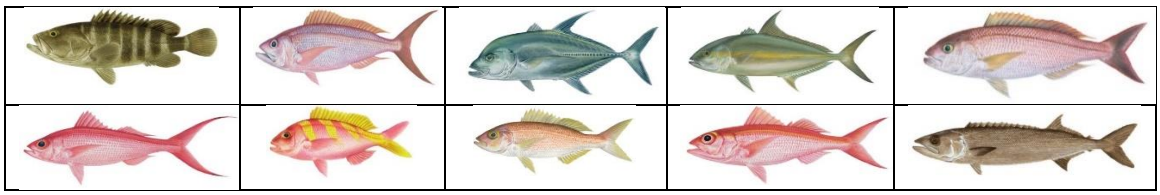
Deep Bottom Snapper

Management Plan



March 2017
Fisheries Division
Ministry of Fisheries and Marine Resources Development

Part I

1. Introductory Provisions

1.1 The deep bottom snapper (DBS) resource is a collective nomenclature given to those deep bottom fish species that belong to the family: Lutjanidae (Snappers of the subfamilies: Etelinae, Lutjaninae and Apsilinae), Lethrinidae (Emperors), Serranidae (Groupers, of the subfamily Epinephelinae), and Carangidae (trevallies). These resources occupy deep reef slopes ranging from 80-400 meters deep and also found on seamounts. Like all deep bottom fish species, DBS are top level carnivores preying on deep-water invertebrates and benthic fishes.

1.2 The development of the DBS resources of Kiribati was initiated in the early 1980s as a result of the fishery survey and development work carried out by the Fisheries Division in collaboration with the South Pacific Commission. Several deep bottom fish research fishing trips were conducted in the early years that covered all the Islands of the Gilbert Group, including the inhabited islands of the Line Group.

1.3 The DBS resources of Kiribati are virtually undeveloped and still considered to be in an embryonic stage hence offer significant potential to the locals for commercial fishing opportunities. Estimates of the unexploited stock by SPC in the 1980s, based on 220 kg per kilometre of isobath, provided a maximum sustainable yield (MSY) in the range of 73-220 tons per year. However, the potential MSY for the Gilbert Group alone is probably within a range of 55-165 tons per year. The yields estimated from other studies in other Pacific Countries showed MSY values ranging from 0.16-0.92 $t.nmi^{-1}yr^{-1}$ for seamounts and 0.04-0.27 $t.nmi^{-1}yr^{-1}$ for island's outer reef slopes.

1.4 Moreover, one of the target of the United Nations to Support the Implementation of Sustainable Development Goal 14 of SIDS is to conserve and sustainably use the oceans, seas and marine resources for sustainable development. Among others, it highlights a need to *provide access for small-scale artisanal fishers to marine resources and markets*.

1.5 This DBS Plan aims to ensure optimal utilization of deep bottom fish resources by commercial and artisanal fishers on a sustainable basis, concomitantly provides opportunities to augment economic returns, contributes to food security, and guarantees sustainability of the deep bottom snapper resources for present and future generations.

2. Description of targeted Deep Bottom Snappers

2.1 Deep bottom snappers are widely distributed around the islands of Kiribati and those on the western-side of the islands are especially targeted as they are protected from the prevailing tropical north-easterly trade winds. Several studies have been conducted on DBS in several locations in the Pacific, including Kiribati, which indicated that such species are slow-growing, have low rates of natural mortality, and long-lived, with maximum ages exceeding 20 years.

2.2 DBS species are dioecious (having distinct sexes), and spawn several times over a prolonged breeding season, primarily between November and May. Maturity for such species is attained at 50% of its maximum length. In addition, DBS are protogynous hermaphrodites (i.e. males change sex to become females) and spawn in large aggregations within a short period during which they are mostly susceptible and vulnerable to fishing.

2.3 It was also found from past studies that different DBS species are also depth specific. Those DBS that belong to the subgroup, *carangids, lethrinids*, and many *epinephelids* are shallower dwellers hence occupy depths of less than 120 m deep. *Pristipomoides* spp., and some *epinephelids*, on the other hand, prefer intermediate water depths of between 120-240 m deep, while *Etelis* spp., and a few epinephelids are deeper dwellers found at depth of more than 240 m deep. Moreover, some species such as *P. filamentosus*, have been observed to undergo diurnal migration from deeper day-time high relief areas at depths of 100-200 m, to shallower night flat shelf areas at depth as shallow as 30-80 m.

2.4 A more detailed biological characteristics of the major individually targeted DBS species is briefly summarized in Annex I.

