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Fishery Accounts for South Africa: 1990–2011

Discussion document: D0405.0
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Abbreviations and acronyms

AFS	Annual Financial Statistics
DAFF	Department of Agriculture, Forestry and Fisheries
EEA	Environmental Economic Accounts
GDP	Gross domestic product
MARAM	Marine Resource Assessment and Management
MLRA	Marine Living Resources Act
OMP	Operational management procedure
RC	Reference case
SEEA	System of Integrated Environmental and Economic Accounts
SEEA-Fisheries	System of Integrated Environmental and Economic Accounts for Fisheries
SIC	Standard Industrial Classification of all Economic Industries
Stats SA	Statistics South Africa
SU-tables	Supply and Use tables
TAC	Total allowable commercial catch
UCT	University of Cape Town

Key findings

The closing stock for hake (*M. capensis and M. paradoxus*) (exploitable biomass) is estimated at 572 000 tons in 2011. This is the highest since 2000, but lower than the estimated 640 000 tons in 1996. Since a low of 384 000 tons in 2005, the closing stock has shown annual increases. Between 1990 and 2005, annual catches averaged 148 000 tons. The estimated catch for 2011 is 123 000 tons.

The closing stock for commercial catches of west coast rock lobster (*Jasus lalandii)* is estimated at 16 256 tons in 2011. This is the lowest since 1990. Since 1996 the commercial catch showed stocks decreasing. Between 1990 and 2011, annual harvests averaged 2 969 tons. The estimated catch for 2011 is 2 991 tons.

The resource rent at a SDR of 20% for 2005 was -R138 million increasing to R206 million for 2007, dropping to -R104 million in 2008 but increasing again to R1 074 million in 2010 (refer to Table 5). The resource rent at an SDR of 10% was positive for the entire time series. For 2005 the SDR of 10% was R152 million increasing to R1 270 million in 2010.

1. Introduction

The South African fishing industry is well established, but faces challenges in its ability to ensure the sustainable use of the fisheries as a resource. If overexploited, the fishing industry could become economically unstable. The overexploitation of fisheries not only negatively affects the large industry players (i.e. fishing companies) along with their employees but also the small scale fishermen that rely directly on the fishery for their livelihood (i.e. subsistence fisheries).

There are two branches within the fishing industry, i.e. wild capture fisheries, which range from highly-industrialised capital-intensive fishing industries, to more accessible fishing industries, which include subsistence fisheries and an aquaculture component[1].

The purpose of the discussion document is to present the updated physical fishery accounts for hake (*M. capensis* and *M. paradoxus*) and west coast rock lobster (*J. lalandii*). Monetary fishery accounts and resource rent accounts are presented as well.

This discussion document starts with an overview of the fishing industry in South Africa and the different components are discussed. Section 3 provides details regarding the data that are used to compile the physical fishery accounts and the monetary data that are used to compile the resource rent accounts. In section 4 the physical accounts for hake (*M. capensis* and *M. paradoxus*) and west coast rock lobster (*J. lalandii*) are presented and discussed. Section 5 includes a discussion of the monetary fisheries accounts along with the presentation of the resource rent accounts for all fisheries.

2. Overview of the fishing industry in South Africa

South Africa's fishery industry consists of two components, namely wild capture fisheries and the aquaculture component.

2.1 Wild capture

Wild capture fish includes commercial, recreational and subsistence fisheries. The commercial fishing sector can be broken down into highly industrialised, capital-intensive fisheries which operate in deep water and 'near-shore' fisheries[2]. The management and exploitation of this country's fisheries are governed by an overarching policy known as the Marine Living Resources Act (MLRA), 1998 (Act No. 18 of 1999), first promulgated in 1998[3]. Hake (*M. capensis* and *M. paradoxus*) and west coast rock lobster (*J. Lalandii)* fall under wild capture.

2.2 Aquaculture

Aquaculture is new in South Africa and has room for development. In the past it focused on high value species such as abalone, mussels and oysters. Aquaculture in South Africa is divided into freshwater and marine aquaculture (refer to Tables 1 and 2). For the freshwater aquaculture in 2010 the production of trout is the highest at 950 tons, aquarium species second at 600 tons and koi carp third at 520 tons (refer to Table 1). The top three marine aquaculture fisheries in 2010 were seaweed at 2 015 tons, abalone at 1 015 tons and mussels at 700 tons (refer to Table 2).

Table 1: Freshwater: aquaculture production for South Africa, 2010[4]

Fishery	Species	Production (Tons)
Trout	*Oncorhynchus mykiss*	950
Tilapia	*Oreochomus mossambicus*	10
African Catfish	*Clarias gariepinus*	180
Common carp	*Cyprinus carpio*	1
Mullet	*Myxus capensis* (Fresh water mullet) *Liza richardsoni* (Southern mullet) and *Mugil cephalus* (Flat head mullet)	0
Largemouth Bass	*Micropterus salmoides*	0
Marron crayfish	*Cherax tenuimanus*	1
Koi carp	*Cyprinus carpio*	520
Aquarium species	*Many spp.*	600
Atlantic Salmon	*Salmo salar*	0

Table 2: Marine: aquaculture production for South Africa, 2010[4]

Fishery	Species	Production (Tons)
Abalone	*Haliotis midae*	1 015
Mussel	*Mytilus galloprovinciallis*	700
Oyster	*Crassostrea gigas*	276
Prawn	Family *Crangonidae* or *Pandalus montagui*[a]	0
Finfish	*Argyrosomus japonicus, Argyrosomus inodorus*	0
Seaweed	A seaweed may belong to one of several groups of multicellular *algae*	2 015

[a] The terms *shrimp* and *prawn* originated in Great Britain. South Africa and the former British colonies in Asia also seem to generally follow British usage.

