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FOI Number: FOI2016/20

Date: 21 March 2016

Request: All documents that Dr Alex Wonhas prepared for the "internal documenting unit"

in order to comply with any Senate order for the production of documents made in 2016. Any other documents prepared by CSIRO staff that were delivered to CSIRO's internal documenting unit in relation to any Senate Order for the

production of documents made in 2016.

Document(s): Category A

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Oceans and Atmosphere Business Unit Analysis and inputs





Oceans and Atmosphere Impact Strategy

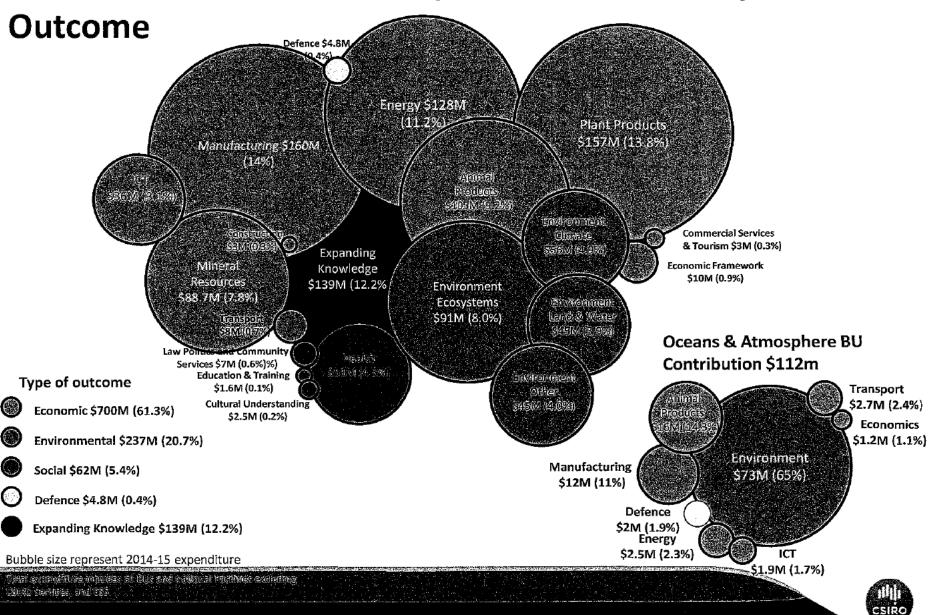
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Source: Business Unit Strategic Plans

