hong Kong for the species encouraged growing of species in cages and pens.

Table 2. Napoleon wrasse sightings from underwater surveys around the Philippines

Province	Municipality	Count	Size (TL) in Centimeters	Year
Batanes	Basco	1	40	1991
Cebu	Cordova	1	35	2003
Oriental Mindoro	Puerto Galera	1	10	1991
		1	30	1991
		1	45	1991
		1	30	1993
Palawan	Tubbataha	1	30	1997
		1	67	1998
		1	40	2009
		1	30	2009
		1	10	2009
		1	18	2009
		1	30	2010
		1	40	2010
	1	45	2010	
	Coron	1	28	2000
Culion	1	50	2004	
El Nido	1	60	2010	
Sarangani	Kiamba (Tuka Reef)	1	40	2003
	Kiamba (Bakud Reef)	1	70	2011
		1	30	2011
Tawi-tawi	Sitangkai	1	10	1991
	Turtle Is.	1	12	1991
		1	10	1991
		1	10	1991
		1	12	1991
		1	10	1991

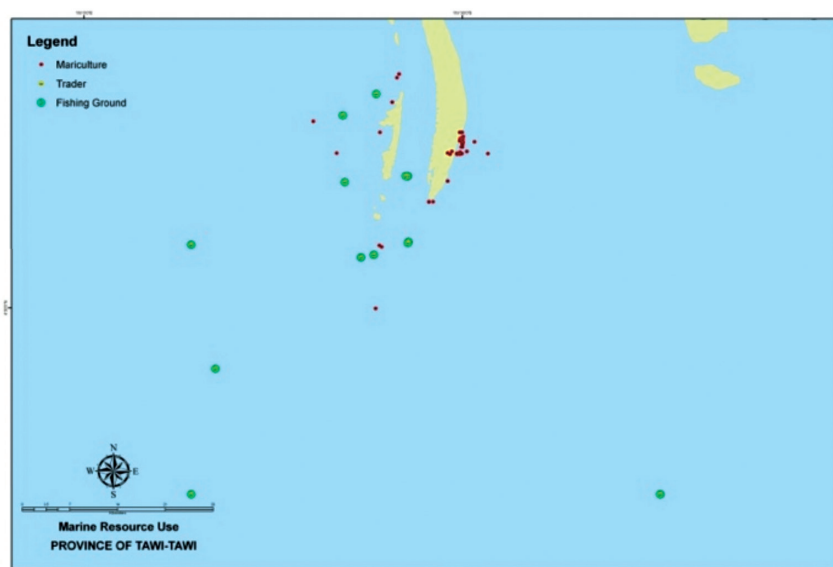


Figure 14. Location of major fishing grounds in Sitangkai and Sibutu, Tawi-Tawi  
Photo Source: Romero & Injani, 2012





Figure 15. Fishing crafts used in Napoleon wrasse fishery  
Photo Source: Romero & Injani, 2012

### 2.9.1. Fishing Grounds and Fishing Crafts

The location of the major fishing grounds for this species in Sibutu and Sitangkai, Tawi-Tawi are shown in Figure 14. The characteristics of the fishing grounds are typically fringing reef areas and reef channels, and these are the same fishing ground for the demersal fishes. These are lagoons and some massive corals with small cavern and 50° inclination slope. Drop-off at estimated depth of crest at 40 feet with some soft corals and sub-massive corals. Juveniles are found mostly at the depth of 20 feet with some branching corals, table coral and submissive corals with 45° inclination slope. The major fishing areas are primarily located in Cebuggal, Serunga, Ligayan Halo, Tumindao and the North Lagoon, particularly near Sipangkot Island.

The major fishing crafts used in the NW fishery are shown in Figure 15.

1. *Beggong* – This is a small non-motorized dug-out boat. This is used to fish near the edge of the reef area or within the lagoon near the community and usually catches only fingerlings. The predominant gear used is hook and line. This is also sometimes used to retrieve the *lambunan* or fish traps which are set near the community.



Figure 16. Typical fishing operation using hook and line. Photo Source: Romero & Injani, 2012



Figure 17. Napoleon wrasse caught by hook and line  
Photo Source: Romero & Injani, 2012



Figure 18. Common gear used in Napoleon wrasse fishing. Photo Source: Romero & Injani, 2012

2. *Papet/Tariret* – This is a small and slender type of motorized boat with a more tapered bow and powered by Briggs and Stratton or Mitsubishi engines from a minimum of 7.5 horsepower (HP) to a maximum of 13 HP. This is a faster craft and is predominantly used for multiple troll line for tuna fishing. This is also used for hook and line fishing and for laying fish traps and nets.

3. *Tempel/Kurikong* – This is bigger than the papet or tariret with a more bulging hull. This motorized boat is powered with Briggs and Stratton or Mitsubishi engines ranging from 10 HP to 16 HP. Some use double engines. This is used to fish in far reef areas.

4. *Jung-Jung/Katigan* – This is an outrigger boat usually with 10 HP to 18 HP Briggs and Stratton or Mitsubishi engines. This is used to reach outer reef areas like those near the Semporna area. This is also used for multiple troll fishing for tuna.

### 2.9.2. Fishing Gears

1. Hook and line is the most common gear used as shown in Figure 16. Figure 17 shows a prized catch of Napoleon wrasse using hook and line, which usually catch less fish.

2. *Lambunan* or *bubu* is a fish trap made of bamboo or plastic netting material as shown in Figure 18(A) and (B). It is set in a reef area and is usually baited to attract fish. Fish trap catches 1–5 fingerlings or juveniles depending on the season.

3. *Linggih Lakoran* is a modified gill net usually 50 m by 1.3 m and mesh size of 2” and pulled by the fishermen. It is also considered to be more efficient.

Table 3. Class Size and Number of Pieces Napoleon Wrasse Caught by 41 fishermen in 2009

Class Size		Number of pieces caught
Fingerlings	0.2 – 0.5 kg	325
Undersize	(0.5 - 0.7 kg)	343
Good size	(0.7 – 1.0 kg)	222
Export Size	1.2 kg	46
	1.4	7
	1.5 kg and above	47

4. *Bungsud* shown in Figure 18 (C) is the fish corral.

5. *Lakud* is a modified beach seine which uses fine mesh nets and also utilizes divers with scareline to drive the fishes to the net. This can catch 10–20 Napoleon wrasse depending on the season. Cyanide with compressor fishing, though prohibited by law, is still being practiced.