3. Data availability

This section discusses the data sources that were used to compile the physical accounts. It also investigates the available monetary data for future compilation of the monetary accounts.

3.1 Physical data

To compile the physical accounts the data were sourced from the Department of Agriculture, Forestry and Fisheries (DAFF) Fisheries branch and the University of Cape Town's (UCT) Marine Resource Assessment and Management (MARAM) programme. The model used for the data compilation is briefly discussed below.

3.1.1 Department of Agriculture, Forestry and Fisheries

The Fisheries branch is a division within the DAFF, which is the regulatory authority responsible for managing all marine and coastal activities which includes:

- Allocation and management of fishing rights;
- Regulation of recreational fishing;
- Management of South Africa's marine protected areas;
- Protection and monitoring of South Africa's costal and estuarine resources;
- Control of vehicle use on beaches;
- Promotion of fish farming or mariculture; and
- Research of fish stocks and advice on the status of fish stock.

DAFF-Fisheries employ scientists and technicians who conduct research on more than 200 species of fish each year. This data are used to advise the Minister of DAFF and for DAFF-Fisheries to determine the amount of fish that may be harvested from each of the 20 fisheries. DAFF-Fisheries employ the operational management procedures (OMP) database and use the OMP to manage the major marine fisheries[5]. The OMP approach is based on the precautionary principle, and derives total allowable commercial catch (TAC) using simulations run in Bayesian models[b] that explicitly allow for scientific uncertainties. In each fishery

[b] In statistics, Bayesian model comparison is a method of model selection based on Bayes factors. It is commonly interpreted as an alternative to hypothesis tests.

a non-tradable quota is allocated as a share of the species TAC, which is annually adjusted in accordance with projections from the models. Data are perpetually inputted, thus iteratively improving estimates of historic fish stocks and allowing conditional estimates of current stocks and sustainable harvests. Such models have been in place for the major fisheries listed below for some time:

- Hake, modelled jointly for the two sub-species, *M. capensis* and *M. paradoxus* since 1990;
- Small-pelagics, modelled jointly for pilchard (*Sardinops sagax*) and anchovy (*Engraulidae capensis*) since 1991; and
- West coast rock lobster (*J. lalandii*) since 1997.

South coast rock lobster (*P. gilchristi*) and Patagonian toothfish (*D. eleginoides*) OMP models are in the process of being developed.

An advantage of the system is that each OMP is rooted in an annual meeting at which modellers, scientists and commercial fishermen exchange views while working towards consensus on the estimates for the year. These values go into the model which is then further fine-tuned over the season. The longer the system runs, the more robust it becomes, provided the quality of the data input is maintained[5].

Estimates of stocks and catches suited to use in the fishery physical accounts can be obtained through the OMP models run for all major fisheries. The OMP uses the most comprehensive and verifiable data. More to the point, these models operate over long periods, and permit backward induction to estimate pre-exploitation stock levels. Hence, they offer insight into the health of these resources, and into potential yields, which short period stock and harvest values would not provide[5].

3.1.2 University of Cape Town

MARAM is a research unit within the Department of Mathematics and Applied Mathematics at UCT that carries out the quantitative analyses upon which scientific advice for catch levels for all of the major South African fisheries are based. MARAM runs the OMP for DAFF-Fisheries.

3.2 Monetary data

This section investigates the available monetary data that could be used to compile fishery monetary accounts in the future. The System of Integrated Environmental and Economic Accounts for Fisheries (SEEA-Fisheries)[6] provide details on how these national

accounting concepts are used to compile fishery monetary accounts. The following national accounting concepts are required to compile monetary accounts:

- Output;
- Intermediate consumption;
- Compensation of employees;
- Consumption of fixed capital; and
- Fixed capital stock.

The national accounting concepts mentioned above can be used to populate the asset accounts (industry assets)[6].

3.2.1 Statistics South Africa

In this section the monetary data sources that may be used to populate the fishery monetary and resource rent accounts are explored and discussed. The data are classified according to the Standard Industrial Classification of all Economic Industries (SIC) revision five[7].

3.2.1.1 Gross domestic product

Monetary data were sourced from the gross domestic product (GDP)[8]. The specific national accounting concepts namely: Output at basic prices, intermediate consumption and compensation of employees are available from GDP statistical reports for SIC 1300 'Fishing and fish farming' only.

3.2.1.2 Annual Financial Statistics

The Annual Financial Statistics (AFS)[9] provides the national accounting concepts of consumption of fixed capital and fixed capital stock. AFS data are available at SIC 1300 'Fishing and fish farming' and SIC 3012 'Processing and preserving of fish and fish products'. AFS collects final audited financial data direct from the different role players in the fishing industry, thus making it a reliable data source to utilise for the resource rent accounts.

4. Physical accounts for the South African fishing industry

This section presents the updated physical fishery accounts for hake (*M. capensis* and *M. paradoxus*) and west coast rock lobster (*J. lalandii*). Only physical accounts for hake (*M. capensis* and *M. paradoxus*) and west coast rock lobster (*J. lalandii*) were compiled since these two commercial species (fisheries) account for 80% of the economic contribution to the fishing industry in South Africa. The data for these two commercial species are readily available and of high quality. The data for the physical account are sourced from MARAM.

4.1 Hake

Two species of hake occur off South Africa's coast: shallow water hake (*M. capensis*) and deep-water Cape hake (*M. paradoxus*). Hake (*M. capensis* and *M. paradoxus*) is primarily exported to Europe, mostly Spain, with smaller markets in Australia and the United States of America where it is sold under the collective name of Cape hake[3].

The physical accounts for hake (*M. capensis* and *M. paradoxus*) (refer to Table 3) present data on opening stock, catches, other volume changes and closing stock (exploitable biomass). Catch data are disaggregated into offshore trawl, inshore trawl, long-line and handline. Closing stock (exploitable biomass) is disaggregated into two species of hake namely *M. capensis* and *M. paradoxus*.