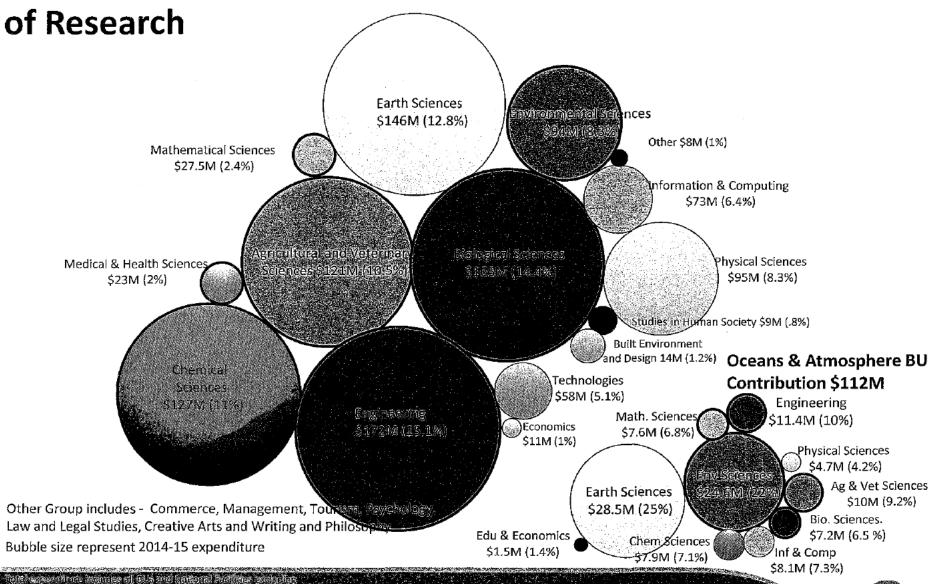


CSIRO & Oceans and Atmosphere Investment by





CSIRO & Oceans and Atmosphere Investment by Field

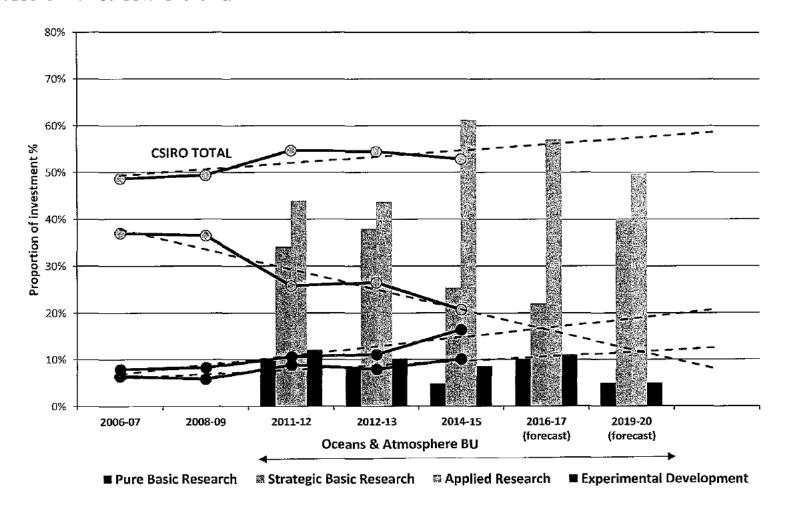


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Oceans and Atmosphere Portfolio by "Type of Activity"

Business Unit vs. CSIRO trend





External Revenue Pipelines

Oceans and Atmosphere Business Unit snapshot as at 31 October 2015

Program	Year Budget	W	ighted Pipelir	iè.	Gap		YTD Budget	YTD Actual	Variance	% of Year's budget earned	Remaining to Earn		Unan	eighted 50.1	62
		Secured	Opportura.	Total		I								X	
Management Oceans and Atmosphere	e	0	0	0	0	I	0	Đ	Đ	0%	е		sec	ures (20,30	•
Doean & Climate Dynamics	7,500	7,059	77	7,136	(364)	L	2,500	2,606	196	35%	4,894				
Earth System Assessment	7,500	5,177	111	5,288	(2,212)		2,500	1,490	(1,010)	20%	6,010				
Coastal Development and Monagement	9,969	5,831	628	6,658	(3,311)		3,323	1,975	(1,348)	20%	7,994				
Marine Resources and fixtustries	10,800	17,500	871	18,371	7,571		3,600	5,063	1,483	47%	5,737		Ar	tual 14,67	
Engineering and Technology	6,500	7,470	18	7,488	988	Ī	2,167	3,539	1,372	54%	2,961				
	42,269	43,037	1,904	44,942	2,673	_	14,690	14,674	584	35%	27,585] Ш			
SSNET EIF Funded Research Infrastructure	CO24	ORC Limited		Qualify	10	1	8,73	ib 8,4	123 8	CSIRC 423	96%	X	X	X	۸
				Stage	to Close (%)	(years)				Ratio t		42		V	X
SSNET EIF Funded Research Infrastructure	CO26	ORC Limited		Qualify	10	1	8,73	60 8,4	122 8	423	96%	X	•	₹%	
ntegrated Pest Management of Crown-of-Thorus	Starfist Reci	and Reinfore	st Research Cen	Create	90	3	4,23	19 3,0	300 E 1,	000	71%				
NESP Biodiversity Director Salary	Unive	reity of Tasm	enia	Quality	60	6	3,56	iš 2,6	X0 [340	57%				
Siobal Ocean Biodiversity Initiative (UK) & Int'l U	nion for 020	Migration - In	temal Use Orly	Cuality	30	3	1,82	85 1,7	765 Ê	595	93%				
									Br.	B0000078(8)					
ÆSP Marine Biodiversity Hub Project A3 - A noti				Qualify	10	2	3,38			SECTIONS	50%				
(ESP Marine Siodiversity Hub Project A3 - A natio (ESP Marine Biodiversity Hub Project - A2 - Quar				Qualify Qualify	10 10	2 3		12 1,1	101	413	50%				
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Oceans and Atmosphere and Program capability mapping

Based on project plan data (2014-15)



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KPI#1: Impact Return on Investment

	Actual		Target			
	2015	2016	2017	2018	2019	2020
CSIRO	4.1	4.1	4.1	4.2	4.2	4.3
OCEANS & ATMOSPHERE	4.6	>4.6	>4.6	>4.6	>4.6	>4.6
Ocean & Climate Dynamics	4.4	4.4	4.4	4.4	4.4	4.4
Earth System Assessment	NA	4.3	4.4	4.4	4.5	4.5
Coastal Development & Management	4.5	4.5	4.5	4.5	4.5	4.5
Marine Resources & Industries	4.7	4.7	4.7	4.7	4.7	4.7
ngineering & Technology	NA	4.1	4.1	4.2	4.2	4.3