Part II

3. Management of Deep Bottom Snapper Resources

3.1 The most convenient and practical way of managing DBS resources is through technical measures, which would ideally fine-tuned as more reliable catch and effort data have been amassed over time.

3.2 Given the paucity of catch and effort data due to the embryonic stage of the DBS fishery, it is practically feasible to initially manage the fishery

through Granting of DBS Fishing Licenses and at the same time Enforcement of Area Restrictions. Licensing allows only those that have licenses to fish for DBS thus commercially involve in the harvesting and marketing of DBS species. Area Restrictions allows the DBS resources population to maintain at its virgin stock with respect to those found in restricted areas that may concomitantly act as a source for recruitment to adjacent and contiguous consistently fished areas.

3.3 In addition, the DBS resources are also managed through Limiting DBS Catches to a level that each specific Island has been assigned with, commonly known as an Island Catch Allocation (ICA) as depicted in Table 1. When reasonable data has been accumulated on DBS, more innovative and practical management schemes would be adopted and where possible implemented.

Table 1. Island Catch Allocation (ICA) of Deep Bottom Snappers (DBS)

Island Name	**ICA (kg)**		**Islands Name**	**ICA (kg)**
Makin	**5,500**		**Tab North**	**13,500**
Butaritari	**11,000**		**Tab South**	**13,500**
Marakei	**5,500**		**Onotoa**	**8,000**
Abaiang	**13,500**		**Beru**	**8,000**
North Tarawa	**5,500**		**Nikunau**	**8,000**
Maiana	**13,500**		**Tamana**	**5,500**
Kuria	**8,000**		**Arorae**	**5,500**
Aranuka	**10,750**		**Kiritimati**	**16,000**
Abemama	**13,500**		**Tabuaeran**	**8,000**
Nonouti	**13,500**		**Teraina**	**8,000**
Banaba	**8,000**		**S/Tarawa & Betio**	**16,250**
Sub Total	**108,000**		**Sub Total**	**110,250**
Total Island Catch Allocation				**218,250**

3.4 It is extremely important to monitor and maintain the annual Total Island Catch Allocation of 218,250 kg (218.25 tons) as it is within the estimated maximum sustainable yield (MSY) that SPC has come up with of about 73-220 tons per year for the whole of the Kiribati Group. The Total ICA of 218.25 tons per year is at the higher range of the estimated MSY, which was premised on the average catches of deep bottom species caught on each individual Island during the early stages of developing the fishery and also of the recent catches by the Kiribati Fish Limited (KFL) small scale vessels.

4. DBS Seasonal Fishing Closures and Restricted Fishing Areas

4.1 Other additional conservation and protection measures for the DBS resources involve the mandatory closure of deep bottom fishing through seasonal fishing closures (SFC) at the following times:

4.1.1 Seasonal Fishing Closures

a) In addition to limiting catches of DBS resources to each individual Island Catch Allocation (ICA), fishing for DBS species must be observed during their spawning season that extends from November to May as follows:

- *Seasonal Fishing Closures for Northern Gilbert Group[1] must be observed throughout April and May;*
- *Seasonal Fishing Closures for Central Gilbert Group[2] must be observed throughout January and February;*
- *Seasonal Fishing Closures for Southern Gilbert Group[3] must be observed throughout November and December;*
- *Seasonal Fishing Closures for Line Group[4] must be observed throughout March and April.*

4.1.2 Restricted Fishing Areas

a) The oceanic eastern part of each individual Island is reserved as Restricted Fishing Areas where deep bottom fishing for DBS species is totally banned throughout the years.

b) The Director of Fisheries, with the approval of the Minister, may allow deep bottom fishing for scientific and research purposes only in these Restricted Fishing Areas.

Part III

5. DBS Resources Fishing Rights

5.1 The Deep Bottom Snapper Resources Fishing Rights is grouped into two categories:

5.1.1 Access and Fishing Control

a) The Master or owner of a DBS vessel must comply to all conditions of a Deep Bottom Snapper (DBS) Coastal Fishing License;

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[1] *Northern Gilbert Group* consists of Makin, Butaritari, Marakei, and Abaiang
[2] *Central Gilbert Group* consists of Tarawa, Maiana, Kuria, Aranuka and Abemama
[3] *Southern Gilbert Group* consists of Nonouti, Tab North, Tab South, Onotoa, Beru Nikunau, Tamana and Arorae
[4] *Line Group* consists of Kiritimati, Tabuaeran and Teraina

b) Harvesting of DBS resources is prohibited in any Protected Area managed through a Community-based set up;
c) Harvesting of DBS resources is prohibited in all the Islands comprising the Phoenix Group; and
d) Harvesting of DBS resources in other designated Restricted Fishing Areas (RFAs) that will be promulgated from time to time by the Director of Fisheries is prohibited.