The closing stock (exploitable biomass) from 1990 to 1996 recovered to 640 thousand tons (1996). From 1996 to 2006 closing stock (exploitable biomass) declined to 392 thousand tons (2006) but recovered to 572 thousand tons in 2011 (refer to Table 3).

Figure 1 shows the inverse relationship between catch data and the closing stock (exploitable biomass). Catches increased from 137 thousand tons in 1990 to 159 thousand tons in 2001 and decreased to 109 thousand tons in 2009, but recovered to 123 thousand tons in 2011.

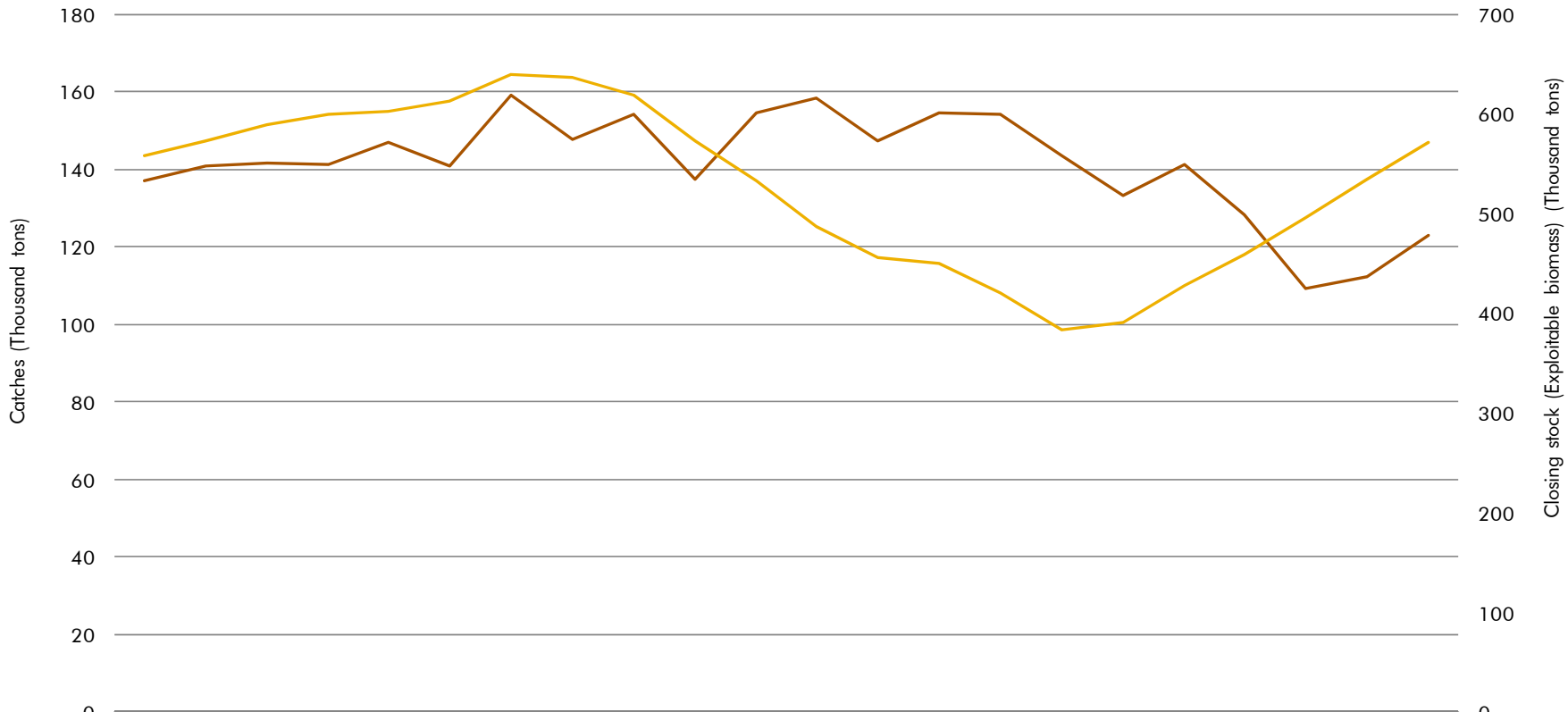
A better picture of the relationship between catch data and closing stock (exploitable biomass) can be seen by analysing the stock levels for an expanded time series. Figure 2 present the hake (*M. paradoxus and M. capensis*) closing stock (exploitable biomass) and catches from 1917 to 2011. With the expanded time series, one can observe the inverse relationship, i.e. as catch levels increase, the level of closing stock (exploitable biomass) decreases.

Table 3: Hake: physical accounts for South Africa, 1990–2011[10]

		Catches					Closing stock (exploitable biomass)		
	Thousand tons								
Year	Opening stock	Offshore trawl	Inshore trawl	Long-line	Handline	Other volume changes	*Merluccius paradoxus*	*Merluccius capensis*	Species combined
1990	541	126	10	0	0	155	271	288	559
1991	559	129	8	3	1	155	277	296	573
1992	573	130	9	2	1	159	287	303	590
1993	590	132	9	0	0	151	287	313	600
1994	600	135	10	2	0	150	277	326	603
1995	603	128	11	2	1	152	288	326	614
1996	614	142	11	4	2	185	321	319	640
1997	640	133	9	4	1	145	322	315	637
1998	637	142	8	2	2	137	308	312	620
1999	620	119	9	7	3	90	266	307	573
2000	573	131	11	7	6	115	237	296	533
2001	533	134	12	6	7	113	218	269	487
2002	487	124	10	11	4	116	219	237	456
2003	456	130	10	12	3	149	232	218	450
2004	450	133	10	10	2	125	223	198	421
2005	421	125	8	11	1	107	207	177	384
2006	384	118	6	9	0	141	223	169	392
2007	392	126	6	8	0	177	255	173	428
2008	428	117	5	6	0	160	271	189	460
2009	460	96	6	7	0	145	275	221	496
2010	496	99	5	7	0	151	276	259	535
2011	535	109	6	8	0	160	276	296	572

Calculations: Statistics South Africa.
Notes: Where figures have been rounded, discrepancies may occur with totals.
Other volume changes are changes in fish stock, such as impacts of natural disasters and natural growth and decline.

