

**SEACHANGE  
(SOCIETY, ECOSYSTEMS AND CHANGE)  
PROGRAMME**

**EXECUTIVE SUMMARY REPORT  
OF THE 2013-2014 GRANT YEAR**

**Compiled by the Knowledge Fields Development Directorate  
National Research Foundation**

**November 2014**



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## 1. PREAMBLE

The National Research Foundation (NRF) compiled this report for the Department of Environmental Affairs (DEA) and the Department of Agriculture, Forestry and Fisheries (DAFF), as part of its programme obligations.

The SEACChange Programme is the successor to the Sea and Coast II Programme and was jointly sponsored by the former DEAT and the NRF. This collaboration was undertaken as a joint venture and the renewed contract for 2007-2010 was formalised in January 2008 when it was signed by Dr Monde Mayekiso, Deputy Director General of the former Marine and Coastal Management of the then DEAT, and Dr Albert van Jaarsveld, who was at the time, Vice-President of the NRF. Both investors saw this collaboration in research funding as a cost-effective and efficient means of attaining the convergent goals of the NRF and DEAT. Since the termination of the contract in 2010 NRF has funded the programme in the interim.

The SEACChange Programme consists of four broad themes, namely:

- **Ecosystems and Change** is concerned with changes in marine ecosystems over space and time, including forecasting on a large spatial scale, the physical and biological explanations for changes such as extreme marine events, harmful algal blooms, low-oxygen events and Benguela Niños.
- **Ecosystems and Society** emphasizes the interactions between natural ecosystems (and parts thereof) and human societies.
- **Ecosystem Functioning** concentrates on explaining the fundamental structure and functioning of ecosystems and the factors that influence the dynamics of these systems.
- **Marine Biotechnology** supports research towards the development of new products and processes involving marine organisms.

## 2. INTRODUCTION

This report summarises investment and output from the SEACChange Programme in the 2013-2014 financial year. This is the final grant year (2013-2014) of the SEACChange Programme. Information on SANCOR's research programmes since 1999 is provided as a background. The information has been sourced from NRF databases and the annual grant-holder reports submitted to the NRF by each grant-holder.

For 2007, the SEACChange Programme was embedded in the Focus Area Programme. Hence the data presented in this report includes data from the Focus Area Programme funding in 2007.

This report presents achievements of the SEACChange Programme NRF, DEA and DAFF joint venture investments in marine and coastal research in South Africa. This joint venture initiative programme supports only a fraction of the total cohort of researchers in the marine and coastal environment in the country. It is therefore important to contextualise the content of this report within the bigger picture at the national scale. Outputs or activities from the programme are, in some cases, not solely funded by the NRF. Grant-holders and student bursary holders may have acquired supplementary funding from their own institutions or other sources which are not reflected in this report. In addition, some students participating on SEACChange projects are not funded through the SEACChange grant-holder-linked bursaries. These students have not been included in this report.

### 3. STATUS OF SEACHANGE PROGRAMME IN 2013

#### 3.1. FUNDING

In 2013 a total of 30 grants were awarded to 28 grant-holders of the SEACChange Programme. The original award by the NRF amounted to R 5.4 million. Table 1 outlines the funding status of the programme during 2013. The actual amount spent paid out to grant-holders was R 4.4 million in addition to a carry forward from the previous year of R 420k. Table 2 outlines the funding history of SANCOR's research programmes since 1999 to 2013.

**Table 1: Summary of the funding status of the 2013-2014 SEACChange Programme**

<b>2013 Initially granted</b>	R 5,447,197.39
<b>2013 Finally awarded</b>	R 4,436,532.26
<b>2012-2013 Grants Carried Forward</b>	R 422,010.97

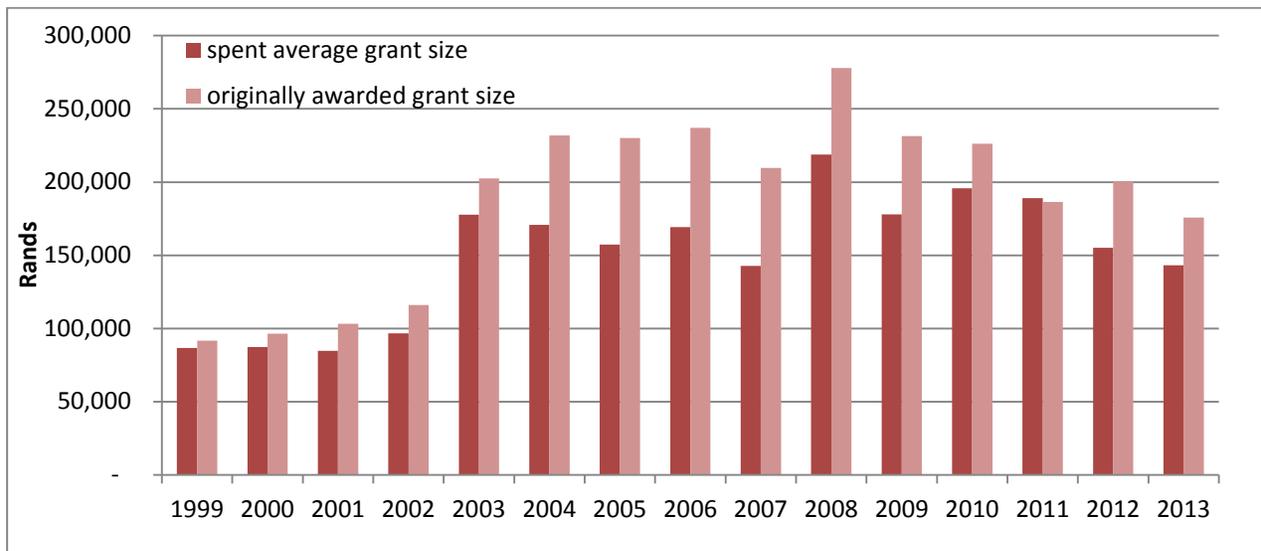
**Table 2: Investor Input and Grant-holder expenditure from 1999-2011**

<b>Programme (Actual expenditure)</b>	<b>Year</b>	<b>Originally awarded (R Million)</b>	<b>NRF's contribution (R Million)</b>	<b>Former DEAT's contribution (R Million)</b>	<b>Actual spent by grant-holders (R Million)</b>
<b>Sea &amp; Coast 1 R 8m</b>	1999	4.8	3.3	1.5	4.5
	2000	4.7	3.3	1.5	4.3
<b>Sea &amp; Coast II R 36.0m</b>	2001	5.1	3.4	1.7	4.2
	2002	5.8	4.0	1.8	4.8

	2003	7.3	5.4	1.9	6.4
	2004	9.0	7.0	2.0	6.7
	2005	9.2	7.1	2.1	6.3
	2006	10.7	9.7	1.0	7.6
<b>SEACHange</b>	2007	10.1	9.1	1.0	6.8
<b>R 38.3m</b>	2008	3.9	2.9	1.0	3.1
	2009	5.6	4.6	1.0	4.3
	2010	7.5	7.5	-	6.5
	2011	7.5	7.6	-	7.6
	2012	7.2	5.6	-	5.6
	2013	5.4	4.4	-	4.4
<b>Total (R million)</b>		<b>103.8</b>	<b>84.9</b>	<b>16.5</b>	<b>83.1</b>

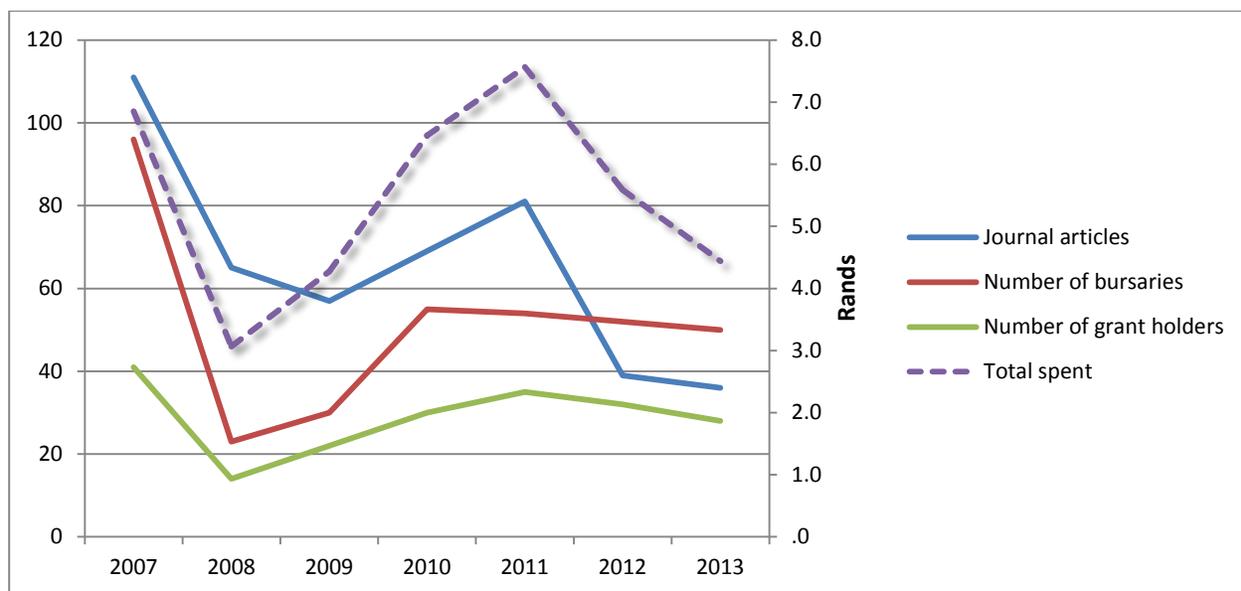
*Note: For each year the unspent grant funds were managed by NRF (GMSA) according to the NRF policies on carryover of research grants.*

In the SEACHange programme, the average size per project was R174k during 2007-2013 (Fig. 1) compared to an average of R142k for the Sea and Coast II Programme (2001-2006). Long-term funding cycles were introduced in 2003. This allowed grant-holders the flexibility to spread their running expenses over the full grant cycle (5 years) with the possibility of carry overs from one year to the next. Such flexibility was not possible with the one year funding cycles.



**Fig. 1: Originally awarded and spent average grant size in SANCOR'S research programmes from 1999 to 2013**

As indicated in Fig. 2, since 2007 a consistent trend emerged, showing that the number of grant-holders supported, the number of bursaries and the the number of journal articles produced were closely related to each other and to the level of investment in the programme. This illustrates the need for extended investment in the programme to further strengthen human capacity development and research outputs in the marine and coastal environment. As many projects in the SEACChange Programme are nearing completion, the number of journal articles have declined. No new calls for proposals were issued since 2012.