5.1.2 Fishing Input Controls

5.2 Fishing Gears and Fishing Methodologies listed below must be adhered to by the Master or Owner of a DBS vessel who is licensed to commercial fish for the DBS resources:

a) Any deployed Vertical Longline must be limited to 15 hooks per set;
b) Hand reels, electric or hydraulic reels is limited to 5 hooks per rig;
c) Vessel must properly equipped with a Sea Anchor or Parachute Anchor;
d) Vessel must be equipped with at least three types of sea safety gears.

Part IV

6. Sustainable Management Objectives

Objective 1: To establish an effective and practical management system for the commercial Deep Bottom Snapper Fishery.

6.1 Strategies to achieve operationalization of Objective 1

6.1.1 Establish a permanent closed spawning site at all times for the conservation of DBS resources in Kiribati.

6.1.2 A Fishing activity is only allowed to be carried out in fishing grounds that have been approved by an Island Council through an Island Council License.

6.1.3 Allow investors to train locals the know-how to maintain their catches in a good and acceptable condition.

6.1.4 Allow the alternation of fishing activities from Island to Island in line with the assigned Islands Catch Allocation (ICA).

6.1.5 To review the Island Total Catch for the target species for each Island group based on submitted catch and effort data and the preliminary findings of any stock assessments.

Objective 2: To establish an ecologically sustainable DBS fishery based on sustainable fishing practices that will ensure an effective management of the DBS industry.

6.2 Strategies to achieve operationalization of Objective 2

6.2.1 The banning of certain fishing practices which are destructive including fishing gears and fishing methods that have side-effect to coral reefs and the general marine ecosystem.

6.2.1. The use of cyanide fishing which is detrimental to the marine environment including coral reefs is prohibited so that to provide protection to fish habitat and ecology.

6.2.3 Establish a licensing system that would allow only locals to participate in the harvest of the DBS resources.

6.2.4 Limit the number of fishing operation or license issued according to the Island's Allowable Catch

Objective 3: To help improve the economic wellbeing of local communities participating in the Deep Bottom Snapper (DBS) fishing industry.

6.3. Strategies to achieve operationalization of Objective 3

6.3.1 Establish an Island Total Catch that comprises of individual Island DBS Entitlements for each fished Island.

6.3.2 Establish an Island Catch Allocation (ICA) for the target species for each Island Groups based on catch and effort data and the preliminary findings of stock assessments.

6.3.3 Establish a minimum benchmark price per kg that is based on a genuine world market price for DBS species.

Objective 4: To establish an effective mechanism to allow the collection of information to assist in decision making to refine and improve the management of DBS fishing industry.

6.4 Strategies to achieve operationalization of Objective 4

6.4.1 Establish an ongoing monitoring program for the collection of relevant scientific information on DBS targeted species.

6.4.2 The catch and effort data should be submitted by the Master or Owner of the licensed vessel to the Fisheries Division in the relevant forms, copies of which are attached as Annex III.

6.4.3 The Fishing Master of the licensed vessel is required to provide data on the quantity of fish, weight, and type of species caught using attached fishing data form.

6.4.4 A record of export form should be submitted by the Licensed Fish Exporter to the Fisheries Division prior to the shipment of the DBS to overseas markets.

6.4.5 Limit the number of operating licenses to ensure the sustainability and viability of the DBS Fishery.

Objective 5: To monitor and control the marketing and shipment of Deep Bottom Snapper species to overseas market.

6.5 Strategies to achieve operationalized Objective 5

6.5.1 A fishing vessel should undergone Pre fishing assessment through involvement of stationed Fisheries Extension staffs.

6.5.2 A vessel check list of prohibited goods, fishing gears and other commercial goods must be confiscated if found to be present on the vessel during any Pre-fishing assessment undertakings.

6.5.3 A fishing master must provide a copy of all catches of DBS stocks harvested that are kept on board the vessel.

Part V

7. Miscellaneous

7.1 An applicant should lodge his/her application form to the Fisheries Division, of the Ministry of Fisheries and Marine Resources Development. If an applicant does have a coastal fishing vessel specifically for this operation, it should be registered in the Coastal Fishing Vessel Register that is administered by the Fisheries Division.