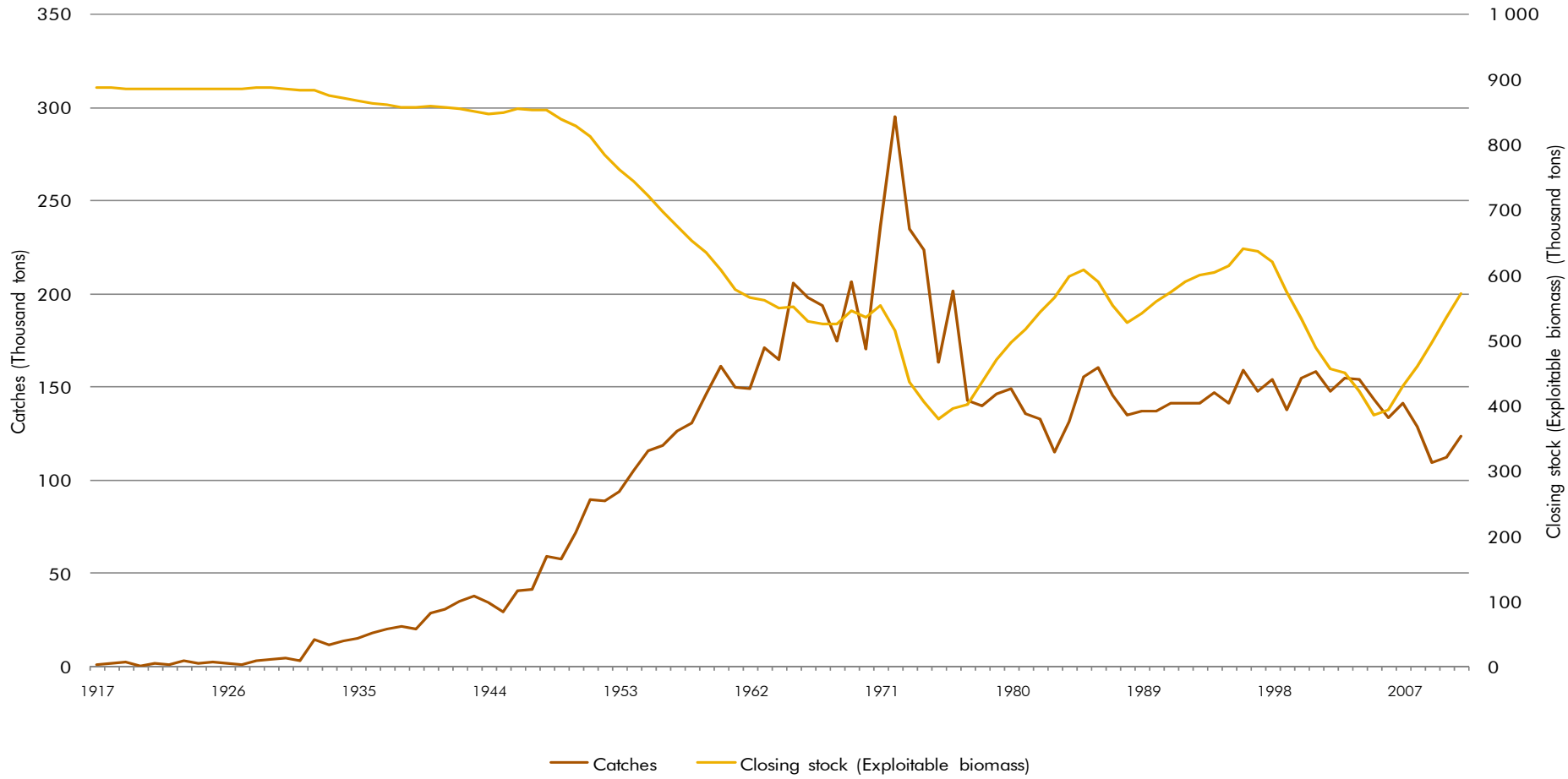
Figure 1: Hake: closing stock (exploitable biomass) and catches, 1990–2011[10]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Catches	137	141	142	141	147	141	159	148	154	137	155	159	147	155	154	144	133	141	128	109	112	123
Closing stock	559	573	590	600	603	614	640	637	620	573	533	487	456	450	421	384	392	428	460	496	535	572

Calculations: Statistics South Africa.

Figure 2: Hake: closing stock (exploitable biomass) and catches, 1917–2011[10]



Calculations: Statistics South Africa.

4.2 West coast rock lobster

The west coast rock lobster (*J. lalandii*) fishery is the most economically important rock lobster fishery in South Africa contributing approximately R260 million per annum in market value[3]. Although considered overexploited, the 2009 assessment showed some improvement since the last assessment in 2006. It is likely that the stock recovery of west coast rock lobster (*J. lalandii*) will continue as long as permit allocations remain at the current sustainable levels[11].

The physical accounts for west coast rock lobster (*J. lalandii*) (refer to Table 4) present data on opening stock, catches (commercial, recreational, poaching and subsistence), other volume changes and closing stock (exploitable biomass). The physical data received from DAFF, has two reference case (RC) models for west coast rock lobster (*J. lalandii*) for poaching estimates and closing stock (exploitable biomass). RC1 receives a 65% weight, and RC2 receives a 35% weight. A single scenario was preferred so averages of the two sets of results with the weights were calculated and presented in Table 4.