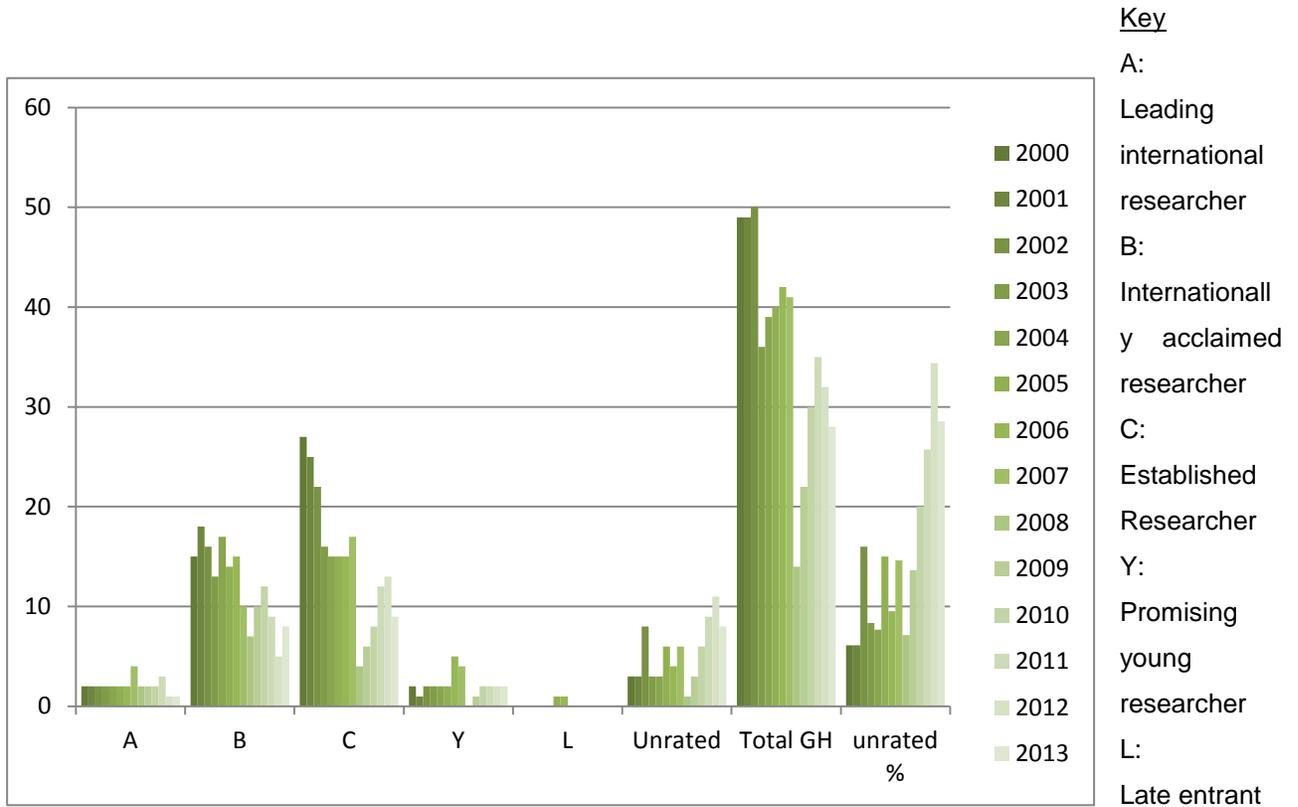
**Fig 2: The investment into and research output of the SEACChange Programme (since its inception in 2007 to 2013)**

### 3.2. RESEARCH OUTPUTS FOR 2013

#### 3.2.1. GRANT-HOLDERS

##### Grant-holder Ratings

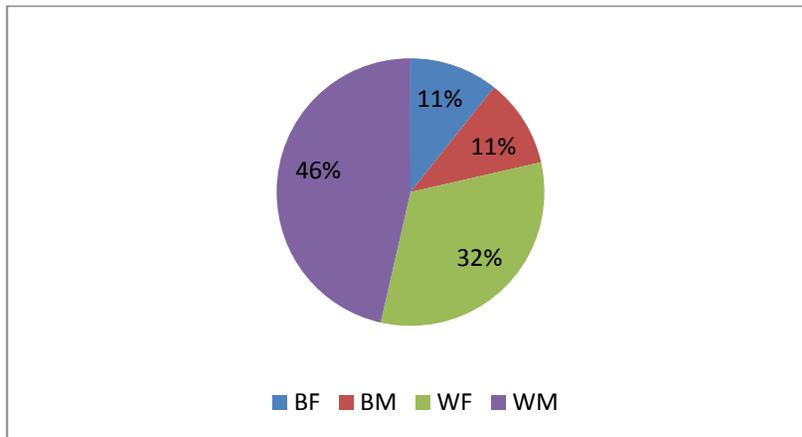
Twenty-eight grant-holders were supported in the SEACChange Programme in 2013, of which 20 were rated by the NRF as follows: A rating- 1; B rating-8; C rating-9, L rating-0 and Y rating- 2 (Fig 3). The number of C- and unrated researchers has steadily increased during 2007-2012, while the number of Y-rated scientists remained the same in the past 4 years. The current profile within this programme will benefit from the NRF's strategic plan whereby rated researchers will receive incentive funding from the NRF in addition to what they could obtain through the SEACChange Programme. Fig 3 also shows that, not only did the Sea and Coast versions of the programme have more researchers, but many of them were B- and C- rated researchers, of which some of them have retired since then.



**Fig. 3: Grant-holder ratings from 1999 to 2013**

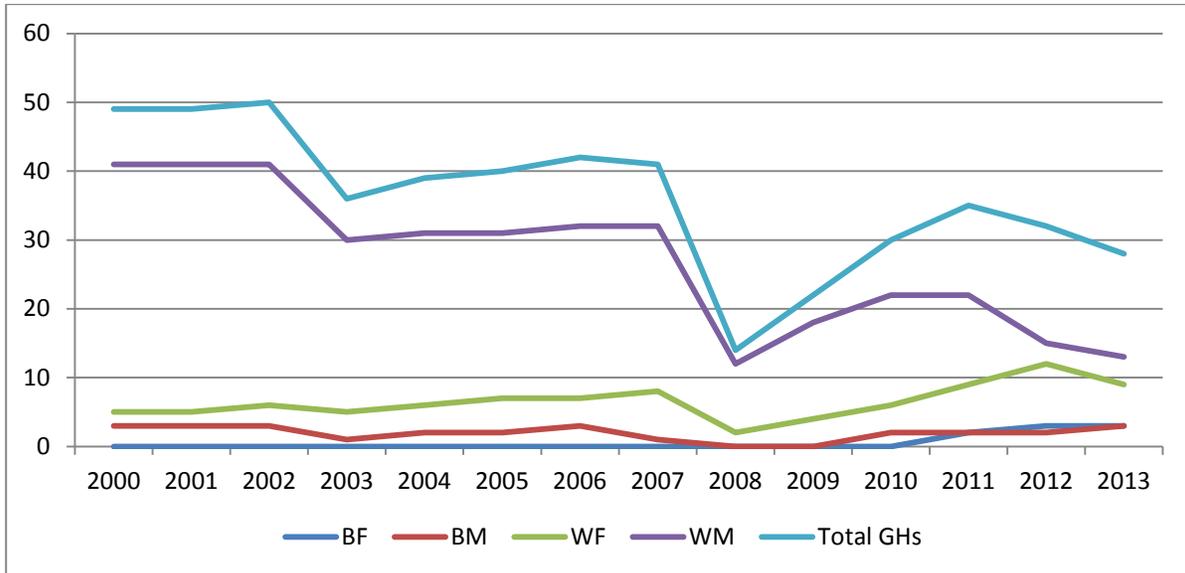
**Demographic Profile of Grant-holders**

Of the 28 principal grant-holders in 2013, three black female, 9 white female researchers, three black male and 13 white male researchers were supported (Fig 4). 2011 saw the first black female grant-holders on SANCOR’s research programme. The number of female researchers has grown moderately since 2008 (Fig 5). There has been a decline in white male grant-holders in 2012, the number of black grant-holders remain low.



**Fig 4 : Demographic profile of grant-holders in 2013**

A study commissioned by SANCOR, to assess marine and coastal research in South Africa over the period 1994 to 2008, has confirmed that the demographics of the marine science community in general has remained relatively unchanged over time. A key finding from this study was that long-term multidisciplinary research programmes (> 5 years) produce the highest number of journal publications and postgraduate students. This result highlights the need for funding agencies to support long-term multidisciplinary studies.



**Fig. 5: SANCOR grant-holders by race and gender from 1999 to 2013**

### 3.2.2. GRANT-HOLDER LINKED BURSARIES

#### Bursaries during 2013-2014

R1.9m was spent on SEACHange grant-holder linked bursaries during the 2013-2014 financial year (Table 3) and a total of R12.8m during 2007-2013. 50 students were supported with these grant-holder linked bursaries, of which 16 were black female, 18 were white female, 8 were black male and 7 were white male. Most of the bursaries supported during 2013 were for masters and undergraduate students (Table 4). In 2013, 68% of the bursary holders were female and 48% were black (Table 5).

#### Bursaries during 2007-2013

During this period a total of 345 bursaries were funded of which 58% were distributed to women and 35% were apportioned to black students. It has been observed that towards the end of a research grant cycle or project, students usually try to secure funding from other sources. Grant-holders have also indicated that some students participating in SEACHange projects are funded by other organizations outside the NRF.

### Progress with transformation

Between 2007 and 2013, the proportion of black students ranged between 22-48% while the proportion of female students comprised 48-68% of the total number of students (Table). Based on these figures, gender transformation has been successful, however racial transformation still needs to be stimulated. Programmes such as the NRF internships play a significant role in exposing science graduates to marine and coastal research and developing research capacity.