KPI#2: Customer Satisfaction

	'Actual '	12		Target		
	2015	2016	2017	2018	2019	2020
CSIRO	8.2	8	8		8	8
OCEANS & ATMOSPHERE	8.2	>8				
Ocean & Climate Dynamics	NA					
Earth System Assessment	NA	9	9	9	9	9
Coastal Development & Management	.NA	NA	NA.	NA.	NA	NA
Marine Resources & Industries	NA	NA .	NA,	.NA	NA	NA
Engineering & Technology	NA	8.6	8.6	8.6	8.6	8.6



KP1#3: Active Licences

	Actual			Target	1 () () () () () () () () () (
	2015	2016	2017	2018	2019	2020	
CSIRO	276	280	290	300	320	350	
OCEANS & ATMOSPHERE	1	2	3	3	. 3	1	
Ocean & Climate Dynamics	NA	NÁ	NA	NA	NA.	NA	
Earth System Assessment	NA	0	0	0,	0	0	
Coastal Development & Management	NA	NA	NA	NA.	NA	NA	
Marine Resources & Industries	NA	NA	NA	NA "	NA	NA.	
Engineering & Technology	NA	1	2	3	3	3	



KPI#4: External Revenue Ratio

	Actual		10 Supplemental (1997)	Target			
	2015	2016	-2017	2018	2019	2020	
CSIRO	38%	39%	40%	41%	43%	45%	
OCEANS & ATMOSPHERE	39%	39%	42%	43%	44%	44%	
Ocean & Climate Dynamics	43%	42%	43%	43%	44%	44%	
Earth System Assessment	29%	33%	35%	36%	36%	36%	
Coastal Development & Management	33%	34%	35%	35%	36%	36%	
Vlarine Resources & Industries	42%	42%	43%	43%	44%	44%	
Engineering & Technology	42%	42%	42%	43%	44%	45%	



KPI#5: Internal & external Collaboration

	Actual			Target		e di Salahan di Salaha
	2015	2016. –	2017	2018	2019	2020
CSIRO	1	1.05	1.1	1.15	1.2	1.25
OCEANS & ATMOSPHERE	NA	NA	NA	NA.	NA	NA
Ocean & Climate Dynamics	NA	· NA	NA _	NA	NA -	NA .
Earth System Assessment	NA	NA	NA	NA	· NA	NA
Coastal Development & Management	.NA	NA	NA	NA	. NA	NA ⁻
Marine Resources & Industries	NA	NA	NA	NA	NA -	NA
Engineering & Technology	NA	NA -	NA	NA	NA	NA



KPI#6: Diversity & Inclusion

	Actual			Target			
	2015	2016	2017	2018	2019	2020	
CSIRO	11	12	13	14	15	16	
OCEANS & ATMOSPHERE	9	>11 :	>11	>11	>11	>11	
Ocean & Climate Dynamics	10	10	11	11	12	13	
Earth System Assessment	10	16	16	17	17	18	
Coastal Development & Management	22	23	24	24	25	25	
Marine Resources & Industries	8	10	10	12	15	16	
Engineering & Technology	5	5	6	6	7	7	



Oceans and Atmosphere and Program Diversity Profile

KPI#6: Diversity & Inclusion (supplementary information)

			Leaders	FTE	All Staff			
	FTE	Female FTE	% Leaders (Female)	NESB FTE	% Leaders (NESB)	Total	ATSI All staff	% All staff
CSIRO	1102	313	28.4%	179	16.2%	5209	63	1.2%
OCEANS & ATMOSPHERE	83	17	20.5%	11	13.3%	405	3	0.7%
Ocean & Climate Dynamics	16	4	25.0%	3	18.8%	71		0.0%
Earth System Assessment	17	2	11.8%	5	29.4%	78	-	0.0%
Coastal Development & Management	17	3	17.6%	2	11.8%	99	3	3.0%
Marine Resources & Industries	15	.3	20.0%		0.0%	79		0.0%
Engineering & Technology	13	2	15.4%	1	7.7%	69		0.0%



KPI#7: Innovation Capacity

	Actual		Target			
	2015	2016	2017	2018	2019	2020
CSIRO	55%	56%	57%	58%	59%	60%
OCEANS & ATMOSPHERE	52%-	54%				
Ocean & Climate Dynamics	52%	52%	53%	53%	55%	55%
Earth System Assessment	52%	55%	55%	60%	60%	60%
Coastal Development & Management	52%	55%	60%	60%	60%	60%
Varine Resources & Industries	52%	55%	60%	60%	60%	60%
Ingineering & Technology	52%	53%	53%	54%	54%	55%