The commercial catch has shown fluctuations over the period from 1990 to 2011. In 1990 the commercial catch was 2 996 tons decreasing to the lowest level of 1 610 tons in 2000 and then reaching 3 091 tons in 2006 and down to a level of 1 992 tons in 2011.

Closing stock (exploitable biomass) has shown fluctuations over the period from 1990 to 2011. In 1990 the closing stock (exploitable biomass) was at 21 065 tons reaching 23 071 tons in 1996 and declining to 16 256 tons in 2011.

Figure 3 illustrates the inverse relationship between closing stock (exploitable biomass) and catches. From 1990 to 1992 closing stock (exploitable biomass) and catches followed the same declining trends, with catches at 3 058 tons in 1992 and closing stock (exploitable biomass) at 16 654 tons in 1992. From 1993 to 2000 the catch level dropped to 2 337 tons and the closing stock (exploitable biomass) recovered to 21 575 tons. From 2001 to 2003 the catch levels increased to a level of 3 671 tons with closing stock (exploitable biomass) at a level of 20 935. From 2003 to 2007 the closing stock (exploitable biomass) declined to 16 845 tons, resulting in the catch level surpassing the stock (exploitable biomass) at 2 711 tons. In 2011 both the closing stock (exploitable biomass) at 16 256 tons and catch level at 2 991 tons (Figure 3).

Figure 4 presents the closing stock (exploitable biomass) for the time period of 1910 to 2011. With the extended time series one can observe the depletion in the stock of the west coast rock lobster (*J. lalandii*) over time. In 1910 the closing stock (exploitable biomass) was at 607 703 tons decreasing to 35 405 tons in 1970. The closing stock (exploitable biomass) has since remained stable decreasing to 16 256 tons in 2011.

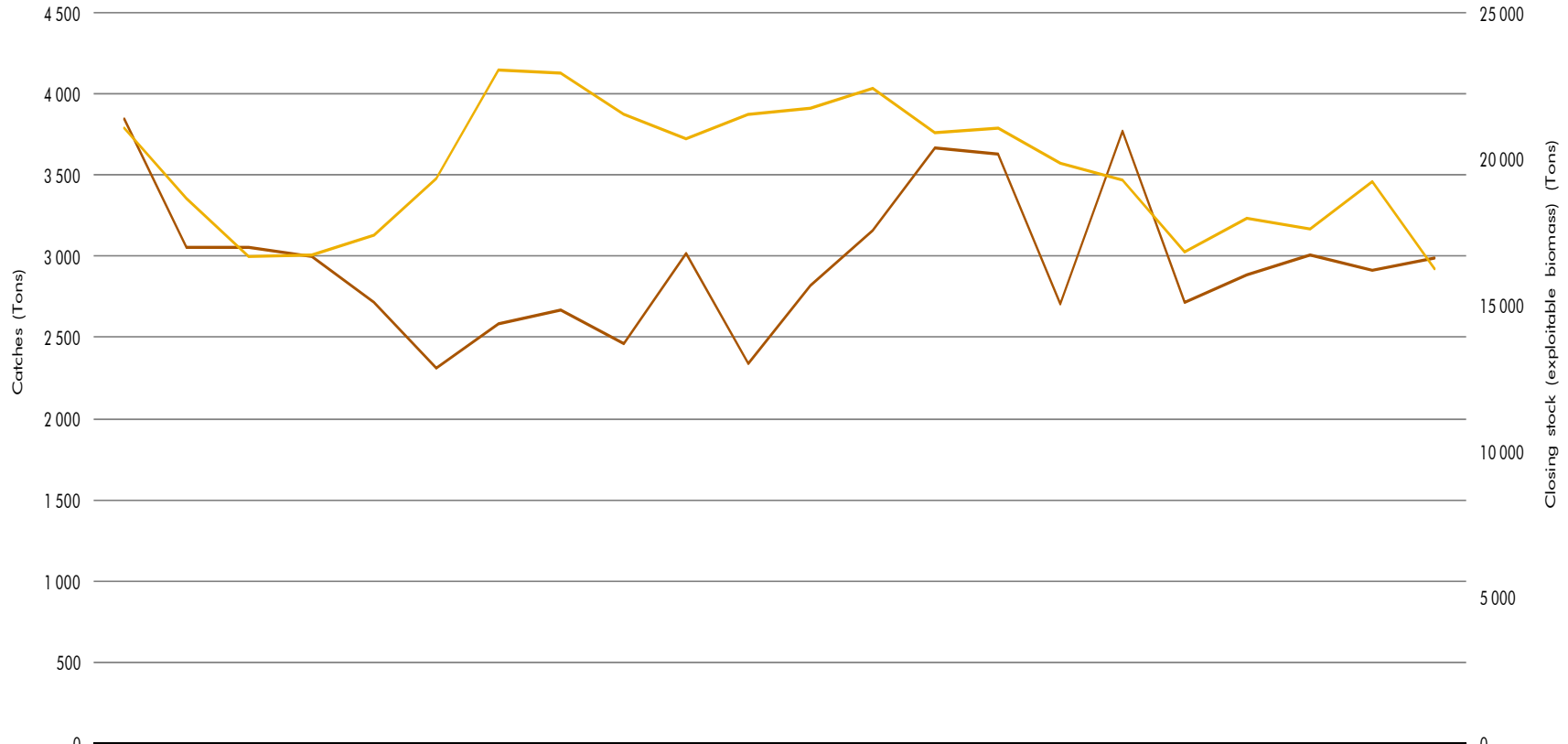
Table 4: West coast rock lobster: physical accounts for South Africa, 1990–2011[10]