**Table 3: Demographic Profile of bursary holders on the SEACChange Programme 2007-2013**

	2007	2008	2009	2010	2011	2012	2013
<b>BF</b>	13	3	3	7	8	11	16
<b>WF</b>	32	8	14	23	21	22	18
<b>BM</b>	16	2	4	11	10	8	8
<b>WM</b>	23	10	9	13	14	10	7
<b>Total number of students = 345</b>	84	23	30	54	53	51	50
<b>Total spent (million rands)= R12.8m</b>	2.1	.7	1.0	2.4	2.4	2.2	1.9

*(includes last year of focus area programme in 2007)*

**Table 4: Student level of SEACChange busary-holders 2013-2014**

Academic level	Number of Students
<b>Undergraduate</b>	11
<b>Honours/B Tech</b>	5
<b>Masters</b>	19
<b>Doctoral</b>	11
<b>Post Doctoral</b>	4

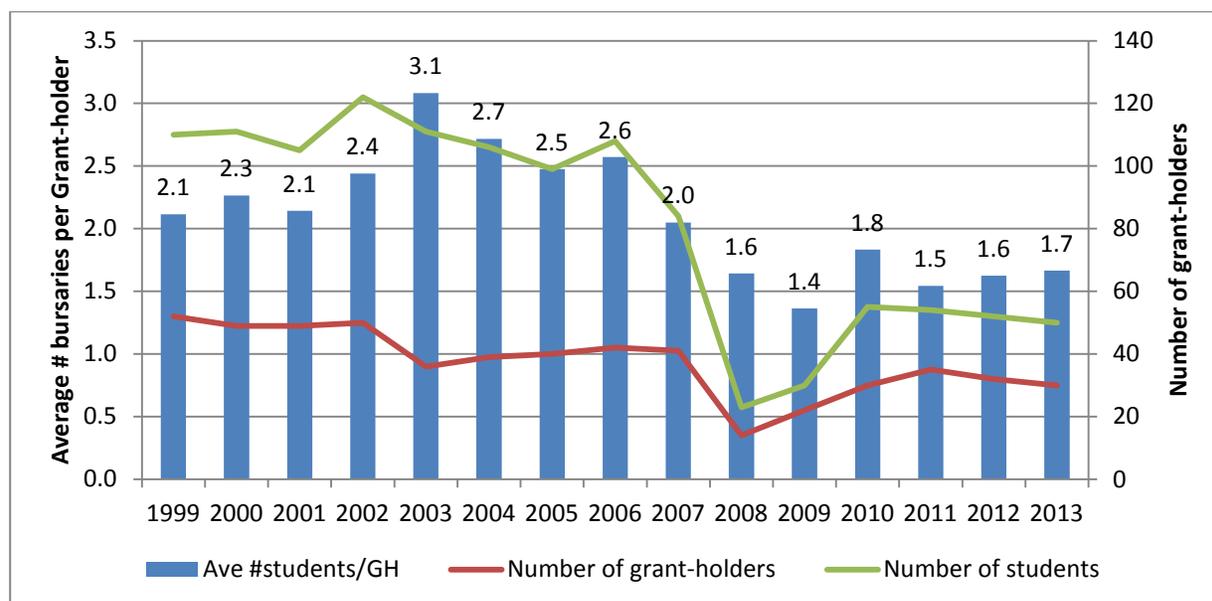
**Table 5: Proportion of black and female students on the SEACChange Programme 2007-2013**

	2007	2008	2009	2010	2011	2012	2013	Total #students = 345
<b>Number of black students</b>	29	5	7	18	18	19	24	120
<b>Percentage black</b>	35%	22%	23%	33%	34%	37%	48%	35%
<b>Number of female students</b>	45	11	17	30	29	33	34	199
<b>Percentage female</b>	54%	48%	57%	56%	55%	65%	68%	58%

*(includes last year of focus area programme in 2007)*

Since 2007 there has been a slight decline in the number of bursaries allocated and this is consistent with a decreasing number of grant-holders (Fig. 6). The average number of bursaries per grant-holder has also decreased since 2004 (Fig. 8). In a recent survey conducted on SEACChange grant-holders, some perceived supervisory capacity as a major challenge which limited the numbers of students. There are several interventions that the NRF has in place to address this apparent stagnation or slight decline of the system namely, the PhD Programme where competitive free-standing bursaries are offered; the increase

in the value of the grant-holder linked bursaries; as well as increasing the student supervisory capacity through the South African Research Chairs and Centres of Excellence Initiatives.



**Fig. 6: Average number of grant-holder linked student bursaries per grant-holder**

#### Graduations (2007-2013)

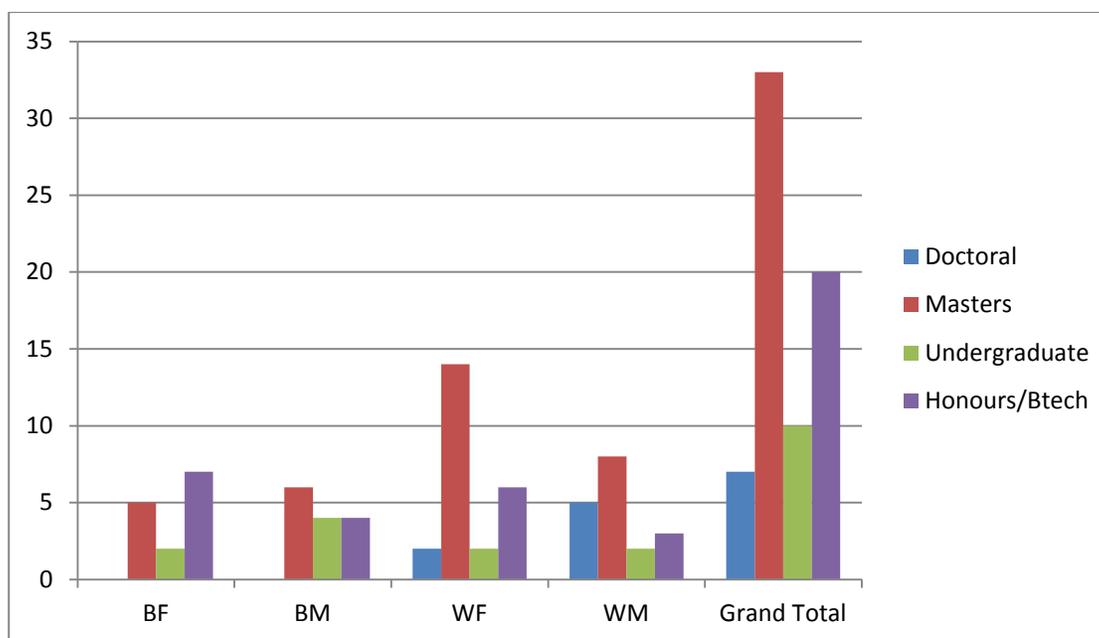
70 graduations were attained on the SEACHange Programme during this period. The demographic breakdown is indicated in Table 6. As indicated in Table 7, there were 38 female graduates (representing 54% of the total graduates) and 28 black graduates (representing 40%). In terms of academic level, 47% of the students graduated with Masters degrees (Fig 7). These figures exclude the 2007 Focus Area Programme.

**Table 6: Graduations on the SEACHange Programme (2007-2013)**

Graduate demography	Doctoral	Masters	Undergraduate	Honours/Btech	Grand Total
BF	0	5	2	7	14
BM	0	6	4	4	14
WF	2	14	2	6	24
WM	5	8	2	3	18
Grand Total	7	33	10	20	70

**Table 7: Proportion of female and black graduates**

	Number of Graduates	Percentage
Females	38	54%
Black	28	40%



**Fig. 7: Number of graduates in the SEACChange Programme (2007-2012)**

### 3.2.3. DISSEMINATION - STIMULATING THE USE OF PUBLICLY FUNDED RESEARCH AND TECHNOLOGY DEVELOPMENT THROUGH:

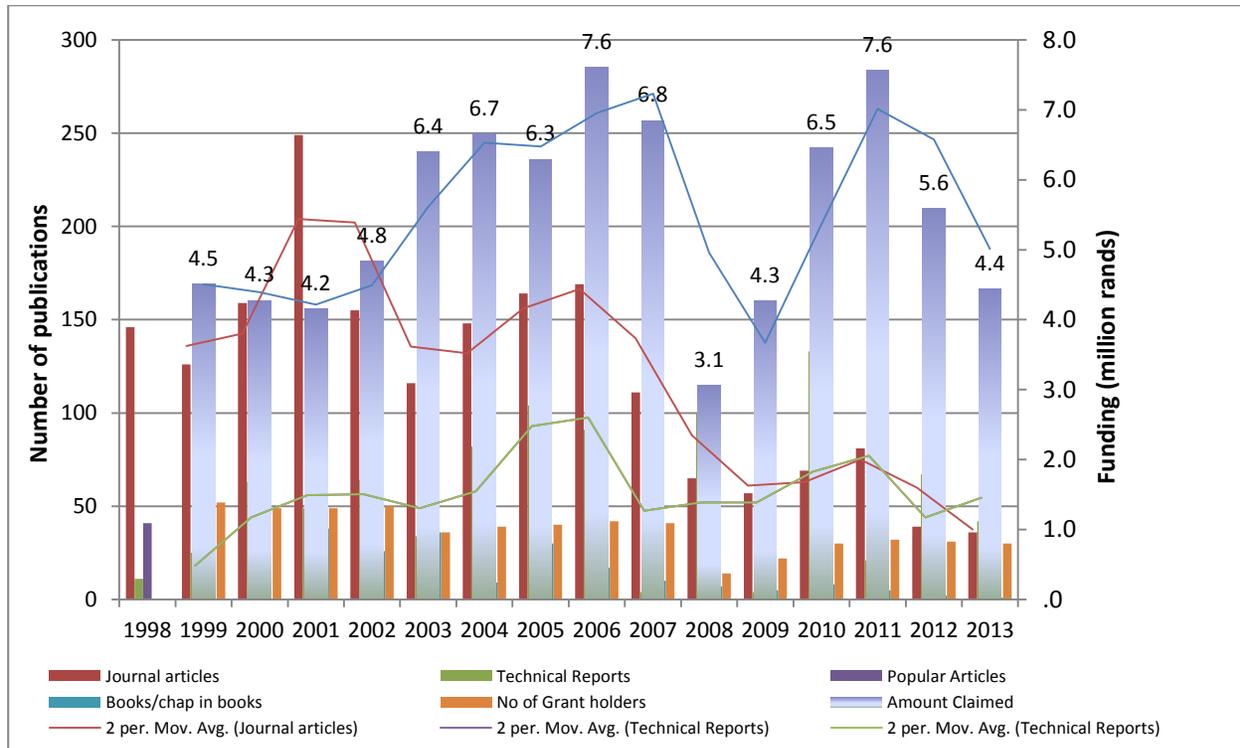
#### Publication output

For the 2013-2014 grant year, grant-holders published 36 peer reviewed articles (Table 8). Fig 8 shows a general decline in publication output by the programme's grant-holders. The publication of peer-reviewed journal articles appears to follow a cyclic pattern of 4-5 years each which is probably a result of research project cycles. The numbers of technical reports, books/chapters in books and popular articles have all declined since 2007. This apparent decline in research productivity could be attributed to many factors including institutional mergers, and increased administrative and teaching loads. However, if South Africa wants to be a competitive contributor to the global knowledge economy we need to increase and improve our knowledge production outputs. The ongoing challenge is to create an enabling environment whereby researchers can flourish. This does not only mean an adequate funding supply but also the support mechanisms for research productivity. SANCOR could potentially play a role in providing this co-ordination and support mechanisms.