### 2.9.3. Fishing Operation and Fish Catch

Depending on the type of gear used, fishers go out to the reef slope to fish either individually or in pairs. They claim that they usually have a good catch during the southwest monsoon (*Satan*), which occurs from April to June, and during full moons. However, there has been a decreasing trend in their catch, which they attribute to the sheer number of fishermen fishing for this species. Some volunteer to say that there may already be less Napoleon wrasse that could be caught in the

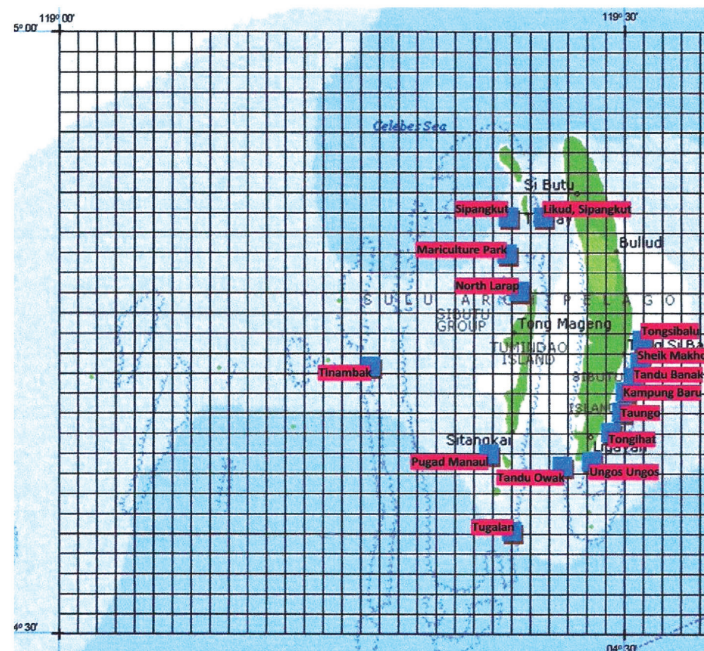


Figure 19. Location of mariculture pens and cages in Sibutu and Sitangkai, Tawi-Tawi  
Photo Source: Romero & Injaki, 2015





Figure 20. Sample Napoleon wrasse cages amidst seaweed farm and view of cultured Napoleon wrasse inside cage  
Photo Source: Romero & Injaki, 2015

wild. Generally, fishermen claim that they spend longer and go farther to catch the fish than in the past. They also observe a decreasing trend in catch, unstable catch, and catching smaller Napoleon wrasse. Average catch per fisher per trip ranges from 0–12 pieces. Table 3 shows the class size and number of pieces caught by 41 fishermen interviewed.

#### 2.9.4. Mariculture Practices

As the demand for the Napoleon wrasse and groupers grew and considering that the price of live Mameng is 250% more than that of fresh dead fish, ranching of this species in pens and cages started in the last decade. This involves catching juveniles and about to mature species and growing those to marketable sizes in grow-out pens and cages. Grow-out cages are now found in many areas of the North Lagoon, in the reef edges of Sitangkai, and from Tandubanak to Tandu Owak in Sibutu within the lagoon extending to about 10 kms along the shoreline. Figure 19 shows the distribution of the grow-out cages in Sibutu and Sitangkai.

In general, the pens are 4 m x 6 m with three modules per pen system. One module is for the juveniles; another module for medium size fish; and a third module is for the marketable fish. Most of the pens are underneath platforms, usually extension of the houses used as drying areas for seaweeds. Some are also set beneath kitchen floors or working areas. The platforms, made of bamboo or wooden slats, simulate the shading effects in reef systems. Others are set about 200–300 meters away from the shoreline within the lagoon. The pens generally use black polyethylene nets of thick twine and 3-cm meshes which are usually bought in Sabah, Malaysia and secured to hard wood. The net is likened to an inverted mosquito net with the bottom portion buried into the sandy bottom and then covered with coral or shell fragments and coral stones to simulate the habitat of the Humphead wrasse and also to prevent them from escaping.

It is known that the Napoleon wrasse is a slow growing species. The length of grow-out time depends on the size of the fish during initial stocking. This would also depend on the feeding regimen of the mariculturist. Napoleon wrasse has been



Figure 21. Mix of Napoleon wrasse and finned groupers in one of the pens Photo Source: Romero & Injani, 2012

found to be resilient to various stressors, and eat almost any kind of food. For fingerlings (0.2–0.5 kg), it would take about 16–24 months to grow to marketable size (1.0 kg). The mariculturists prefer to stock fish ranging from 0.6–0.8 kg since they observed that the grow-out time would only be about 6–12 months and consider this to be most profitable.

However, considering the volume of immature Napoleon wrasse that are continuously harvested for growing out, there is a serious concern on growth overfishing of this species.

The Philippines has been a major source of live reef food fish in Southeast Asia. Due to increasing demand in Hong Kong, the Republic of China, and Taiwan for live reef food fish especially for groupers, hatcheries have been developed to meet the demand for grouper fingerlings. However, this technology has not fully met the demand, so reef fish aquaculture with fingerlings coming from the wild, particularly for Napoleon wrasse, has been practiced in many source countries like the Philippines. This practice has been identified as a cause of the

decrease in the wild populations of these cultured species. Almost all high-value reef fish species for the live food fish trade are cultured by the natives. Table 4 shows the average percentage distribution of species cultured, indicating that the Napoleon wrasse is the highest cultured species at about 76%.



Figure 22. Typical catch from the fish traps and juvenile shark being cut up as feeds. Photo Source: Romero & Injani, 2012

Table 4. Percentage Distribution of Species Cultured

Species	Percentage
Giant (giant) grouper <i>Epinephelus lanceolatus</i>	0.02
Humpback (highfin) grouper <i>Cromileptes altivelis</i>	11.33
Napoleon wrasse <i>Cheilinus undulatus</i>	76.16
Red grouper, <i>Cephalopis miniata</i>	0.07
Brown-marbled grouper, <i>Epinephelus fuscoguttatus</i>	12.41
Other species (Siganids, Caranx, lobster, etc. )	0.07

There is no feeding regimen adopted by the fish farmers in the culture of Napoleon wrasse and groupers. Except in the Mariculture Park in the North Lagoon, Sitangkai, which alternatively uses pelletized feeds for their groupers, all other fish cages and pens use mainly pelagic fishes like sardines and anchovies as feeds. The Mariculture Park is a complex system of floating cages (54 cages at 4 m x 5 m) and this is estimated to be about 16.5% of the total mariculture pens and cages in the two municipalities. The feeds are usually pelagic fishes which are however seasonal and are usually sold at PhP15.00/kg. These are usually caught in the North Lagoon and in the western side of Sibutu Island. In other mariculture pens, feeds come from the by-catch of their *lambunan* (fish trap) which are varieties of reef

fishes and even juvenile sharks (Figure 22). These by-catches come from other fishing operations.