Year	Opening stock	Commercial catch	Recreational catch estimate	Poaching estimate	Subsistence catch	Other volume changes	Closing stock (exploitable biomass) (>75mm)
				Tons			
1990	24 851	2 996	441	413	-	64	21 065
1991	21 065	2 480	159	413	-	632	18 646
1992	18 646	2 176	469	413	-	1 065	16 654
1993	16 654	2 197	391	413	-	3 075	16 729
1994	16 729	1 966	336	413	-	3 371	17 386
1995	17 386	1 516	379	413	-	4 272	19 350
1996	19 350	1 674	496	413	-	6 304	23 071
1997	23 071	1 918	340	413	-	2 576	22 977
1998	22 977	1 792	258	413	-	1 051	21 565
1999	21 565	2 315	286	413	-	2 144	20 696
2000	20 696	1 610	314	413	-	3 216	21 575
2001	21 575	2 073	336	413	-	3 026	21 779
2002	21 779	2 462	289	413	-	3 820	22 436
2003	22 436	2 917	341	413	-	2 170	20 935
2004	20 935	3 040	179	413	-	3 750	21 054
2005	21 054	1 998	293	413	-	1 532	19 882
2006	19 882	3 091	212	413	63	3 187	19 290
2007	19 290	1 863	261	413	174	265	16 845
2008	16 845	2 062	243	413	170	4 037	17 995
2009	17 995	2 022	216	489	278	2 638	17 627
2010	17 627	1 979	101	565	270	4 535	19 247
2011	19 247	1 992	183	565	251	0	16 256

Calculations: Statistics South Africa.

Notes: Poaching estimates remains constant due to lack of data.
Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.
Other volume changes are changes in fish stock, such as impacts of natural disasters and natural growth and decline.

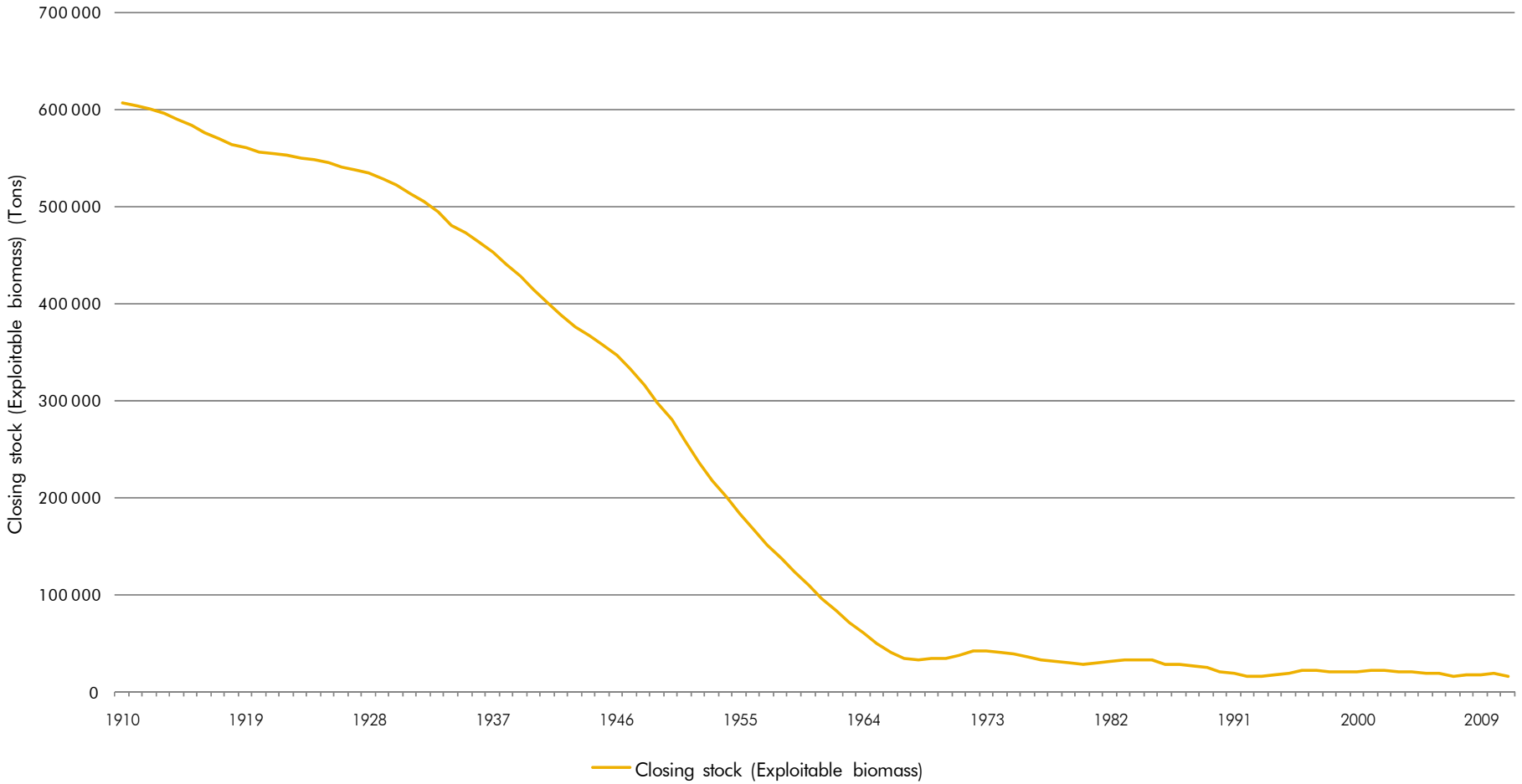
Figure 3: West coast rock lobster: closing stock (exploitable biomass) and catches, 1990–2011[10]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Catches	3 850	3 052	3 058	3 001	2 715	2 308	2 583	2 671	2 463	3 014	2 337	2 822	3 164	3 671	3 632	2 704	3 779	2 711	2 888	3 005	2 915	2 991
Closing stock (Exploitable biomass)	21 065	18 646	16 654	16 729	17 386	19 350	23 071	22 977	21 565	20 696	21 575	21 779	22 436	20 935	21 054	19 882	19 290	16 845	17 995	17 627	19 247	16 256

Calculations: Statistics South Africa.