**Table 8: Publication output for 2013-2014**

Type of output	Number of publications
Peer-reviewed articles	36
Research based technical reports	42
Chapters in books	1
Other significant conference proceedings	10
Other recognised research output (taxonomic key)	0

Although the number of grant-holders increased steadily in the SEACChange programme between 2008 and 2013 (Fig 11), it is still low in comparison to the Sea and Coast II programme. Despite increased inflation over time, funding levels have not increased significantly in the SEACChange Programme (compared to the previous programme – see Table 2). As seen in Fig 2, the amount of funding impacts the number of grant-holders supported. This will in turn limit the number of publications produced and reduce the number of students supported on the programme.



**Fig. 8: Number of publications from 1997-2012**  
(no stats available for books prior to 2001 and funding before 1999)

Table 9 compares publication outputs from similar programmes during 2013-2014. It does not take into account funding levels or the age of the various programmes.

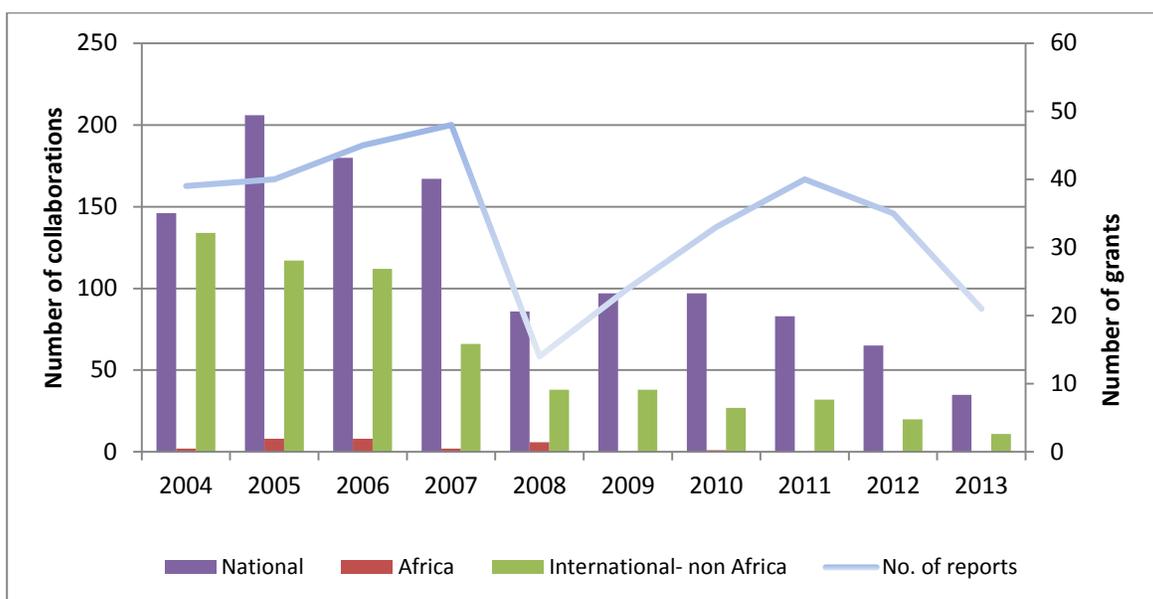
**Table 9: Comparison of publication outputs from similar programmes**

Programme	Number of peer reviewed articles published
<b>SEACChange (2013-2014)</b> Intranet Source: <a href="http://phoenix.nrf.ac.za/mis/APR Data/APROutputs.xlsx">http://phoenix.nrf.ac.za/mis/APR Data/APROutputs.xlsx</a>	36
<b>UCT Marine Research Institute (2013-2014)</b> <a href="http://ma-re.uct.ac.za/wp-content/uploads/2010/04/Ma_Re_ARV12013V5.pdf">http://ma-re.uct.ac.za/wp-content/uploads/2010/04/Ma_Re_ARV12013V5.pdf</a>	126 (All marine research papers with UCT address)

<b>ACEP (2013-2014)</b> <a href="http://www.saiab.ac.za/uploads/files/acep_project_overviews_2014_final.pdf">http://www.saiab.ac.za/uploads/files/acep_project_overviews_2014_final.pdf</a>	30
<b>SAIAB (2013-2014)</b> <a href="http://www.saiab.ac.za/publications-2013.htm">http://www.saiab.ac.za/publications-2013.htm</a>	66

### Collaborations

Collaboration in 2013 has generally decreased and as was the case throughout this programme, grant-holders are still collaborating mainly with national team members and collaborations with other African scientists remain low (Fig 13) despite regional marine programmes in Africa, including BENEFIT, BCLME, ASCLME, IOGOOS and ACEP. It is essential that SANCOR must encourage grant-holders to integrate their projects within regional programmes. This was identified as one of the guiding principles in the SEACChange Programme.



**Fig. 9: Number of collaborations within the SEACChange programme from 2004 to 2013**

### 3.3. SELECTED RESEARCH HIGHLIGHTS

#### ADAMS - Estuary habitats and change

The research on mangroves determined the present state, distribution, population structures of mangroves and identified causes of mangrove loss or gain. The study identified the current threats to mangroves, which are both of anthropogenic and natural change origin. The major findings were that anthropogenic pressures had been more profound and widely distributed than the pressures from natural changes. However if environmental pressures would intensify and coupled with anthropogenic pressures it would accelerate mangrove degradation and loss.

The study presented management recommendations from the findings of this research that would provide decision-makers with the tools for effective management plans and conservation of mangrove ecosystems. The findings of this research will provide input to multi-disciplinary forums such as SANBI's National Biodiversity Assessment and estuary management plans which are a requirement of the Integrated Coastal Management Act of the Department of Environmental Affairs. An understanding of the responses of plants to changes in environmental conditions also provides important input to the Department of Water Affairs' ecological water requirement studies which are conducted to ensure implementation of the National Water Act (Act 36 of 1998).

A database was used to collate available maps indicating habitat distribution and changes over time, species composition and ecophysiological tolerances of estuary plants. This database will be used in the estuary component of the National Biodiversity Assessment of SANBI. This will make a significant contribution to the conservation and management of South African estuaries.

#### **BOLTON - Seaweed chemistry and biosystematics**

- Many species new to science discovered in the Laurencia complex.
- Global collaboration (organised by Dr F Leliaert, University of Alabama USA), of which we are members, has demonstrated over 90 cryptic species in the chemically interesting widespread 'species' *Portieria hornemannii*. Five of them occur in South Africa. Chemical constituents from seaweeds have been tested against anti-cancer stem cell activity (de la Mare et al. 2013).
- We have set up the first group actively carrying out seaweed molecular systematics in South Africa, which in 2014 will comprise a Post Doc, two PhD students and an MSc student. This will have repercussions for discovery of new marine algal diversity in South Africa. This close collaboration of marine biologists and chemists is enabling a much wider range of marine biodiversity to be tested for potential bioactivity.

#### **DAVIES-COLEMAN - Marine Biodiscovery**

Five research highlights were identified in 2013

- Publication of a new oxindole secondary metabolite from a South African marine ascidian.
- Poster presentation of this work at the International Marine Natural Products conference in Spain September, 2013.
- First discovery of the presence of diiodotyramine and three known nucleosides in a South African marine ascidian.
- First discovery of the presence of a polyphenyl marine pollutant in South African marine ascidians.

The major research impact of this project has been to continue to draw attention to the value of South Africa's marine invertebrate resources as a possible new source of medicinally important compounds. In addition to identifying a new class of potential anti-cancer agents in 2012, the mandelalides, this project has also provided the first baseline data set of metal ion accumulation in an African ascidian population and the first discovery in African marine organisms of an organic marine pollutant from the degradation of plastic in sunlight. The development of three new international collaborations in marine biodiscovery plus three publications already published (two further publications in preparation) and a PhD degree (thesis in preparation April 2014) are the academic returns on this research investment.

#### **GRIFFITHS - Marine invertebrate systematics**

- Biccard graduated with MSc in December 2012 and Laird with a PhD in June 2013, with Filander also passing and due to graduate in June 2014.
- Thirteen barnacle species and 12 anemone species recorded for the first time in South Africa and two anemone species described as new to science
- Nineteen urchin species and several starfish species reported as new to South African fauna
- Three amphipod species described as new to science and 13 others as new to region
- Fully illustrated guides to the barnacle, anemone and sea-urchin faunas of the region compiled, with photographs and distribution maps of all species.
- Echinomap Virtual Museum reached 1000 photographic contributions from general public, which have already resulted in discovery of several previously unreported species.
- New species of mysid shrimp discovered and described.

The significance of these achievements lie in two main areas. Firstly there have been significant advances in term of discovery of new biodiversity and description of new species. Of more general use are the keys and identification guides that are a key output of this project and which will allow a wide range of students, consultants and researchers to accurately identify all regional species from these taxa for the first time.

#### **MOLONEY - Ecosystems end to end**

Shannon Hampton's PhD results suggest that, despite some differentiation in sardine between west and south coasts, there is more likely to be genetic differentiation at the level of sample sites than at a larger spatial scale. Such patterns of genetic patchiness provide evidence for sweepstake recruitment of sardine. Sardine showed significant differences in otolith shape between the south coast and other regions. These results contribute to ongoing investigations of whether there are one or two stocks of sardine off South Africa, which is important to resolve for purposes of fisheries management. However, sardine proved to be a difficult species to develop genetic markers for, and further research is needed.

Shannon Hampton's research results are of direct relevance to management of the sardine fishery, as the results tend to support the existence of more than one stock off South Africa.

Grea Groenewald's model of small pelagic fish will contribute to a new modelling study investigating causes of recruitment variability of small pelagic fish off South Africa.

All the postgraduate students funded by this project regularly participate in outreach activities to schools and the general public, including Science Days and volunteer teaching

## **4. CONCLUSION**

This document marks the final phase of the SEACChange Programme. There are a number of issues identified in this document that need to be addressed. In ongoing good will, the investors in SANCOR's research programme (i.e. NRF, DEA and DAFF) together with the SANCOR community will work together to find solutions and/or alternative strategies to address these challenges to make the new programme a success.