Napoleon wrasse is observed to eat whatever is thrown into their pens, including leftovers from the kitchen like crab legs, rice, and even biscuits. In the Tandubanak area, some aquaculturists started to experiment on using formulated feeds. There is no information on the volume (weights) of feed per kg of fish per month since they do not follow any feeding regimen.

## 2.10. SPAWNING AGGREGATIONS

Part of the reproductive behavior of reef fishes like groupers and the Napoleon wrasse is that males and females assemble in one reef area when they spawn. This behavior has been documented where the fish assemble in the substrates and then rise up to the water column to spawn usually as the dusk approaches. This fish aggregation is determined from significant density increases of the species compared to the non-reproductive season. The Napoleon wrasse, like other reef fishes, aggregate consistently at the same specific period of the year at a specific area to spawn (Sadovy, Kulbicki, et al., 2003). This can vary from a few hundred fish to thousands of individuals like the groupers. Napoleon wrasse has smaller aggregations. Spawning aggregation sites for many reef fishes are usually on the outer reef slopes, in reef channels, or at drop-offs. Several species of groupers and *C. undulatus* use the new moon for spawning (Pet & Muljadi, 2001).

The major reefs of Tawi-Tawi are spawning aggregations sites and actual sources of Napoleon wrasse juveniles. Aside from Sibutu and Sitangkai, the municipalities of Panglima Sugala (Balimbing), Sapa-Sapa, Tandubas, South Ubian, and Languyan are also fishing areas of Napoleon wrasse. Based on anecdotal accounts, Badjao fishermen indicate that this phenomenon is known to the Badjaos as *Nabo*—a season when this spawning aggregation occurs, usually during the months of September to February.

A study on the spawning aggregations of Napoleon wrasse has been conducted, resulting in the passage of municipal ordinances establishing two spawning aggregations marine protected areas (MPAs) in Tawi-Tawi province (see Section 4.1). Establishing these spawning aggregations MPAs is part of the management initiatives of local governments to protect and manage this species since it is a source of livelihood for the communities.

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# CHAPTER 3: MARKETING AND TRADE

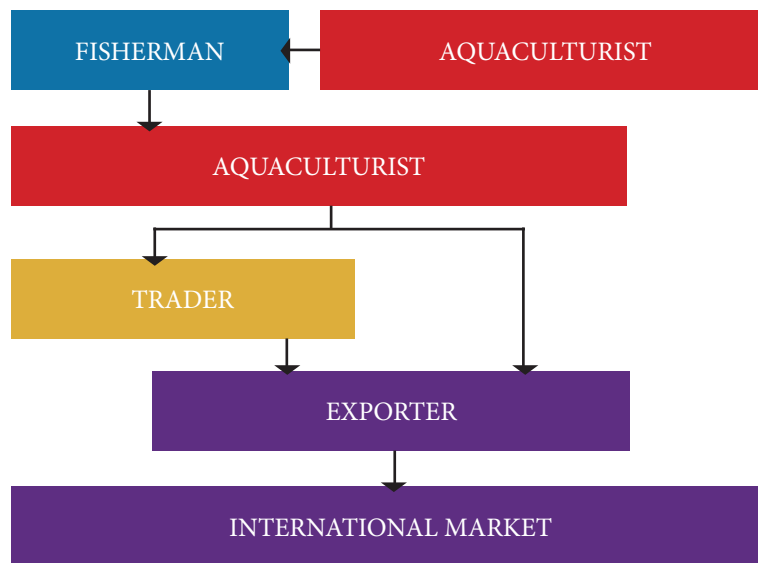


Figure 23. Market flow

There is an ongoing fishery in Tawi-Tawi that includes Napoleon wrasse mariculture for the export trade. Figure 23 shows the market flow of the Napoleon wrasse particularly in Tawi-Tawi.

## 3.1. MARKET STRUCTURE AND TRADE

Market flow starts from the fishers who fish for this species from the reef areas of Sitangkai and Sibutu and directly stock their catch into their pens and cages and grow them out until marketable size, and therefore are by themselves also mariculturists. Some of those who do not own pens or cages sell to the mariculturists since most of them owe the cost of their fishing operations and daily subsistence to the mariculturists. The traders have direct links to the exporters, and so some mariculturists sell their products to these traders especially if they have advanced money from them. Otherwise, they sell directly to the exporter who brings in a vessel with livewell every quarter to Sibutu and buys the standing crop, which is shipped directly to Taiwan or Hong Kong. According to local BFAR staff, this ship has obtained permits from the BFAR, Bureau of Customs, Philippine Coast Guard, Bureau of Immigration, and other enforcement and regulatory agencies to buy live reef food fish from the mariculture cages and export them. The permit is for buying and exporting groupers but about 85% of the fish is Napoleon wrasse. Given the illegal nature of Napoleon wrasse direct exportation, it is difficult to obtain documentation of such operation. Lately, this type of operation has already stopped, and fishermen and mariculturists have complained of the low price of Napoleon wrasse compared to when the direct exportation was still happening.

## 3.2. ECONOMIC BENEFITS TO FISHERS AND MARICULTURISTS

During her 2008 State of the Nation Address, President Gloria Macapagal-Arroyo cited, among others, the accomplishment of Mr. Tarnati Dannawi, a Badjao fish farmer from Tongehat who was able to culture fin fish in cages and was able to earn PhP80,000.00 in one harvest.

Although this was not mentioned in the speech, it is public knowledge that a large percentage of the harvest of this fish farmer was Napoleon wrasse, the only marine fin fish put under Appendix II of CITES. The culture of Napoleon wrasse has been going on since 2000 and this is often considered as a family business and the household members including children are involved. This fishery has generated tangible benefits to this poor fishing community. It is estimated that from the total number of pens during the sampling period (March 15–April 15), those pens with marketable sizes had 4,765 pieces of Napoleon wrasse. If the average weight of each fish is 1.2 kg, this would translate to 5,610 kgs of fish. At this size, each fish would have a price of PhP1,200.00 which would have a potential sale PhP6,732,000.00. Assuming that we have 100 mariculturists, each would have an estimated income of PhP67,320.00. Since there are two harvest periods for the year, the estimated income would be about more than PhP100,000.00 per year or approximately PhP8,500.00 a month.