8. Register of a Coastal Fishing Vessel

8.1 A complete Vessel Registration/Application Form, as per Annex II, must be submitted with the appropriate supporting documentations as follows:

8.1.1 Certificate of Seaworthy (Declaration of Eligibility)

8.1.2 Certificate of Ownership; and

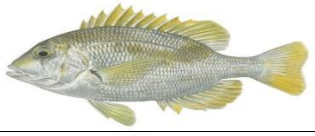
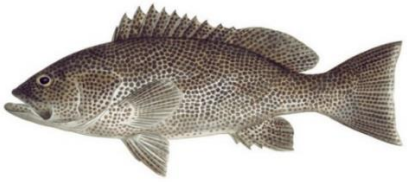
8.1.3 A Full List of the Vessel of Officers and Crews.

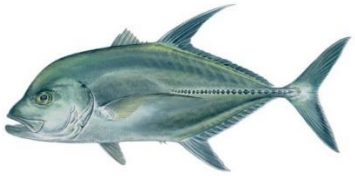
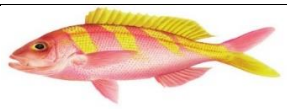
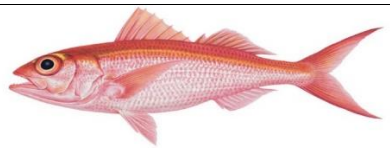
8.2 A License Fee must be payable to the Coastal License Unit, Fisheries Division of the Ministry of Fisheries and Marine Resources Development.

9. Review of the DBS Management Plan

9.1 This DBS Plan is open for review every two years or as and when issues that warrant its renewal need to be incorporated to ensure that the DBS stocks are sustainably conserved and protected. Of more importance, to allow newly developed innovative management measures to be proactively adopted and implemented accordingly.

Annex I: List of Deep Bottom Snapper Species

Drawing of DBS species	Name of DBS	Biology of DBS
	*Aphareus furco* Small-toothed jobfish **Awaiuea**	Inshore coral and rocky reefs, lagoon clean waters and occupy waters not as deep as 120 m. Fee on fish and crustaceans **Max size**: 70 cm
	*Pristipomoides auricilla* Goldflag jobfish **Buki-iaro**	Outer reef slopes & seamounts of 90-360 m water deep and feed mainly on fish. **Max size**: 45 cm
	*Gymnocranius euanus* Iodine Bream **Kontiba**	Occur in sand and rubble areas adjacent to rock and coral reefs at depth range of 15-50m Feed on bottom-dwelling gastropods. **Max size**: 45 cm
	*Monotaxis grnadoculis* Humpnose bigeye bream **Matakore**	Sand and rubble areas near coral reefs at depth not exceeding 100 m. A nocturnal feeder on invertebrates **Max size**: 60 cm
	Wattsia mossambica Large-eye bream **Baamaii**	Occupy outer reef slopes and seamounts at 100-180 m deep. Feed on invertebrates and fish **Max size**: 55 cm
	*Epinephelus morrhua* Comet Grouper **Kuau-morua**	Occupy outer reef slopes and seamounts at depth range of about 80-370 m. Mostly feed on fish and crustaceans. **Max sizes**: 90 cm and 6.7 kg
	*E. chlorostigma* Brown-spotted Grouper **Utinnaano**	Found on the outer reef slopes and on seamounts in waters as deep as 300 m. Mostly feed on fish and crustaceans **Max sizes**: 75 cm and 7 kg
	*E. octofasciatus* Eight-bar Grouper **Kauoto**	Probably occur in rocky reefs at depth of 150-300 m **Max sizes**: 130 cm and 80 kg
	*Aphareus rutilans* Rusty jobfish **Bukinrin**	Occupy outer reef slopes and rocky bottom areas at depth range of 40-330 m. Feed on fish, squid, and crustaceans **Max sizes**: 110 cm and 12 kg