## ANNEXURE A

*Individual grant-holder information on the SEACChange Programme for 2013*

GrantHolder	Grant-holder linked bursaries*	Number of published articles
Adams, JB Prof	5	12
Baker, PGL Prof	5	
Bauer, R Dr	2	
Bolton, JJ Prof	4	9
Butterworth, DS Prof		2
Davies-Coleman, MT Prof	1	2
Glassom, D Dr	1	
Green, LJF Prof		
Griffiths, CL Prof		
Iwuoha, EI Prof	5	
Jacobs, K Prof	1	
Meyer, M Dr		
Moloney, CL Dr	3	8
Nel, P Dr	1	
Newman, BK Dr		
Newman, BK Dr		
Perissinotto, R Prof	1	
Pistorius, PA Dr	1	
Rajkaran, A Dr		
Roberts, MJ Prof	1	
Roodt-Wilding, R Prof		
Roychoudhury, AN Prof		1
Simon, CA Dr		
Strydom, NA Dr	5	2
Tuffin, IM Prof	7	
Underhill, LG Prof	2	
Villet, MH Prof	1	
Vosloo, A Dr		1
Wepener, V Prof	4	1
<b>TOTAL</b>	50	38 (2 common articles different grantholders)

\* reflects number of students supported by SEACChange. It does not reflect the number of students participating in the project but funded by other sources.

## APPENDIX 1: GRANTHOLDER DEMOGRAPHICS

GrantHolder	ShortTitle	GHRace	GHGender	GrantID	Awarded	Count	
Adams, JB Prof	Estuary habitats and change	White	Female	148474	218,543.20	A-rated	1
Baker, PGL Prof	Immunosensor for toxins in seawater	Black	Female	148464	261,167.16	B-rated	8
Bauer, R Dr	Bioactive marine products	White	Female	90020	-	C-rated	9
Bolton, JJ Prof	New products: seaweed and urchins	White	Male	68778	60,000.00	Y-rated	2
Bolton, JJ Prof	Seaweed chemistry and biosystematics			159478	294,126.82	Unrated	8
Butterworth, DS Prof	Fisheries Assessment Management	White	Male	79744	159,513.41	White Male	13
Davies-Coleman, MT Prof	Marine Biodiscovery	White	Male	148478	140,280.81	Black Male	3
Glassom, D Dr	Sandy bottom ecology of iSimangaliso	White	Male	160794	147,342.66	White Female	9
Griffiths, CL Prof	Marine invertebrate systematics	White	Male	159474	45,619.65	Black Female	3
Iwuoha, EI Prof	Estrogenic sensorchips	Black	Male	148614	315,585.11	Total GHs	28
Jacobs, K Prof	Microbiology of Abalone	White	Female	79742	175,279.28		
Meyer, M Dr	Bioactive marine products	Black	Male	159486	218,291.80		
Moloney, CL Dr	Ecosystems end to end	White	Female	79740	180,622.96		
Nel, P Dr	Connectivity in beach ecosystems	White	Female	148496	72,567.33		
Perissinotto, R Prof	Lake St Lucia	White	Male	71051	40,000.00		
Roychoudhury, AN Prof	Si isotopes and global change	Black	Male	71065	63,331.40		
Simon, CA Dr	Shell-boring polychaetes on oysters	Black	Female	148608	46,323.29		
Strydom, NA Dr	Estuarine Fish Nurseries	White	Female	159466	511,324.26		
Underhill, LG Prof	Bank Cormorant Conservation Research	White	Male	159470	132,780.07		
Vosloo, A Dr	Thermal adaptation in abalone	White	Male	148488	49,813.38		
Wepener, V Prof	Monitoring of metals and organics	White	Male	245656	295,503.59		
Pistorius, PA Dr	Cape gannets at Bird Island	White	Male	79741	220,000.00		
Villet, MH Prof	SIA of marine fish	White	Male	159472	91,849.64		
Newman, BK Dr	Toxicity test development	White	Male	74303	70,000.00		
Newman, BK Dr	Persistent organic pollutants in coa			74305	70,000.00		
Tuffin, IM Prof	Marine bioproducts by metagenomics	White	Female	159468	334,962.14		
Roodt-Wilding, R Prof	Abalone population genomics	White	Female	71069	57,349.32		
Green, LJF Prof	Fishers Knowledge for EAF	White	Female	70959	109,769.76		
Rajkaran, A Dr	Expansion of mangroves in SA	Black	Female	79731	3,547.02		
Roberts, MJ Prof	Vertical migration of paralarvae	White	Male	159490	51,038.20		
					<b>4,436,532.26</b>		

*Individual grantholder ratings are confidential and are not supplied here*

## APPENDIX 2A: STUDENT DEMOGRAPHICS (2013-2014)

<b>Grantholder Surname</b>	<b>Grant Master</b>	<b>Student Surname</b>	<b>Student Level</b>	<b>Student Race</b>	<b>Student Gender</b>	<b>Total Amount Funded</b>
Adams	74237	Beyers	Honours/B Tech	White	Female	20,000.00
		Mbense	Undergraduate	Black	Female	8,000.00
		NAIDOO	Undergraduate	Black	Female	8,000.00
		PRETORIUS	Masters	White	Female	40,000.00
		Rautenbach	Masters	White	Female	40,000.00
Baker	74232	Baleg	Post Doctoral	Not specified	Male	80,000.00
		France	Undergraduate	Black	Female	8,000.00
		Godo	Undergraduate	Black	Male	8,000.00
		Nohaku	Doctoral	Black	Female	60,000.00
		Phelane	Masters	Black	Female	40,000.00
Bauer	79743	Brown	Doctoral	White	Female	60,000.00
		Janodien	Masters	Black	Female	40,000.00
Bolton	68778	Brand	Doctoral	White	Male	60,000.00
	79739	Adam	Masters	Black	Male	40,000.00
		Francis	Doctoral	Black	Female	60,000.00
Davies-Coleman	74239	Mubaiwa	Masters	Black	Male	40,000.00
		Bromley	Doctoral	White	Female	60,000.00
Glassom	80397	Harmer	Masters	White	Male	40,000.00
Iwuoha	74307	CARELSE	Undergraduate	Black	Female	8,000.00
		Ikpo	Post Doctoral	Black	Female	80,000.00
		MABUYA	Undergraduate	Black	Female	8,000.00
		Mailu	Doctoral	Black	Male	60,000.00
		Nowasha	Undergraduate	Black	Male	8,000.00
Jacobs	79742	LAUBSCHER	Doctoral	White	Female	60,000.00
Moloney	79740	ATKINS	Doctoral	White	Female	60,000.00
		Harikishun	Honours/B Tech	Black	Male	20,000.00
		Kennedy	Honours/B Tech	White	Female	20,000.00
Nel	74248	Bezuidenhout	Doctoral	White	Female	60,000.00
Perissinotto	71051	Fru Azinwi	Masters	Black	Female	40,000.00
Pistorius	79741	POTTER	Masters	White	Female	40,000.00

## APPENDIX 2A: STUDENT DEMOGRAPHICS (2013-2014)

<b>Grantholder Surname</b>	<b>Grant Master</b>	<b>Student Surname</b>	<b>Student Level</b>	<b>Student Race</b>	<b>Student Gender</b>	<b>Total Amount Funded</b>
Roberts	79745	Muller	Masters	White	Male	40,000.00
Strydom	79733	COETZER	Honours/B Tech	White	Female	20,000.00
		Costalago Meruelo	Post Doctoral	White	Male	80,000.00
		Edworthy	Undergraduate	White	Female	8,000.00
		Lemley	Masters	White	Male	40,000.00
		NEL	Masters	White	Female	40,000.00
Tuffin	79734	Black	Post Doctoral	White	Male	80,000.00
		Mankile	Masters	Black	Female	40,000.00
		Matobole	Masters	Black	Male	40,000.00
		NEVONDO	Doctoral	Black	Male	60,000.00
		NTSHINGA	Undergraduate	Black	Female	8,000.00
		Ponco	Undergraduate	Black	Female	4,000.00
		Williams	Undergraduate	Black	Female	8,000.00
Underhill	79735	Botha	Masters	White	Female	40,000.00
		MEYER	Masters	White	Female	40,000.00
Villet	79736	Voogt	Masters	White	Female	40,000.00
Wepener	82959	Coetzee	Masters	White	Female	40,000.00
		Farquharson	Doctoral	White	Female	60,000.00
		Hannam	Honours/B Tech	Black	Female	20,000.00
		JOUBERT	Masters	White	Male	40,000.00
Grand Total						<b>1,924,000.00</b>

## APPENDIX 2B: STUDENT DEMOGRAPHICS SUMMARISED

*SUMMARISED STUDENT BURSAR DEMOGRAPHICS (2007-2013)*

	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>Total</b>
BF	13	3	3	7	8	11	16	61
WF	32	8	14	23	21	22	18	138
BM	16	2	4	11	10	8	8	59
WM	23	10	9	13	14	10	7	86
Total number of students	84	23	30	54	53	51	50	345
Total spent (million rands)	2.1	.7	1.0	2.4	2.4	2.2	1.9	12.8

*PROPORTION OF BLACK AND FEMALE STUDENT BURSARIES (2007-2013)*

	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>Total</b>
Number of black students	29	5	7	18	18	19	24	120
Percentage black	35%	22%	23%	33%	34%	37%	48%	35%
Number of female students	45	11	17	30	29	33	34	199
Percentage female	54%	48%	57%	56%	55%	65%	68%	58%

## APPENDIX 3A: PUBLISHED PEER REVIEWED ARTICLES (2013-2014)

<b>Surname</b>	<b>Grant Master</b>	<b>Description</b>	<b>Volume</b>	<b>Other Authors</b>	<b>Title</b>	<b>PageFrom</b>	<b>PageTo</b>
Adams	74237	Ecological Engineering	51	Shang-Shu Shih, Gwo-Wen Hwang, Janine B. Adams, Hong-Yuan Lee, Chang-Po Chen	The salinity gradient influences on the inundation tolerance thresholds of mangrove forests	59	65
Adams	74237	South African Journal of Botany	84	Tabot, P and JB Adams	Early responses of <i>Bassia diffusa</i> (Thunb.) Kuntze to submergence for different salinity treatments	19	29
Adams	74237	Water SA	39	Bate, GC, PA Smailes and JB Adams.	Epipellic diatoms in the estuaries of South Africa	105	118
Adams	74237	African Journal of Aquatic Science	38	Hoppe-Speer, JB Adams and A Rajkaran.	Response of mangroves to drought and non-tidal conditions in St Lucia Estuary, South Africa.	153	162
Adams	74237	Aquatic Botany	110	D. Vromans, J.B. Adams, T. Riddin	The phenology of <i>Ruppia cirrhosa</i> (Petagna) Grande and <i>Chara vulgaris</i> L in a small temporarily open/closed estuary, South Africa.	1	5
Adams	74237	Biodiversity and Conservation	22	Quisthoudt, K, CF Randin, J B Adams, A Rajkaran, F Dahdouh-Guebas and N Koedam.	Disentangling the effects of global climate and regional land-use change on the current and future distribution of mangroves in South Africa.	1369	1390
Adams	74237	Ocean & Coastal Management	80	Tabot, PT and Adams	Ecophysiology of salt marsh plants and predicted responses to climate change in South Africa.	89	99
Adams	74237	Hydrological Sciences Journal, Special issue: Hydrological Sciences for Environmental Flows,	59	J Adams	A review of methods and frameworks used to determine the environmental water requirements of estuaries.	1	15
Adams	74237	Wetlands	33	Tabot, P and JB Adams	Response of the salt marsh succulent <i>Bassia diffusa</i> (Thunb.) Kuntze to salinity and inundation.	787	797