Table 5 shows how much fishermen are paid, which ranges from PhP200–PhP1,200 (US\$4.44–US\$26.67) depending on the size of the fish. This is high compared to the ordinary dead fish catch which at most gives them an income of PhP20.00/kg.



Table 5. Comparative price range for the fishermen and mariculturists

Fishermen (Weight in kg)	Mariculturist Buying Price/kg (PhP)	Mariculturist (Weight in kg)	Exporter's Buying Price/kg (PhP)
0.2	200 – 400	0.5	1,000 – 1,200
0.4	400 – 600	0.7	1,200 – 1,500
0.5	600 – 800	1	1,500 – 2,400
0.7	800 - 1,000	1.2	2,000 – 2,150
1.0	1,000 - 1,200	1.4	2,100

Table 6. Estimated Weight of Export (2009) based on record of mariculturists (Respondents represent 86% of mariculturists)

Volume of Exported of Napoleon wrasse from Sibutu and Sitangkai (Kgs)	33,732 kgs.
Number of exported fish	39,957 pcs
Income from Napoleon wrasse	PhP 80,956,800.00 or US\$ 1,759,930.00

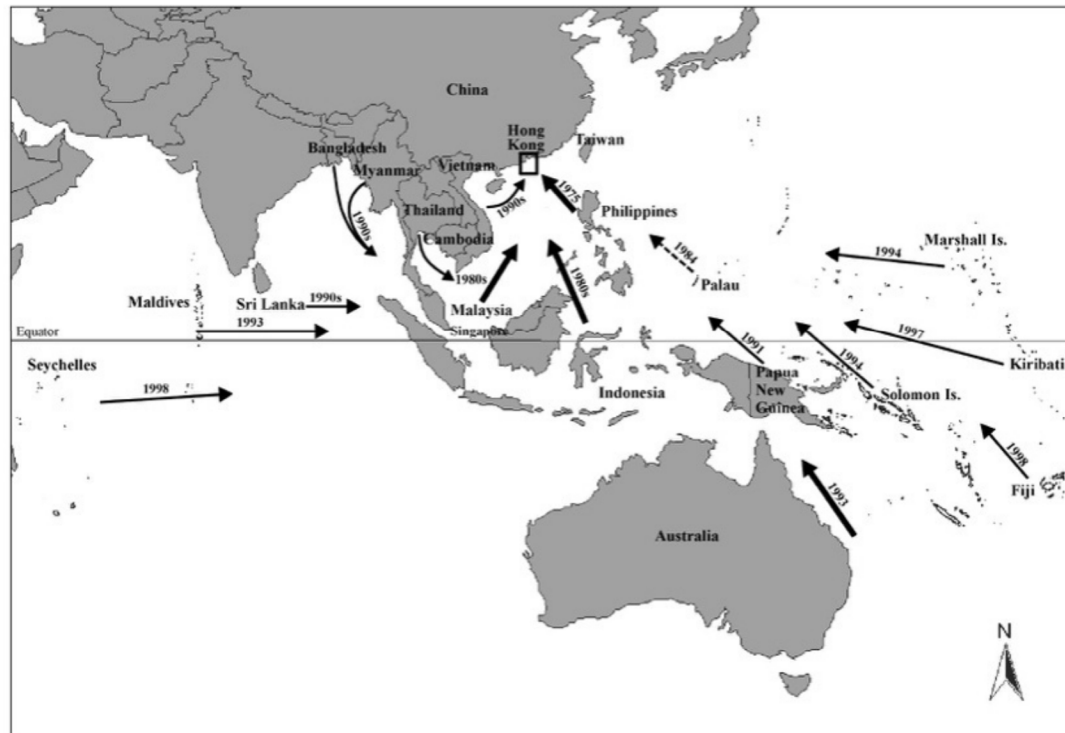


Figure 24. Spread of countries sourced for reef fish for the live reef food fish trade to include the Napoleon wrasse  
Source: Sadovy & Vincent, 2002

Table 5 also shows the prices paid to the mariculturists which ranges from PhP1,000–PhP2,400/kg (US\$22.22–US\$53.33).

However, if we compare the current price of the Napoleon wrasse in the Hong Kong market which is about US\$200/kg, what the fisherman earns is just a very small percentage of the price of the fish in the export market. While this live reef fishery is a lucrative source of income for the coastal communities in comparison to the other fisheries, there is a serious concern about the long-term impacts of this trade on the fish stocks, because their decline would ultimately mean

fewer income opportunities as well as possible threats to local food security.

### 3.3. EXPORT MARKET

The bulk of Napoleon wrasse exported is by boat with livewell to Hong Kong or Taiwan. One boat which carries permit to buy fish from the area comes every quarter or depending on the availability of live fish. Table 6 shows the total weight of exported Napoleon wrasse which is sold as cultured fish since they were all reared in either the Mariculture Park or the

mariculture pens/cages. They are identified as cultured species since they could not be given permits to export them if they were identified as wild caught, even if it is general knowledge that they were wild caught and just reared in the pens or cages.

The gross sale from the Napoleon wrasse in Sibutu and Sitangkai alone is about PhP80,956,800.00 a year. This was based on the information given by the traders and the estimated weight of Napoleon wrasse sold to the buyer from the ship for the year at an average PhP2,400.00 kg. Some of the Napoleon wrasse are also shipped by native sea crafts to Sandakan and Kudat in Sabah, Malaysia, while others are shipped by plane to Cebu and Zamboanga and packed together with aquarium (ornamental) fish before being shipped to Hong Kong.

### 3.4. LIVE REEF FISH TRADE

In the Philippines, Tawi-Tawi is a major source of the live reef fish trade of groupers like Leopard grouper (*Plectropomus leopardus*) or Red suno, Giant grouper (*Epinephelus lanceolatus*), Humpback grouper (*Cromileptes altivelis*), stone fishes, caranx, and lobsters.

The Napoleon wrasse is one of the most important component of live reef fish trade with Hong Kong at the center. Figure 24 shows that the major sources of this lucrative fish trade are countries in the Coral Triangle such as Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands and Timor Leste. According to a report (Chu, Kirkpatrick, Kwan, & Sadovy, 2006) by TRAFFIC East Asia and WWF Hong Kong, the total annual value of live reef food fish imported into Hong Kong is estimated to be over US\$400 million (40% of the estimated US\$1billion of the trade's global value). Total imports flowing into Hong Kong included 10,153 metric tons, of which 30% was re-exported to mainland China. Other major markets include Singapore and Taiwan. Humphead wrasse is a small but important part of the overall trade in live reef food fish. In 1997, the leading suppliers of the Humphead wrasse to the China, Hong Kong Special Administrative Region (SAR) market were Australia, China, Indonesia, Malaysia and Philippines. The total recorded international live trade in this species ranged from about 58 to 138 tonnes for the years 2000–2006 (Gillett, 2010).