	*Caranx lugubris* Black jack **Aonga**	Prefers clear oceanic waters at depth range of 10-350 m. A nocturnal feeder preying on fish Max sizes: 100 cm and 17.9 kg
	*Aprion virescens* Green Jobfish **Awai**	Occur on reefs & deep slopes-180 m. Feed on fish, shrimp, crab, cephalopods and zooplankton. Matures at 50 cm **Max sizes**: 112 cm and 15.4 kg
	*Seriola rivoliana* Longfin yellowtail **Tieriora**	Occur in the open ocean at depth of 100-80 m. Feed on fish, squid, crustaceans **Max sizes**: 200 cm and 17.9 kg
	*Pristipomoides filamentous* Crimson Jobfish **Buki-touki**	Occupy outer reef slopes and seamounts in depth of 40-400 m. Feed on fish, crustaceans and zooplankton & matures at 50 cm **Max sizes**: 100 cm and 9 kg
	*Pristipomoides flavipinnis* Golden-eye Jobfish **Buki-niti**	Occur on the outer reef slopes and seamounts in 90-360 m. Prey on fish, crustaceans and squid. **Max sizes**: 60 cm and 3 kg
	*Pristipomoides multidens* Gold-banded Jobfish **Buki-mouta**	Prefer outer reef slopes, seamounts and rocky bottoms at 90-360 m deep. Feed on fish, crustaceans, squids **Max size**: 90 cm
	*Pristipomoides zonatus* Oblique-banded snapper **Ika-bwaun**	Found at depths 70-300 m on the outer reef slopes and seamounts. Feed on fish, shrimp, crabs, cephalopods & other inverts. **Max sizes**: 50 cm and 1.8 kg
	*Etelis coruscans* Flame snapper **Buki-uaaki**	Favour outer reef slopes, seamounts, and close to rocky bottom areas at 90-450 m deep. Feed on small fish, squids and crustaceans. **Max size**: 120 cm
	Etelis carbunculus Ruby snapper **Arataba**	Occupy outer reef slopes and seamounts at 90-450 m deep but prefer 300 m. Prey on fish, squid, shrimps, crabs and zooplankton **Max. size**" 127 cm
	*Ruvettus pretiosus* Oilfish **Ikanenea**	Open ocean at 100-800 m deep. Feed on fish, crustaceans and squid. **Max sizes**: 200 cm and 63.5 kg
	*Promethicthys Prometheus* Escolar / Snake mackerel **Tauri**	Outer reef slopes and seamounts but nocturnally migrates to mid-water. Feed on squid, fish and crustaceans **Max size**: 100 cm

Annex II
Coastal Fishing Vessel Registration and Application Form

Coastal Fishing Unit
P.O. Box 276
Bikenibeu, Tarawa

Tel: +686 28095
Email:

1. GENERAL INFORMATION

Name of Vessel _____ Application date _____
Country of Registration _____ IMO No. _____
Registration Number _____ Vessel ID _____
International Radio Call Sign (IRCS) _____ Flag of Convenience _____

2. OWNERSHIP & OPERATOR DETAILS

Owner name _____ Operator name _____
Address _____ Address _____
_____ _____

3. DIMENSION & CAPACITY

Length LOA _____ (m) Moulded Depth _____
Beam _____ Gross Tonnage _____

4. BUILDER & DELIVERY

Builder Name _____ Year Built _____
Place Built _____ Year delivery _____

5. ENGINE & HULL DETAIL

Engine Model _____ Engine Power _____ (HP)
Minimum Fuel Carrying Capacity _____ (kiloliters/gallons)
Hull Material: Steel ____ Wood ____ FRP _____ Other _____

6. CREW MANAGEMENT

Master Name _____ Master Nationality _____
Crew complement _____ Language(s) onboard _____

7. STORAGE CAPACITY

Number of Fishhold _____ Capacity _____
Circulation Method _____ Capacity _____

I declare that the above information is true and complete. I understand that I am required to report any changes to the above information within 30 days, and further understand that failure to do so may cause the license to be revoked.

Applicant's Name _____ **Signature** _____
(OWNER, CHARTERER, or CAPTAIN)

Address _____
_____
_____

Telephone Number: _____ **Email** _____

Annex III
Catch and Effort Data Forms

DEEP BOTTOM FISHING DATA FORM

Fisherman Details	Trip and Time Details	Fishing Gear Details	Fishing Location Details	Weather Details	Other Fishing Essentials
Island Name:_____	Trip N0:_____	N0. of Hooks_____	Lat:_____	Wind Direction:_____	Baits Name:_____
Fisherman First Name:_____	Trip Date:_____/_____/_____	Size of Hooks:_____	Lon:_____	Cloud Cover (%):_____	Ice (kg):_____
Fisherman Last Name:_____	Departure Time:_____	Name of Hooks:_____		Sea State:_____	Fuel (ltrs):_____
N0. of Fisherman:_____	Return Time:_____	Number of Lines:_____		Moon Phase:_____	Oil (ltrs):_____
		Lbs of Lines:_____		Rain:_____	
				Current:_____	

FISHING SET DETAILS

Set No.:_____	Fishing Site:_____	Fishing Start:_____	Fishing End:_____	Depth (m):_____	Total Weight (kg):_____

FISHING CATCH DETAILS

Species Local Name	Species Scientific Name	Fork Length (cm)	Weight (kg)