## APPENDIX 3A: PUBLISHED PEER REVIEWED ARTICLES (2013-2014)

<b>Surname</b>	<b>Grant Master</b>	<b>Description</b>	<b>Volume</b>	<b>Other Authors</b>	<b>Title</b>	<b>PageFrom</b>	<b>PageTo</b>
Adams	74237	Water SA	39	Kaselowski, T and Adams JB.	Not so pristine – characterizing the physico-chemical conditions of an undescribed temporarily open/closed estuary.	627	635
Adams	74237	Estuarine Coastal & Shelf Science	130	Van Niekerk L, Adams JB, Bate GC, Forbes N, Forbes A, Huizinga P, Lamberth SJ, MacKay F, Petersen C, Taljaard S, Weerts S, Whitfield AK and Wooldridge TH.	Country-wide assessment of estuary health: An approach for integrating pressures and ecosystem response in a data limited environment.	239	251
Adams	74237	Southern African Journal of Marine Science	35	Mead, A, C.L. Griffiths, G.M. Branch, C.D. McQuaid L.K.Blamey, J.J. Bolton, R.J. Anderson, F. Dufois, M. Rouault, P.W. Froneman, A.K. Whitfield, L. Harris, R. Nel, D. Pillay & J. Adams.	Human-mediated drivers of change, with emphasis on the impacts to marine biota and ecosystems along the South African coast.	403	425
Bolton	68778	Journal of Applied Phycology		Shuuluka D, Bolton JJ, Anderson RJ	Protein content, amino acid composition and nitrogen-to-protein conversion factors of <i>Ulva rigida</i> and <i>Ulva capensis</i> from natural populations and <i>Ulva lactuca</i> from an aquaculture system, in South Africa.		
Bolton	68778	African Journal of Marine Science	35	Scholtz R, Bolton JJ, Macey B	Effects of different microalgal feeds and their influence on larval development in the white-spined sea urchin <i>Tripneustes gratilla</i> .	25	34
Bolton	68778	Journal of Agricultural Research	8	Amosu AO, Robertson-Andersson DV, Maneveldt GW, Anderson RJ, Bolton JJ	South African seaweed aquaculture: A sustainable development example for other African coastal countries.	5260	5271
Bolton	79739	African Journal of Marine Science	35	Bolton JJ, Davies-Coleman M, Coyne VE	Innovative processes and products involving marine organisms.	449	464

## APPENDIX 3A: PUBLISHED PEER REVIEWED ARTICLES (2013-2014)

<b>Surname</b>	<b>Grant Master</b>	<b>Description</b>	<b>Volume</b>	<b>Other Authors</b>	<b>Title</b>	<b>PageFrom</b>	<b>PageTo</b>
Bolton	79739	S. Afr. J. Botany	86	Brown CA, Maneveldt GW, Bolton JJ, Anderson RJ	Abundance and species composition of non-geniculate coralline algae epiphytic on the South African populations of the rocky shore seagrass <i>Thalassodendron leptocaula</i> MC Duarte, Bandeira & Romeiras	101	110
Bolton	79739	African Journal of Marine Science	35	A Mead, C L Griffiths, G M Branch, C D McQuaid, L K Blameybc, J J Bolton, R J Anderson, F Dufois, M Rouault, P W Froneman, A K Whitfield, L R Harris, R Nel, D Pillay & J B Adams	Human mediated drivers of change - impacts on coastal ecosystems and marine biota of South Africa	403	425
Bolton	79739	Phycologia	52	Mattio L, Zubia M, Loveday B, Crochelet E, Duong N, Payri C, Bhagooli R, Bolton JJ	Sargassum (Fucales, Phaeophyceae) in Mauritius and Reunion, western Indian Ocean: taxonomic revision and biogeography using hydrodynamic dispersal models.	578	594
Bolton	79739	African Journal of Marine Science	35	Browne CM, Milne R, Griffiths C, Bolton JJ, Anderson RJ	Epiphytic seaweeds and invertebrates associated with South African populations of the rocky shore seagrass <i>Thalassodendron leptocaula</i> — a hidden wealth of biodiversity	523	531
Bolton	79739	PLOS ONE	8	Smit AJ, Roberts M, Anderson RJ, Du Fois F, Dudley SFJ, Bornmann TG, Olbers J, Bolton JJ	A coastal seawater temperature dataset for biogeographical studies: large biases between in situ and remotely-sensed data sets around the coast of South Africa	e81944	
Butterwort	79744	Marine Policy	42	Agnew, D., Gutiérrez, N.L. and Butterworth, D.S.	Fish catch data: Less than what meets the eye.	268	269
Butterwort	79744	African Journal of Marine Science	35(3)	de Moor CL, Butterworth DS and Coetzee JC.	Can anchovy age structure be estimated from length distribution data collected during surveys?	335	342

## APPENDIX 3A: PUBLISHED PEER REVIEWED ARTICLES (2013-2014)

<b>Surname</b>	<b>Grant Master</b>	<b>Description</b>	<b>Volume</b>	<b>Other Authors</b>	<b>Title</b>	<b>PageFrom</b>	<b>PageTo</b>
Davies-Col	74239	African Journal of Marine Science		Bolton JJ, Davies-Coleman, MT and Coyne VE	Innovative processes and products involving marine organisms.	449-464	
Davies-Col	74239	South African Journal of Chemistry	66	Bromley, CL, Parker-Nance, S, De La Mare J, Edkins AL, Beukes, DR and Davies-Coleman, MT.	New oxindole from the South African marine ascidian <i>Distaplia skoogi</i>	64	68
Moloney	79740	South African Journal of Science	109 (3/4)	Treasure, A.M., Moloney, C.L., Bester, M.N., McQuaid, C.D., Findlay, K.P., Best, P.B., Dowan, D.A., de Bruyn, P.J.N. et al	South African research in the Southern Ocean: new opportunities and challenges.		
Moloney	79740	ICES Journal of Marine		Wilhelm, M.R., Jean-Paul Roux, J.-P., Moloney, C.L. and Jarre , A.	Data from fur seal scats reveal when Namibian <i>Merluccius capensis</i> are hatched and how fast they grow.		
Moloney	79740	African Journal of Marine Science	35(3)	Moloney, C.L., Coyne, V.E., Griffiths, C.L., Scott, D. and Sowman, M.	Society, marine ecosystems, innovation and change: current states of knowledge.	359	360
Moloney	79740	Deep-Sea Research.	II	José, Y.S., Aumont, O., Machu, E., Penven, P., Moloney, C.L. and Maury, O.	Influence of mesoscale eddies on biological production in the Mozambique Channel: several contrasted examples from a coupled ocean-biogeochemistry model.		
Moloney	79740	Deep-Sea Research	II	Malauene, B.S., Shillington, F.A., Roberts, M.J. and Moloney, C.L.	Cool, elevated chlorophyll a waters off northern Mozambique.		
Moloney	79740	Fisheries Oceanography [doi:10.1111/fog.12046]		Martins, R.S., Roberts, M.J., Lett, C., Chang, N., Moloney, C.L., Camargo, M.G. and Vidal, E.A.G.	Modelling transport of chokka squid ( <i>Loligo reynaudii</i> ) paralarvae off South Africa: reviewing, testing and extending the 'Westward Transport Hypothesis'.		

## APPENDIX 3A: PUBLISHED PEER REVIEWED ARTICLES (2013-2014)

<b>Surname</b>	<b>Grant Master</b>	<b>Description</b>	<b>Volume</b>	<b>Other Authors</b>	<b>Title</b>	<b>PageFrom</b>	<b>PageTo</b>
Moloney	79740	African Journal of Marine Science	35(3)	Moloney, C.L., Fennessy, S.T., Gibbons, M.J., Roychoudhury, A., Shillington, F.A., von der Heyden, B.P. and Watermeyer, K.	Reviewing evidence of marine ecosystem change off South Africa.	427	448
Moloney	79740	Fisheries Research	14	Ndjaula, H.O.N., Gerow, K.G., van der Lingen, C.D., Moloney, C.L., Jarre, A.	Establishing a baseline for evaluating changes in body condition and population dynamics of sardine ( <i>Sardinops sagax</i> ) in the southern Benguela ecosystem.	253	263
Roychoudhury	71065	palaeogeography, palaeoclimatology and palaeoecology	395	A.Baker, J. Routh, M. Blaauw, A.N. Roychoudhury	Geochemical records of palaeoenvironmental controls on peat forming processes in the Mfabeni peatland, Kwazulu Natal, South Africa since the Late Pleistocene	95	106
Strydom	79733	African Journal of Aquatic Science	38(1)	Sutherland, K., Wooldridge, T.H. & Strydom, N.A. 2013.	Spatial and temporal variability in the zooplankton assemblage in the Sundays Estuary.	79	92
Strydom	79733	African Journal of Marine Science	35 (2)	Patrick, P, Strydom, N.A. & Goschen, W.S.	Shallow water nearshore current dynamics in Algoa Bay, South Africa, with notes on the implications for larval fish dispersal.	269	282
Vosloo	74244	Journal of Thermal Biology	38	Vosloo, D., Vosloo, A., Morillion, E.J., Samuels, J.N. and Sommer, P	Metabolic readjustment in juvenile South African abalone ( <i>Haliotis midae</i> ) acclimated to combinations of temperature and dissolved oxygen levels	458	466
Wepener	82959	Water, Air, and Soil Pollution	224(5)	De Klerk, L.P., De Klerk, A.R., Wepener, V.	An assessment of mercury contamination and the relationship between environmental variables and mercury concentrations in a seasonal wetland	1547	1547

## APPENDIX 3B: PUBLISHED CHAPTERS IN BOOK

ReportingYear	2013
OtherAuthors	Wepener, V.
Title	Active Biomonitoring
Description	Encyclopedia of Aquatic Ecotoxicology
Editor	Blaise, Christian; Féraud, Jean-Francois
PageFrom	15
PageTo	20
Beneficiary	North-West University
GrantMaster	82959
Surname	Wepener
Initials	V
Title2	Prof