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# CHAPTER 4: MANAGEMENT AND LAW ENFORCEMENT

## 4.1. POLICIES AND LEGISLATIONS

At the international level, trade of Napoleon wrasse is regulated under the Convention on International Trade of Endangered Species (CITES) as of October 2004, where it is listed as Appendix II. It is likewise listed on the International Union for the Conservation of Nature (IUCN) Red List since 1996 initially as Vulnerable and as Endangered since 2004.

There are national and regional legislations which specifically devolve some powers and functions of the national and regional autonomous governments to local government units in the management and protection of the environment and the protection of endangered species of flora and fauna. One of these is RA 7160, otherwise known as the Local Government Code. Section 447 of the Code specifically gives the Sangguniang Bayan (Municipal Council) the authority to enact ordinances and policies to protect the environment and impose appropriate penalties for acts which endanger the environment, including harvesting of natural resources products and of endangered species of flora and fauna. A similar provision is also provided for in the ARMM Local Government Code or Muslim Mindanao Autonomy Act 25 (MMAA 25).

At the national level, Section 102 (b) of Republic Act (RA) 8550 or the Fisheries Code, as amended by RA 10654, states that it is unlawful to fish, take, catch, gather, sell, purchase, possess, transport, export, forward or ship out aquatic species listed in CITES Appendices II and III if scientific assessments show that population of the species in the wild cannot remain viable under pressure of collection and trade. The law imposes stiff penalty of imprisonment of 12 to 20 years and/or a fine of PhP120,000.00 and forfeiture of the catch, as well as the cancellation of fishing permit. The Fisheries Code further provides that the taking or fishing of these species from the wild for scientific research, or conservation breeding simultaneous with commercial breeding may be allowed.

RA 9147, otherwise known as the Conservation and Protection of Wildlife Resources and their Habitats Act, also prohibits the cutting, gathering, harvesting, injuring and possession of all threatened species, whether the classification is under the Red List of Threatened Species under the IUCN or the CITES. Section 11 of this act provides further that for the implementation of international agreement on international trade in endangered species of wild fauna and flora, the management authorities for terrestrial and aquatic resources shall be the Protected Areas and Wildlife Bureau (now the Biodiversity Management Bureau) of the Department of Environment and Natural Resources (DENR) and the BFAR.

BFAR likewise issued Fisheries Administrative Order (FAO) 208 entitled Conservation of Rare, Threatened and Endangered Fishery Species. Section 2 of this Administrative Order provides that it shall be “unlawful for any person, natural or juridical, to take or catch or cause to be taken or caught fishery/aquatic species considered to be endangered or threatened as classified under CITES.” Section 3 provides for a “penalty of imprisonment from 12 years to 20 years or a fine of PhP120,000.00, or both such fine and imprisonment in the discretion of the court.”

At the regional level, the ARMM version of the Fisheries Code, MMAA 86, likewise has a similar provision under Section 80 of this Code. The BFAR ARMM shall ensure that “the use and exploitation of fisheries and aquatic resources in ARMM waters shall be reserved exclusively to Filipinos with preference to ARMM residents: Provided, however, that research and survey activities may be allowed under strict regulations for purely scientific, technological and educational purposes that would also benefit Filipinos.” Other regulations such as fees and other fishery charges, access to fishery resources, catch limits, closed and open seasons, and use of gear shall be in accordance with MMAA 86.

At the provincial level, Section 37 (“Threatened Flora and Fauna”) of the Tawi-Tawi Provincial Environment Code states that the Tawi-Tawi Environment Management Office shall list species that are threatened with local extinctions, and such list shall be issued as a memorandum order by the Governor. The cutting, gathering, harvesting, injuring, and possessing of all threatened species shall be strictly prohibited, whether the classification is under the Red List of Threatened Species under the IUCN, or CITES, or on the list of provincial threatened species.

At the municipal level, Municipal Ordinance No. 3, Series of 2013, “Establishing Mameng Spawning Aggregations Marine Protected Area in Barangay Sipangkot on the Municipal Waters of Sitangkai, Province of Tawi-Tawi, Providing Management Intervention Thereof, and for Other Purposes” was enacted to protect and manage the spawning aggregation of this species. Municipal Ordinance No. 2, Series 2013 was also passed, “Establishing Napoleon Wrasse (Mameng) Spawning Aggregations Marine Protected Area in Tando Owak, Dungun Dungon to Tong Bakkaan to Pamalikan and Tahing, Ungus Mataha in the Municipal Waters of Sibutu, Province of Tawi-Tawi, providing management interventions thereof, and for other purposes.”

Most of the fishers who catch Napoleon wrasse are not aware of the Wildlife Act or of CITES. They are aware that this is a banned fish species but they could not understand why this is classified as threatened species since they can still catch many Napoleon wrasse from the wild. While BFAR enforces CITES regulations as well as the Fisheries Code and Wildlife Act, there are still constraints in implementation due to the lack of alternative livelihood for the fishers.

Both the national and the ARMM fisheries codes provide that no construction and operation of fish corrals/traps, fish pens and fish cages shall be allowed without a license/permit from the BFAR. This function has been devolved to the local government, so in Sibutu and Sitangkai, the mayor issues the permit or license to construct and operate fish pens/cages. Permits are given to individuals or associations. The operators also should apply for lease of the area where they culture fish. As in the case of the licensing and application for lease, this is not being imposed by the local government since many of the local officials and their relatives are also involved in the ranching of fish in pens. There has been no regulation or control in the proliferation of cages and pens in these two municipalities.

#### **4.2. ENFORCEMENT IN AUTONOMOUS REGION IN MUSLIM MINDANAO**

Even if the national Fisheries Code (RA 8850 as amended by RA10654) and the ARMM version of the Fisheries Code (MMAA 86) both ban the use of cyanide, its use is still prevalent in catching Napoleon wrasse and other live reef fish for food because of challenges in enforcement. Cyanide continues to be imported for industrial applications like steel, plastics, synthetic fibers, chemical synthesis, electroplating, metallurgy, and mining. However, locally it is traded illegally and lands in the hands of fishermen either from exporters or from big time cyanide fishing operators. This toxic chemical is still being used in the catching of Napoleon wrasse and other live food fish as well as aquarium fishes based on our actual sighting of boats with hookah compressors operating in the reef areas of Sitangkai. Many of these are operated by non-residents of Sitangkai, mainly from Cebu, collaborating with local operators. Some mariculturists claim that they do not want to buy cyanide-caught fish because they trace the mortality in the pens to the initial shock from cyanide. There is no record of apprehension and prosecution of people using cyanide in Sitangkai and Sibutu.