Figure 4: West coast rock lobster: closing stock (exploitable biomass), 1910–2011[10]



Calculations: Statistics South Africa.

5. Monetary accounts for the South African fishing industry

This section explores the fishery resource rent accounts. Due to data constraints, these are the only monetary accounts that can be developed for the period 2005 to 2010.

5.1 Resource rent accounts

The first step in compiling monetary accounts is to compile the resource rent accounts. The resource rent tables are presented in Table 5.

Two social discount rates (SDR) are applied when estimating resource rents: 10% as a primary rate and 20% as a sensitivity allowance to acknowledge the high risks associated with in the fishing industry[5].

The monetary accounts could not be completed at this time as there is not sufficient disaggregated physical data, which is required to enable a full analysis of the monetary data.

Data for the resource rent accounts were sourced from Stats SA and is only available from 2005 to 2010 for SIC 1300 and SIC 3012. Data for SIC 1300 for the reference period 2005 to 2010 are only available at a national aggregated level, i.e. data cannot be disaggregated for each fishery. The data that are suitable for use to calculate the resource rent are only available for SIC 1300.

The data used to compile Table 5 were sourced from the national accounts (output, intermediate consumption, value added at basic prices and compensation of employees). The national accounting concepts of consumption of fixed capital and fixed capital stock were sourced from the AFS[9]. The national accounting concepts of opportunity cost of capital and rent were calculated (refer to the SEEA-Fisheries[6] for methods of calculations). Unit rent could not be calculated as there was insufficient physical data (catch data) for all species to compile the calculation.

The resource rent at an SDR of 20% for 2005 was -R138 million increasing to R206 million for 2007, dropping to -R104 million in 2008 but increasing again to R1 074 million in 2010 (refer to Table 5). The resource rent at an SDR of 10% was positive for the entire time series. For 2005 the SDR of 10% was R152 million increasing to R1 270 million in 2010.

Figure 5 presents the output, intermediate consumption, value added at basic prices and consumption of fixed capital for all fisheries. Output (turn-over generated by catches), intermediate consumption and value added at basic prices have shown steady increases

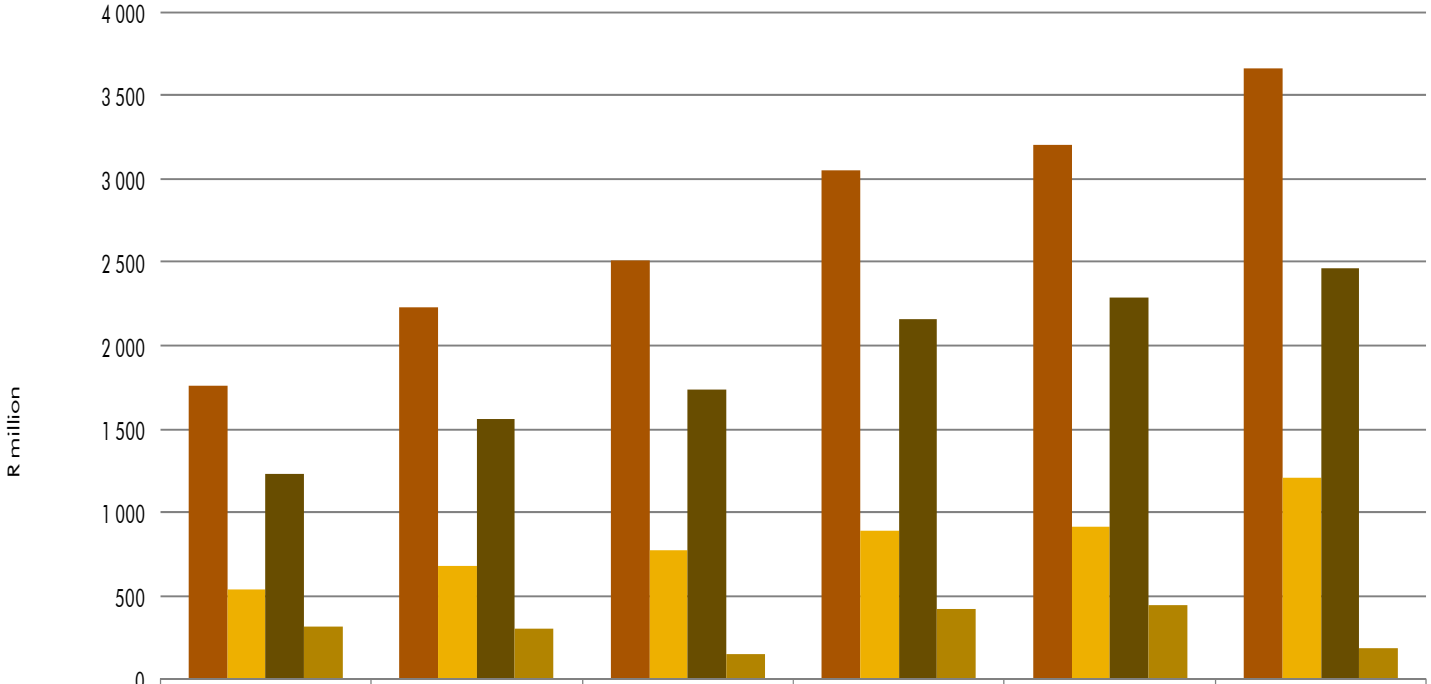
from 2005 to 2010. Consumption of fixed capital exhibited a fluctuating trend from R319 million in 2005 decreasing to R154 million (2007) but recovering to R442 million 2009 then decreasing again to R185 million in 2010.