## APPENDIX 3C: PUBLISHED TECHNICAL REPORTS POLICY STUDIES (2013-2014)

<b>Surname</b>	<b>Grant</b>	<b>Other Authors</b>	<b>Title</b>
Butterworth	79744	Brandão, A., Johnston, S. and Butterworth, D.S.	Updated trends in policing effort and the number of confiscations for West Coast rock lobster. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-WCRL/18: 23pp.
Butterworth	79744	Brandão, A. and Butterworth, D.S.	Trends in policing effort and the number of confiscations for abalone including compliance data until March 2013. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-AB/09: 9pp.
Butterworth	79744	Brandão, A. and Butterworth, D.S.	A "Replacement Yield" model fit to catch and survey data for the South and West coasts kingklip resource of South Africa. DAFF Branch Fisheries document: FISHERIES/2013/SEP/SWG-DEM/51(rev): 12pp.
Butterworth	79744	Brandão, A. and Butterworth, D.S.	Analyses of the Fisheries Independent Monitoring Survey data of the rock lobster resource of South Africa to include the 2012/13 season. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-WCRL/22: 2pp.
Butterworth	79744	Robinson, W. and Butterworth, D.S.	GLMs relating penguin demographics and foraging behaviour to forage fish abundances. DAFF Branch Fisheries document: FISHERIES/2013/FEB/SWG-PEL/ICTT/03: 47pp.
Butterworth	79744	Rademeyer, R.A. and Butterworth, D.S.	Update of the reference set of the Operating Models used in testing candidate OMPs for the South African hake resource. International Stock Assessment Workshop document: MARAM IWS/DEC13/Hake/P7: 7pp.
Butterworth	79744	Maharaj, G., Brandão, A., Burgener, M., Butterworth, D.S. and	Summary of abalone poaching trend estimates as updated in 2013. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-AB/15: 5pp.
Butterworth	79744	Johnston, S.J. and Butterworth, D.S.	Re-tuning of OMP-2011 using updated 2013 operating models for the South Coast rock lobster resource to provide OMP-2013. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-SCRL/11: 4pp.
Butterworth	79744	Johnston, S.J., Butterworth, D.S. and Brandão, A.	OMP 2011 re-tuned to be used for setting TACs for the West Coast rock lobster fishery for the 2013+ seasons. DAFF Branch Fisheries document: FISHERIES/2013/FEB/SWG-WCRL/03: 65pp.
Butterworth	79744	Johnston, S.J. and Butterworth, D.S.	OMP-2011 re-tuned to account for 2012/13 TAC decisions while maintaining an unchanged recovery target. DAFF Branch Fisheries document: FISHERIES/2013/JAN/SWG-WCRL/01: 8pp.

## APPENDIX 3C: PUBLISHED TECHNICAL REPORTS POLICY STUDIES (2013-2014)

<b>Surname</b>	<b>Grant</b>	<b>Other Authors</b>	<b>Title</b>
Butterworth	79744	Ross-Gillespie, A. and Butterworth, D.S.	Incorporating cannibalism and inter-species predation effects into the hake assessment model: Methods and some preliminary results. International Stock Assessment Workshop document: MARAM IWS/DEC13/Ecofish/P10: 14pp.
Butterworth	79744	Ross-Gillespie, A. and Butterworth, D.S.	Update on progress in modelling cannibalism and inter-species predation in Cape hake ( <i>Merluccius</i> spp.). DAFF Branch Fisheries document: FISHERIES/2013/FEB/SWG-DEM/05: 3pp.
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	OMP-13: Further investigation of the anchovy control rule. DAFF Branch Fisheries document: FISHERIES/2013/MAY/SWG-PEL/06: 8pp.
Butterworth	79744	Glazer, J.P. and Butterworth, D.S.	Further squid effort calculations, also taking into account the introduction of small scale fishers as an additional sector in the squid fishery. DAFF Branch Fisheries document; FISHERIES/2013/OCT/SWG-SQ/69: 8pp.
Butterworth	79744	Rademeyer, R.A. and Butterworth, D.S.	List of suggested robustness tests for the revised hake OMP. International Stock Assessment Workshop document: MARAM IWS/DEC13/Hake/P6: 9pp.
Butterworth	79744	Rademeyer, R.A. and Butterworth, D.S.	2013 update of the South African hake reference case assessment. DAFF Branch Fisheries document: FISHERIES/2013/NOV/SWG-DEM/67: 56pp. (Also MARAM IWS/DEC13/Hake/P2)
Butterworth	79744	Rademeyer, R.A. and Butterworth, D.S.	An update of the catchability calibration factor between the Africana with the old and the new gear, with an attempt to estimate its length-dependence. DAFF Branch fisheries document: FISHERIES/2013/NOV/SWG-DEM/66: 10pp. (Also MARAM IWS/DEC13/Hake/P1)
Butterworth	79744	Rademeyer, R.A., Fairweather, T., Glazer, J.P., Leslie, R.L. and Butterworth, D.S.	The 2010 Operational Management Procedure for the South African <i>Merluccius paradoxus</i> and <i>M. capensis</i> resources. DAFF Branch Fisheries document: FISHERIES/2010/OCTOBER/SWG-DEM/59 CORRECTED: 23pp.
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	Interim OMP-13 v2. DAFF Branch Fisheries: FISHERIES/2013/JUL/SWG-PEL/15: 18pp. (Also MARAM IWS/DEC13/Sardine/BG4)

## APPENDIX 3C: PUBLISHED TECHNICAL REPORTS POLICY STUDIES (2013-2014)

<b>Surname</b>	<b>Grant</b>	<b>Other Authors</b>	<b>Title</b>
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	OMP-13: Alternative anchovy control rules. DAFF Branch Fisheries document: FISHERIES/2013/MAY/SWG-PEL/10: 19pp.
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	OMP-13: Initial sardine bycatch limit. DAFF Branch Fisheries document: FISHERIES/2013/MAY/SWG-PEL/09: 2pp.
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	Timeline for remaining OMP-13 development. DAFF Branch Fisheries document: FISHERIES/2013/MAY/SWG-PEL/08: 6pp.
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	Re-considering the appropriate risk level for anchovy in OMP-13 development. DAFF Branch Fisheries document: FISHERIES/2013/APR/SWG-PEL/04: 18pp.
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	Assessment of the South African sardine resource using data from 1984-2011: further results for a two stock hypothesis. DAFF Branch Fisheries document: FISHERIES/2013/FEB/SWG-PEL/01REV: 20pp.
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	Draft two-area harvest control rules for OMP-13. DAFF Branch Fisheries document: FISHERIES/2013/OCT/SWG-PEL/30: 16pp. (Also MARAM IWS/DEC13/Sardine/P3)
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	An alternative relationship to determine future movement of sardine recruits between the “west” and “south” stocks. DAFF Branch Fisheries document: FISHERIES/2013/OCT/SWG-PEL/29: 7pp. (Also MARAM IWS/DEC13/Sardine/P2)
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	OMP-13: Initial results assuming a two sardine stock hypothesis. DAFF Branch Fisheries document: FISHERIES/2013/OCT/SWG-PEL/27: 8pp. (Also MARAM IWS/DEC13/Sardine/BG5)
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	The simulation testing framework used during the development of OMP-13. DAFF Branch Fisheries document: FISHERIES/2013/OCT/SWG-PEL/26: 27pp. (Also MARAM IWS/DEC13/Sardine/BG2)
Butterworth	79744	de Moor, C.L., Butterworth, D.S. and Coetzee, J.C.	Proposals to split sardine catch west and east of Cape Agulhas. DAFF Branch Fisheries document: FISHERIES/2013/SEP/SWG-PEL/24: 8pp. (Also MARAM IWS/DEC13/Sardine/BG3)

## APPENDIX 3C: PUBLISHED TECHNICAL REPORTS POLICY STUDIES (2013-2014)

<b>Surname</b>	<b>Grant</b>	<b>Other Authors</b>	<b>Title</b>
Butterworth	79744	de Moor, C.L. and Butterworth, D.S.	Assessment of the South African sardine resource using data from 1984-2011: results for a two stock hypothesis at the posterior mode. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-PEL/20: 46pp. (Also MARAM IWS/DEC13/Sardine/P1)
Butterworth	79744	Brandão, A. and Butterworth, D.S.	Final results for the abalone spatial- and age-structured assessment model for Zones A, B, C and D in 2013. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-AB/12: 14pp.
Butterworth	79744	Brandão, A. and Butterworth, D.S.	GLMM standardisation of the commercial abalone CPUE for Zones A-D over the period 1980-2012. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-AB/11: 9pp.
Butterworth	79744	Fairweather, T., Rademeyer, R.A. and Butterworth, D.S.	Abundance estimates for hake – Nansen vs Africana. DAFF Branch Fisheries document: FISHERIES/2013/SEP/SWG-DEM/54: 7pp.
Butterworth	79744	de Moor, C.L., Butterworth, D.S. and Coetzee, J.C.	Report back on previous recommendations by the International Review Panel. International Stock Assessment Workshop document: MARAM IWS/DEC13/Sardine/P9: 11pp.
Butterworth	79744	de Moor, C.L., Butterworth, D.S.	Assessment of the South African sardine resource using data from 1984-2011, with some results for a single stock hypothesis. International Stock Assessment Workshop document: MARAM IWS/DEC13/Sardine/BG1: 36pp. (Also DAFF Branch Fisheries document: FISHERIES/2012/SEP/SWG-PEL/48)
Butterworth	79744	de Moor, C.L., Butterworth, D.S. and Robinson, W.M.L.	Further results from future projections of a single or two sardine stock operating model, with initial results using a two-area directed sardine TAC. DAFF Branch Fisheries document: FISHERIES/2013/OCT/SWG-PEL/31 rev: 26pp. (Also MARAM IWS/DEC13/Sardine/P4)
Butterworth	79744	Butterworth, D.S.	On the two-stock sardine model. International Stock Assessment Workshop document: MARAM IWS/DEC13/Sardine/P7: 7pp.