Illegal acts concerning Napoleon wrasse remains undocumented by governing authorities and no records

have been filed of any seizures and prosecution in relation to the capture, culture and trade of the species. In this respect, governing authorities still need to improve efforts to regulate the capture and culture of Napoleon wrasse. Although licensing or permit to culture fish is required by law, this is not adequately enforced. Based on the interviews with the mariculturists, 68% of the pens are not registered. Only 30.7% are registered with the local government unit (LGU) while only 1.3% is registered with BFAR.

#### **4.3. SOME RECORDED CASES OF VIOLATIONS**

While this may not be a reflection of the Philippine situation in general, the following are some of the documented cases of recent violations:

- On April 25, 2007, the BFAR regional director in General Santos City ordered an investigation on the reported illegal trading of Napoleon wrasse after a private citizen reported that the species is being sold at the fish port complex in the city. However, this case did not prosper (“BFAR chief orders probe on ‘Mameng’ trading in GenSan,” 2007)
- On December 21, 2006, Chinese fishing vessel M/V Hoi Wan was apprehended by park rangers within the Tubbataha Reefs Natural Park. Upon boarding the vessel, the rangers discovered more than 2,000 fishes, including 350 juvenile Napoleon wrasses. M/V Hoi Wan had no permits to buy fish. They had no CITES import application with the Hong Kong Agriculture, Fisheries and Conservation Department although they claimed to be registered there. Barely 48 hours after the apprehension of M/V Hoi Wan was reported in Puerto Princesa, a representative from the Chinese Embassy had arrived to facilitate its immediate release. After almost four years, M/V Hoi Wan was released per Municipal Trial Court order dated April 12, 2010 to Gamman International Limited, the registered owner. This was by virtue of Article 45 of the Revised Penal Code entitled Confiscation and Forfeiture of the Proceeds of the Crime, which exempts the property of a third person not liable for the offense. M/V Hoi Wan was said to have been chartered by the accused Fong Kwan Kong, making Gamman a third party not liable to the offense. Charges for violation of Sections 87, 97, and 100 of R.A. 8550 were dismissed by Regional Trial Court for insufficiency of evidence (Dygico, personal communication, 2010). This order was promulgated and released on September 2, 2009.

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# CHAPTER 5: THREATS AND ISSUES

During the second workshop for the “2016 Country Status Report on Napoleon Wrasse and Sharks” under the Sulu-Sulawesi Seascape Project held at the Dolce Vita Hotel, Puerto Princesa City, Palawan on October 2–8, 2016, the participants identified the threats and issues affecting the Napoleon wrasse.

## 5.1. THREATS

- Illegal, unregulated, unreported fishing activities (e.g., use of dynamite; cyanide and use of compressor);
- Uncontrolled export of Napoleon wrasse without non-detriment findings study;
- Habitat degradation, particularly coral reefs and seagrass beds;
- Intensive and species-specific removal for the live reef fish export trade;
- Species is readily accessible to spearfishing at night with SCUBA or hookah and easy to catch with cyanide or other poisons such as *Derris trifoliata*, due to predictable adult habitat and shallow depth range;
- Lack of coordinated, consistent national and regional management largely due to limited management capacity and the sometimes secretive nature of traders. In particular, there is no relevant regional fishery management authority to address problems with this species;

- Selective fishing or intensive take of juveniles for grow-out since there is no hatchery operation that can produce and rear juveniles for culture. This can result in growth overfishing; and
- Siltation from mining activities particularly in Surigao.

## 5.2. ISSUES

- Species misidentification;
- Ongoing culture of high value species in Siargao area which is suspected also to culture Napoleon wrasse (However, this information still needs to be validated);
- Intensive culture of Napoleon wrasse in Tawi-Tawi using juveniles taken from wild stock;
- Ineffective enforcement of environmental laws due to:
  - Inadequate capacity of the LGUs;
  - Lack of coordination between law enforcers; Lack of technical capability of BFAR-Quick Response Team personnel to enforce regulations on Napoleon wrasse; and
  - Lack of information and capacity to enforce regulations on Napoleon wrasse; and
- How to improve monitoring and data collection, which is brought about by lack of logistics support and the lack of technical knowledge in identifying Napoleon wrasse.

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# CHAPTER 6: NATIONAL PLAN OF ACTION FOR NAPOLEON WRASSE

To address the identified threats and issues, the following actions were recommended by the workshop groups in the form of a National Plan of Action for Napoleon wrasse (NPOA NW, see Annex 1).

The NPOA NW covers the priority areas for management such as national and local administration, research, law enforcement, capacity building and community mobilization, species identification, and knowledge management. Many of the management actions or strategies recommended are incorporated in the NPOA addressing each issue, implementation timeline and agencies that would be responsible for implementation. Not mentioned in the previous chapter are some priority strategies such as:

- Prepare research proposals for the conduct of a non-detriment findings study for the Napoleon wrasse, genetic and connectivity studies, reproduction and fecundity studies, and spawning aggregation studies;
- Develop and implement a traceability system on collection, transport, propagation and trade of aquatic wildlife based on Fisheries Administrative Order (FAO) Fisheries and Aquaculture Circular No. 1123;
- Conduct a value chain analysis for the Napoleon wrasse especially in the export trade;
- Develop inputs to policy development for the conservation and management of the Napoleon wrasse:
  - Immediate issuance of appropriate FAO when data is available, in support to the provisions under Section 102 of RA 8550 as amended by RA 10654; and
  - Review FAO 74, Series of 2009 or the Guidelines in the Operations and Implementation of Mariculture Parks;
- At the regional and local level:
  - Establish a Broodstock Research and Development Center for Groupers and Napoleon Wrasse at the Mindanao State University (MSU)-Tawi-Tawi to enhance local capacity to do research and development of hatchery technology for Napoleon wrasse and other cultivable grouper species;
  - Enact ordinance requiring aquaculturists and fishers to secure permits and licenses for the construction of pens/cages, and to register either as individuals or organizations. Fees have to be levied depending on the willingness to pay of the aquaculturists; and
- Zone mariculture areas—a zoning ordinance is likewise being proposed to delineate the areas where the seaweeds, abalone, and fin fish pens should be located. This should also include the limitations in the area that a person or an organization can apply for seaweed farming, abalone ranching, and for fish pens/cages; and