Table 5: All fisheries: resource rent accounts for South Africa, 2005–2010[8, 9]

	2005	2006	2007	2008	2009	2010
			Rand million			
Output (turnover generated by catch)	1 766	2 241	2 513	3 056	3 211	3 673
Intermediate consumption	536	677	771	897	917	1 208
Value added at basic prices	1 230	1 564	1 742	2 159	2 294	2 465
Compensation of employees (total)	469	511	611	708	792	814
Consumption of fixed capital	319	311	154	429	442	185
Fixed capital cost	2901	2943	3853	5 630	3 438	1 958
Opportunity cost of capital (SDR 10%)	290	294	385	563	344	196
Opportunity cost of capital (SDR 20%)	580	589	771	1 126	688	392
Rent (SDR 10%)	152	448	592	459	716	1 270
Rent (SDR 20%)	-138	153	206	-104	372	1 074

Calculations: Statistics South Africa.

Figure 5: All fisheries: output, intermediate consumption and consumption of fixed capital, 2005–2010[10]



	2005	2006	2007	2008	2009	2010
Output (turnover generated by catch)	1 766	2 241	2 513	3 056	3 211	3 673
Intermediate consumption	536	677	771	897	917	1 208
Value added at basic prices	1 230	1 564	1 742	2 159	2 294	2 465
Consumption of fixed capital	319	311	154	429	442	185

Calculations: Statistics South Africa.

6. Conclusion

In the physical accounts, hake (*M. capensis* and *M. paradoxus*) closing stock (exploitable mass) has shown an increase over the last few years and this can be attributed to the TAC that has helped in managing the catch levels. West coast rock lobster (*J. lalandii*) catches and closing stock (exploitable mass) have stabilised. Resource rent for the fishing industry at both 10% and 20% presented positive values for 2009 and 2010.

Although the fisheries accounts for South Africa has now been improved with the expansion of the resource rent accounts there is still a need for more detailed data sets and accounts. As source data becomes more readily available, both the physical and monetary data will be expanded on.

Although a relatively small industry in the South African economy, there is a need to ensure that it is managed appropriately in a sustainable manner. The fishery accounts serves as a reliable tool to assist informed policy decisions.

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8. Glossary

Term	Description
Account	An account is a tool which records, for a given aspect of economic life, (a) the uses and resources or (b) the changes in assets and the changes in liabilities and/or (c) the stock of assets and liabilities existing at a certain time; the transactions accounts include a balancing item which is used to equate the two sides of the accounts (e.g. resources and uses) and which is a meaningful measure of economic performance in itself.
Bayesian model	In statistics, Bayesian model comparison is a method of model selection based on Bayes factors. It is commonly interpreted as an alternative to hypothesis tests.
Commercial fishing	Commercial fishing refers to the harvesting of fish, either in whole or in part, for sale, barter or trade.
Environmental Economic Accounts (EEA)	EEA brings together economic and environmental information in a common framework to measure the contribution of the environment to the economy, and the impact of the economy on the environment.
Exploitable biomass	Refers to that portion of a stock's biomass that is available to the fishing gear.
Fisheries	The industry or occupation devoted to the catching, processing, or selling of fish, shellfish, or other aquatic animals. A fishery is typically defined in terms of the 'people involved, species or type of fish, area of water or seabed, method of fishing, class of boats, purpose of the activities or a combination of the foregoing features'.
Monetary accounts	Accounts expressed in monetary terms, using only currency as the unit of measure. Monetary is to be taken as synonymous with 'economic value' as understood in economic theory.
National accounts	National accounts are a coherent, consistent and integrated set of macroeconomic accounts; balance sheets and tables based on a set of internationally agreed concepts, definitions, classifications and accounting rules. National accounts provide a comprehensive accounting framework within which economic data can be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policy-making.
Natural Resource Accounting	Natural Resource Accounting is an accounting system that deals with stocks and stock changes of natural assets, comprising biota (produced or wild), subsoil assets (proved reserves), water and land with their aquatic and terrestrial ecosystems. It is frequently

Term	Description
	used in the sense of physical accounting as distinguished from monetary (environmental) accounting.
Natural resources	Natural assets (raw materials) occurring in nature that can be used for economic production or consumption. The naturally occurring assets that provide use benefits through the provision of raw materials and energy used in economic activity (or that may provide such benefits in future) and that are subject primarily to quantitative depletion through human use are subdivided into four categories: mineral and energy resources, soil resources, water resources and biological resources.
Operational management procedure (OMP)	OMP is analogous to a management procedure, except that this term is typically reserved to signify management procedures that have actually been implemented, in contrast to the ones that are conceptual only.
Pelagic	Relates to communities of marine organisms that belong to the open sea, living free from direct dependence on the sea bottom or shore.
Physical accounting	Natural resource and environmental accounting of stocks and changes in stocks in physical (non-monetary) units, for example, weight, area or number. Qualitative measures, expressed in terms of quality classes, types of uses or ecosystem characteristics, may supplement quantitative measures. The combined changes in asset quality and quantity are called volume changes.
Satellite accounts	Satellite accounts provide a framework linked to the central accounts, which enables attention to be focused on a certain field or aspect of economic and social life in the context of national accounts: common examples are satellite accounts for the environment, tourism or unpaid household work.
Spawning biomass	The total weight of all sexually mature fish in a population.
System of Integrated Environmental and Economic Accounts (SEEA)	Satellite system of the System of National Accounts proposed by the United Nations for the incorporation of environment concerns (environmental costs, benefits and assets) into national accounts.
Trawl	A conical fishnet dragged through the water at great depths.