## APPENDIX 3C: PUBLISHED TECHNICAL REPORTS POLICY STUDIES (2013-2014)

<b>Surname</b>	<b>Grant</b>	<b>Other Authors</b>	<b>Title</b>
Butterworth	79744	Butterworth, D.S., Robinson, W.M.L. and Ross-Gillespie, A.	Evaluating the accuracy of hake abundance index predictions using different smoothing techniques. DAFF Branch Fisheries document: FISHERIES/2013/NOV/SWG-DEM/69: 8pp. (Also MARAM IWS/DEC13/Hake/P4)
Butterworth	79744	Butterworth, D.S.	Comments on: Insufficient precautionary management of South Africa's purse-seine fishery for conservation of the African Penguin (FISHERIES/2013/SWG-PEL/ICTT/4) by Pichegru et al. DAFF Branch Fisheries document: FISHERIES/2013/SWG-PEL/ICTT: 20pp.
Butterworth	79744	Butterworth, D.S. and Johnston, S.J.	A proposal for a TAC recommendation for West Coast rock lobster for the 2013/14 season. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-WCRL/27 (Rev+update): 10pp.
Butterworth	79744	Butterworth, D.S.	Proposed steps towards implementing the results from the updated squid assessment. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-SQ/47: 3pp.
Butterworth	79744	Brandão, A. and Butterworth, D.S.	Results for the abalone spatial- and age-structured assessment model for Zones A, B, C and D in 2013. DAFF Branch Fisheries document: FISHERIES/2013/AUG/SWG-AB/12: 15pp.

APPENDIX 4: CONFERENCE ATTENDANCE (2013-2014)					
Surname	Grant	OtherAuthors	Title of Proceeding	Title of Contribution	Country
Meyer	79743	R Bauer, BJ Bladergroen, BG Pollet.	BioH2	Bio-Hydrogen Production in South Africa: Does it make sense?	Montreal, Canada
Meyer	79743	M Smart, R Huddy, S Easton, C Ohlhoff, E Mullapudi1, R Bauer, MI Tuffin and DA Cowan	20th International Symposium on Alcohol Fuels	Saccharification of lignocellulosic feedstocks: From metagenomic gene discovery to enzymatic synergy	Stellenbosch, South Africa
Meyer	79743	S Mackay, EP Gomes, C Holliger, R Bauer, J-P Schwitzguebel	4th International Workshop of COST Action CM0903 (UBIOCHEM)	Bioflocculation of the Microalga Chlorella sorokiniana with the filamentous fungus Isaria fumoroseus through the formation of lichen pellets.	Switzerland
Meyer	79743	DV Robertson-Andersson, AO Amosu, E Kean, GW Maneveldt, R	Aquaculture Conference, Stellenbosch	Industrial scale cultivation of Ulva lactuca for biofuel production. [Oral]	South Africa
Meyer	79743	RK Naidoo, MD Rothman, JJ Bolton, R Bauer.	Aquaculture of brown algae in South Africa. Aquaculture Conference, Stellenbosch	Aquaculture of brown algae in South Africa	
Roychoudhury	71065	Andrea BAKER, Joyanto ROUTH, Nikolai PEDENTCHOUK, Maarten BLAAUW, Alakendra N. ROYCHOUDHURY	International Meeting on Organic Geochemistry	BIOMARKER AND N-ALKANE STABLE CARBON ISOTOPE RECORDS OF CLIMATIC AND ENVIRONMENTAL CONTROLS IN MFABENI PEATLANDS (SOUTH AFRICA) SINCE THE LATE	Canary Islands, Spain
Strydom	79733	Patrick, P.; Strydom, N.A.Ecology of early life history stages of fishes	37th Annual Larval Fish Conference, Miami, Florida.	Ecology of early life history stages of fishes in various habitats in Algoa Bay, South Africa	
Strydom	79733	Deary, A.L.; Patrick, P.; Strydom, N.A.	37th Annual Larval Fish Conference, Miami, Florida	Comparison of the development and ossification of the cranium in two species of South African drum (Sciaenidae), Argyrosomus japonicus and A. thorpei.	
Strydom	79733	Patrick, P.; Strydom, N.A.	37th Annual Larval Fish Conference, Miami, Florida	Occurrence of larval and settlement stage fishes on varying reef types in Aloga Bay, South Africa, with notes on the effectiveness of light traps as a sampling tool.	
Strydom	79733	Nel, L., Bouwman, H & Strydom, N.A.	Sixteenth Biennial International Symposium on Toxicity Assessment (ISTA 16)	Determining the presence, levels and distribution of pollutants in the Swartkops Estuary, South Africa.	Cape Town, South Africa

## APPENDIX 5: EXPENDITURE PATTERNS OF GRANT HOLDERS

Year	Number of grants	Orinally Awarded	Finally awarded	Carry Forward to year	Total expenses (finally awarded +CF)	% spent of awarded	Spent grant size (average)	Originally awarded grant size (average)
1999	52	4,765,000	4,506,164	218,388	4,724,552	95	86,657	91,635
2000	49	4,731,720	4,277,259	71,964	4,349,223	90	87,291	96,566
2001	49	5,059,999	4,156,474	199,231	4,355,705	82	84,826	103,265
2002	50	5,800,619	4,833,849	376,238	5,210,087	83	96,677	116,012
2003	36	7,286,299	6,397,740	372,494	6,770,234	88	177,715	202,397
2004	39	9,039,742	6,659,937	894,240	7,554,177	74	170,768	231,788
2005	40	9,202,764	6,294,640	838,630	7,133,270	68	157,366	230,069
2006	45	10,663,144	7,613,069	1,480,020	9,093,089	71	169,179	236,959
2007	48	10,063,276	6,848,728	1,328,243	8,176,971	68	142,682	209,652
2008	14	3,891,800	3,064,585	101,499	3,166,085	79	218,899	277,986
2009	24	5,554,800	4,271,803	484,425	4,756,227	77	177,992	231,450
2010	33	7,465,172	6,461,273	1,137,064	7,598,338	87	195,796	226,217
2011	40	7,456,695	7,564,240	768,809	8,333,049	101	189,106	186,417
2012	36	7,217,328	5,586,975	1,137,064	6,724,039	77	155,194	200,481
2013	31	5,447,107	4,436,532	422,011	4,858,543	81	143,114	175,713

**APPENDIX 6: ANNUAL PROGRESS REPORT SUBMISSION STATUS**

Surname	Initials	uid	Status	ShortTitle
Adams	JB	74237	Approved	Estuary habitats and change
Bauer			APR submitted	
Baker	PGL	74232	In progress	Immunosensor for toxins in seawater
Bolton	JJ	79739	Approved	Seaweed chemistry and biosystematics
Bolton	JJ	68778	Approved	New products: seaweed and urchins
Butterworth	DS	79744	Approved	Fisheries Assessment Management
Davies-Collier	MT	74239	Approved	Marine Biodiscovery
Glassom	D	80397	Approved	Sandy bottom ecology of iSimangaliso
Green	LJF	70959	None	Fishers Knowledge for EAF
Griffiths	CL	79737	Approved	Marine invertebrate systematics
Iwuoha	EI	74307	None	Estrogenic sensorchips
Jacobs	K	79742	Approved	Microbiology of Abalone
Meyer	M	79743	Approved	Bioactive marine products
Moloney	CL	79740	Approved	Ecosystems end to end
Nel	P	74248	In progress	Connectivity in beach ecosystems
Newman	BK	74303	In progress	Toxicity test development
Newman	BK	74305	None	Persistent organic pollutants in coa
Perissinotto	R	71051	Approved	Lake St Lucia
Pistorius	PA	79741	Approved	Cape gannets at Bird Island
Rajkaran	A	79731	Approved	Expansion of mangroves in SA
Roberts	MJ	79745	Approved	Vertical migration of paralarvae
Roodt-Wilder	R	71069	In progress	Abalone population genomics
Roychoudhury	AN	71065	Approved	Si isotopes and global change
Simon	CA	74304	Approved	Shell-boring polychaetes on oysters
Strydom	NA	79733	Approved	Estuarine Fish Nurseries
Tuffin	IM	79734	Approved	Marine bioproducts by metagenomics
Underhill	LG	79735	None	Bank Cormorant Conservation Research
Villet	MH	79736	Approved	SIA of marine fish
Vosloo	A	74244	Approved	Thermal adaptation in abalone
Wepener	V	82959	Approved	Monitoring of metals and organics

## APPENDIX 7: CONTRIBUTIONS FROM JVAC PARTNES

<b>Year</b>	<b>Originally awarded</b>	<b>NRF's contribution</b>	<b>DEAT's contribution</b>	<b>Actually spent</b>
1999	4,765,000	3,315,000	1,450,000	4,506,164
2000	4,731,720	3,281,720	1,450,000	4,277,259
2001	5,059,999	3,403,999	1,656,000	4,156,474
2002	5,800,619	4,025,619	1,775,000	4,833,849
2003	7,286,299	5,386,299	1,900,000	6,397,740
2004	9,039,742	7,039,742	2,000,000	6,659,937
2005	9,202,764	7,102,764	2,100,000	6,294,670
2006	10,663,144	9,663,144	1,000,000	7,613,069
2007	10,063,276	9,063,276	1,000,000	6,848,728
2008	3,891,800	2,891,800	1,000,000	3,064,585
2009	5,554,800	4,554,800	1,000,000	4,271,803
2010	7,465,172	7,465,172	0	6,461,273
2011	7,456,697	7,564,240	0	7,564,240
2012	7,217,328	5,586,975	0	5,586,975
2013	5,447,107	4,436,532	0	4,436,532
<b>TOTAL</b>	<b>98,198,360</b>	<b>80,344,550</b>	<b>16,331,000</b>	<b>78,536,766</b>

## APPENDIX 8: SUMMARISED ACTIVITY FROM GRANTHOLDERS

<b>Year</b>	<b>Journal articles</b>	<b>Number of bursaries</b>	<b>Number of grant holders</b>	<b>Total spent (million)</b>
1999	126	110	52	4.5
2000	159	111	49	4.3
2001	249	105	49	4.2
2002	155	122	50	4.8
2003	116	111	36	6.4
2004	148	106	39	6.7
2005	164	99	40	6.3
2006	169	108	42	7.6
2007	111	96	41	6.8
2008	65	23	14	3.1
2009	57	30	22	4.3
2010	69	55	30	6.5
2011	81	54	35	7.6
2012	39	52	32	5.6
2013	36	50	28	4.4

## APPENDIX 9: GRADUATIONS 2013-2014

<b>Student Level</b>	<b>Doctoral</b>	<b>Masters</b>	<b>Undergraduate</b>	<b>Honours/Btech</b>	<b>Grand Total</b>
Black					
Female		3		1	4
Male		3	1	1	5
Coloured					
Female		1	1	5	7
Male		3	2		5
Indian					
Female		1	1	1	3
Male			1	3	4
White					
Female	2	14	2	6	24
Male	5	8	2	3	18
<b>Grand Total</b>	<b>7</b>	<b>33</b>	<b>10</b>	<b>20</b>	<b>70</b>