Other actions identified include:

- Establish a fisheries management unit applicable to Ecosystems Based Fisheries Management (EBFM) and make it community-based, holistic, and participatory;
- Define management objectives, reference points and indicators;
- Strictly enforce of fishery laws pursuant to IUCN, CITES, Fisheries Code as amended by RA 10654, Wildlife Act, RA 9147, and FAO 233;
- Intensify local behavior change campaigns, using communication materials produced in local dialects, to address the lack of information on the provisions of fisheries and other environmental laws protecting this species;
- Strengthen the capacity of LGU officials to enforce regulations on Napoleon wrasse;
- Establish better mechanisms of coordination among enforcers (local and national) through dialogue and consultation with other stakeholders, e.g., DENR, LGU, BFAR, fisherfolks, and law enforcers; intensify capacity of the Regional Law Enforcement Coordinating Committee (RLECC) and National Law Enforcement Coordination Committee (NLECC)-Sub Committee on Law Enforcement and Marine Environment Actions;
- Conduct training on fish species identification particularly for enumerators; procure grid mat for fish species identification and length and weight determination, particularly in landing areas where species of wrasses are recorded. This will strengthen the capacities of NSAP enumerators and LGU technicians on the right identification of Napoleon wrasse;
- Adopt local policies like establishment of marine protected areas (MPAs) and protection of juvenile Napoleon wrasse seasonal closures, if the ban will be lifted, especially during spawning season and protecting the Napoleon wrasse spawning aggregations; and

- Popularize the implementing rules and regulations of laws like RA 10654 and the Wildlife Act (RA 9174) and included these in communication outreach activities.

The responsible agencies identified to be involved in the immediate implementation of these management options are the BFAR, Philippine National Police-Maritime Group,

Philippine Coast Guard, DENR, Bantay Dagat, LGUs, civil society organizations, people's organizations, nongovernment organizations, and academe. These partner agencies should be mobilized to ensure strong stakeholder participation and networking among private organizations or businesses, Fisheries and Aquatic Resources Management Councils (FARMCs), Marine Protected Area Management Board (MPAMB), and the local media.

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ANNEX 1. MATRIX OF THE NPOA NAPOLEON WRASSE

1. National Administration

TOPICS	ISSUES	OBJECTIVES	RECOMMENDED ACTIONS	TMELINE	RESPONSIBLE AGENCIES/	STRATEGIC PARTNERS	PERFORMANCE INDICATORS
National Administration	Low management and conservation priority for Napoleon wrasse (NW) at the Bureau of Fisheries and Aquatic Resources Regional Field Units (BFAR RFUs)	To mainstream NW management and conservation at the BFAR RFUs	Issue memorandum to BFAR Regional Directors from BFAR National Director to put more emphasis on NW-related activities in regional plans	Q1 2017	BFAR-Fisheries Resource Management Division (FRMD)	BFAR-National Fisheries Research and Development Institute (NFRDI)	Issuance of memorandum
		To mainstream the NW National Plan of Action (NPOA) in the BFAR annual budget (General Appropriations Act or GAA) by including it in the budget planning at the national and regional levels	Submission of project proposals following the NW NPOA (e.g., on trainings, research, law enforcement, communication) in the BFAR annual budget (under GAA) at the national and regional levels	Q1 2017	BFAR Central Office		1 proposal per region submitted
	Non implementation of some of the provisions of Wildlife Act	To activate the National Aquatic Wildlife Management Committee and the Philippine Aquatic Red List Committee	Creation of BFAR Technical Working Group (TWG) for Aquatic Wildlife at the national and regional levels	Q4 2016	BFAR-Fishery Regulatory and Quarantine Division (FRQD) NFRDI BFAR RFUs		1 BFAR TWG for Aquatic Wildlife created at the national and regional levels
		To implement catch documentation scheme for NW	Development and implementation of traceability system on collection, transport, propagation and trade of aquatic wildlife	2017	BFAR FRQD, NFRDI, BFAR RFUs		1 Fisheries Administrative Order (FAO) promulgated

2. Local Administration

TOPICS	ISSUES	OBJECTIVES	RECOMMENDED ACTIONS	TMELINE	RESPONSIBLE AGENCIES/	STRATEGIC PARTNERS	PERFORMANCE INDICATORS
Local Administration	Non-inclusion of NW management and conservation activities in local government units (LGUs)	To mainstream NW into LGUs' plans and programs in their annual budget	Develop a communication plan for NW management and conservation (in consultation with LGUs)	2018	BEAR-Information and Public Relations Group (IPRG) BEAR RFUs NFRDI	World Wildlife Fund (WWF) Conservation International (CI) GIZ	1 communication plan
			Conduct communication activities in LGUs	2018	BEAR RFUs	WWF, CI, GIZ	1 presentation per region

3. Research

TOPICS	ISSUES	OBJECTIVES	RECOMMENDED ACTIONS	TMELINE	RESPONSIBLE AGENCIES/	STRATEGIC PARTNERS	PERFORMANCE INDICATORS
Research	Limited information on NW	To collect data and information on Napoleon Wrasse	Adopt a standard module to conduct fish visual census (FVC) Include NW species identification	2017	BEAR Fisheries Resources Management Division (FMRD) BEAR RFUs NFRDI	University of the Philippines (UP) Mindanao  UP Marine Science Institute (MSI)	1 standard FVC module adapted
			Develop and implement a training plan to capacitate BEAR RFU coastal resource management units on the standard FVC modules	2017	BEAR FRMD BEAR RFUs NFRDI	UP Mindanao UP MSI	1 FVC training plan developed
			Conduct FVC surveys in areas where NW occurs (in combination with FVCs for targeted fish sanctuaries)	Starting 2018	BEAR RFUs	NFRDI	At least 2 Sites per region surveyed
			Develop an FVC database (to include NW, CITES-listed and other species in the identified survey areas/fish sanctuaries)	2018	NFRDI	BEAR- Fisheries Information Management Center  BEAR RFUs	1 FVC database developed



TOPICS	ISSUES	OBJECTIVES	RECOMMENDED ACTIONS	TMELINE	RESPONSIBLE AGENCIES/	STRATEGIC PARTNERS	PERFORMANCE INDICATORS
Law enforcement	Low compliance to RA 10654 and Wildlife Act and other fisheries laws	To strengthen the enforcement of RA 10654 and Wildlife Act and other fisheries laws of BFAR and other law enforcement agencies	Develop a training plan for NW management and conservation (in consultation with BFAR and other law enforcers)	2017	BFAR-FRQD BFAR RFUs NFRDI	Philippine Coast Guard (PCG) Philippine National Police- Maritime Group (PNP-MG) Philippine Navy (PN)	1 NW training plan developed
	Ineffective enforcement of fisheries laws	To capacitate law enforcers in the identification of NW and implementation of laws relative to NW by 2017	Develop a training plan for confiscation of catch, filing of cases, and apprehension, including NW species identification	Starting 2017	NFRDI, BFAR-Quick Response Team (QRT)	WWE, CI, GIZ, Academe	Number of cases filed  Number of operations relative to NW conducted
			Develop a training plan for trainers' training for NW resource persons under BFAR/NFRDI	Q1 2017	NFRDI, BFAR, QRT	WWE, CI, GIZ, Academe	Number of law enforcers capacitated
			Conduct training for BFAR RFUs and other law enforcers	2017	BFAR-IPRG BFAR RFUs NFRDI	PCG PNP-MG PN	NW training conducted per region
		To conduct presentation for the National Law Enforcement Coordinating Council (NALECC) and Regional Law Enforcement Coordinating Committee (RLECC) on the management of NW	Develop and implement a communication plan for NW management and conservation for RLECC and NLECC-Sub Committee on Law Enforcement and Marine Environment actions	2017	BFAR-IPRG BFAR RFUs NFRDI	NGOs	At least 1 presentation conducted for NALECC and RLECC per region

5. Capacity Building and Community Mobilization

TOPICS	ISSUES	OBJECTIVES	RECOMMENDED ACTIONS	TMELINE	RESPONSIBLE AGENCIES/	STRATEGIC PARTNERS	PERFORMANCE INDICATORS
Capacity building and community mobilization	Low compliance to RA 10654 and RA 9147 (Wildlife Act), and other fisheries laws	To strengthen the enforcement of RA 10654 and RA 9147 (Wildlife Act), and other fisheries laws	Develop appropriate information, education and communication campaign (IEC) module in consultation with the local level/ community on the information they need. Part of the intensification of IEC on RA 10654 and other fishery related laws through social media, radio, print.  Contract out to a professional group or to academe	2017	BFAR-NFRDI	LGUs; Academe; NGOs, NGAs, POs	IEC modules developed
			Assessment of NW through the National Stock Assessment Program (NSAP) and non-NSAP initiatives. This also includes equipment needed in the assessment (e.g., underwater camera, scuba gear) training on fish species id and tagging materials	2017	BFAR-NSAP	LGUs, POs, Academe	Assessment conducted
		To conduct presentations to LGUs for the inclusion of NW plans and programs in their annual budget starting 2018	Prepare informative presentation to encourage LGUs to include NW plans and programs in their annual budget starting 2018	Q3-Q4 2016	BFAR Regional Offices and LGUs	WWF, CI, GIZ	1 presentation per region
		To expedite the creation of the adjudication committee in compliance with RA 8550 as amended by RA 10654 by Q4 2016	Issuance of the Service Order/ Fisheries Office Order for the immediate creation of the adjudication committee	Q4 2016	BFAR		Adjudication board created by region

6. Species Identification

TOPICS	ISSUES	OBJECTIVES	RECOMMENDED ACTIONS	TMELINE	RESPONSIBLE AGENCIES/	STRATEGIC PARTNERS	PERFORMANCE INDICATORS
Species Identification	Misidentification of the species	To enhance the awareness of NSAP enumerators, local communities, enforcers, and other members of the composite team on NW	Training on fish species identification particularly for enumerators, law enforcers, members of the composite team	2017	NFRDI	BFAR-NSAP LGUs Academe POs NGAs (PN, PCG, PNP-MG)	Training Conducted
			Procurement of grid mat for fish species identification, and length and weight determination particularly in landing areas where species of wrasses are recorded	2017	BFAR-NSAP		Materials procured
			Conduct fish visual census on NW areas	Q1- 2018	BFAR-NSAP	LGUs, Fisheries and Aquatic Resources Management Councils Academe	Assessment conducted
			Validate the ongoing culture of high-value species (HVS) if it is still existing (apply soft approach)	2017	BFAR	BFAR-NSAP, LGUs, Academe	Validation conducted

7. Management measures

TOPICS	ISSUES	OBJECTIVES	RECOMMENDED ACTIONS	TMELINE	RESPONSIBLE AGENCIES/	STRATEGIC PARTNERS	PERFORMANCE INDICATORS
Management measures	Lack of management measures	To improve management and conservation of NW	Consultation with other stakeholders (e.g., DENR, LGU, BFAR, fisherfolks) to identify appropriate management measures	2017	BFAR	DENR, LGUs, NGOS	Management measures identified
	Gaps in implementation of management measures		Country status reports to be prepared by consultant, for presentation to the regional offices and stakeholders. To help identify the gaps in implementation (method)	Q4 2016	GIZ,	BFAR, NFRDI	Country status report published and disseminated
			Strengthen management capacities of MPA management boards, and other habitats of NW— identify MPA with NW objective, such as spawning aggregation sites	2017	BFAR, NFRDI	LGUs	MPA management improved
			Sharing available data (though scarce) to support management measures	2017	BFAR, NFRDI	LGUs, Academe	Data sharing ongoing



TOPICS	ISSUES	OBJECTIVES	RECOMMENDED ACTIONS	TMELINE	RESPONSIBLE AGENCIES/	STRATEGIC PARTNERS	PERFORMANCE INDICATORS
Research and Knowledge Management	Limited studies and sharing of knowledge on NW	To conduct researches and enhance knowledge on NW	Prepare and implement research proposals on non-detriment finding study, genetic and connectivity studies, reproduction, and spawning aggregations	2017	Academe	CHED, NFRDI, NGOS	Published materials
			Monitoring and data collection	2017	BFAR	SUCs BFAR NFRDI	Database on NW
			Knowledge sharing	2017	BFAR NFRDI State universities and colleges (SUCs)		Publications
			Complete NSAP data presence, observations, incidental sightings				
			Improve marketing flow information— include value chain analysis and update price as of 2016				









**NAPOLEON WRASSE (*Cheilinus undulatus*)  
“MAMENG” PHILIPPINE STATUS REPORT AND  
NATIONAL PLAN OF ACTION 2017-2022**

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