KPI#8: Safety Performance

	Actual			Target			
	2015	2016	2017	2018	2019	2020	
CSIRO	14.2	0	0	0	0	0	
OCEANS & ATMOSPHERE	10	0	0	0	0	0	
Ocean & Climate Dynamics		0	0	0	0	0	
Earth System Assessment		0	0	0	0	0	
Coastal Development & Management		0.	0	0	0	0	
Marine Resources & Industries		0	0	0	0	0	
Engineering & Technology		0	0	0	. 0	0	



Oceans and Atmosphere Budget Validation Template

To be completed by BUs ahead of deep dives

Business Unit Budget Validation	Oceans l	& Atmosp	here					andriae in this process regard			1			
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Year Budget including Strategy	Adjustme	UT2			Budget Validation - Business	Unit to com	ipiet e	en we seek		Variance	Mint National Pro-		eskonigoristero	STATE OF THE REAL PROPERTY.
Oceans & Almosphere	2015/16	2016/17	2017/18	2018/19	Oceans & Almosphere	2015/16	2016/17	2017/18	2018/19	Oceans & Atmosphere	2015/16	2016/17	2017/18	2018/19
Direct Appropriation	26,321	26,724	26,730	27,418	Direct Appropriation				1	Direct Appropriation	- 26,321	- 25,724	- 25,730	- 27,418
external Revenue - CCS	42,554	46,447	48,653	50,594	External Revenue - CCS					External Revenue - CCS	- 42,554	- 46,447	- 48,653	- 50,594
External Revenue - IP	-	-	-	-	External Revenue - IP					External Revenue - IP	-	-	-	-
External Revenue - Other	700	721	743	765	External Revenue - Other					External Revenue - Other	- 700	- 721	- 743	- 765
Total Revenue	€9,575	73,892	76,126	78,777	Total Revenue	-	-	-	-	Total Revenue	- 69,575	- 73,89Z	- 76,126	- 78,777
Labour	49,692	50,882	50,842	51,859	Labour	<u> </u>	İ			Labour	- 49,692	- 50,882	- 50,842	- 51,859
Operating	19,882	22,156	24,336	26,066	Operating	1				Operating	- 19.882	- 22,156	- 24.336	
Total Expenses	69,575	73,038	75,178	77,925	Total Expenses	<u> </u>	-	-	-	Total Expenses	- 69,575	- 73,038	- 75,178	
1000					Additional Capex Requirement					13.419 4				
The second secon						1					; · · · · · · · · · · · ·			
Staffing Levels	2015/16				Staffing Levels	2015/16	2016/17	2017/12	2018/19	Staffing Levels	2015/16			
Target ASI.	389				Target ASL	1	ļ			Target ASL	-389			
YTD Actual - 30/09/15	370				YTD Actual - 30/09/15	370			,	YTD Actual - 30/09/15	0			
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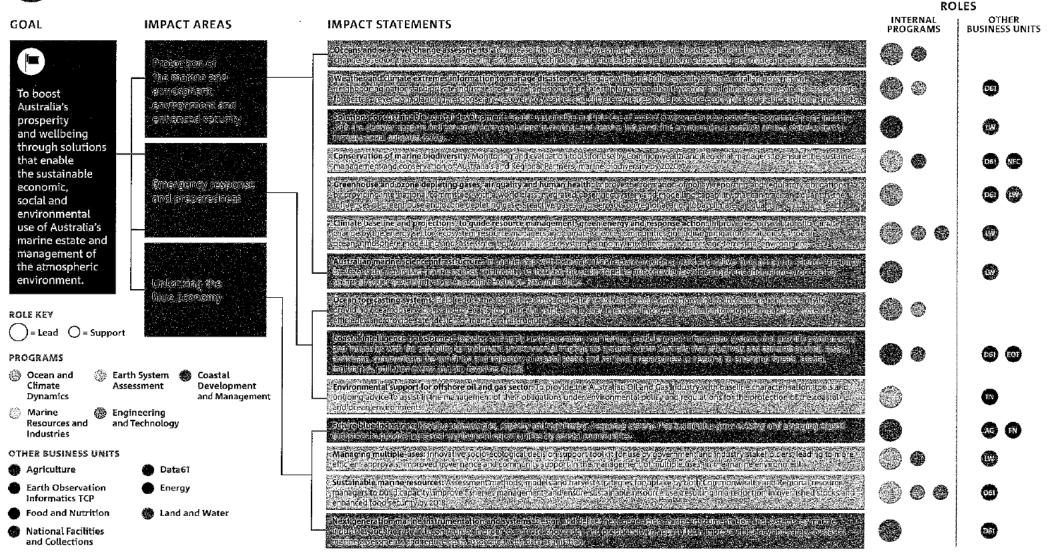
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Oceans and Atmosphere

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Oceans and Atmosphere Budget Validation Template

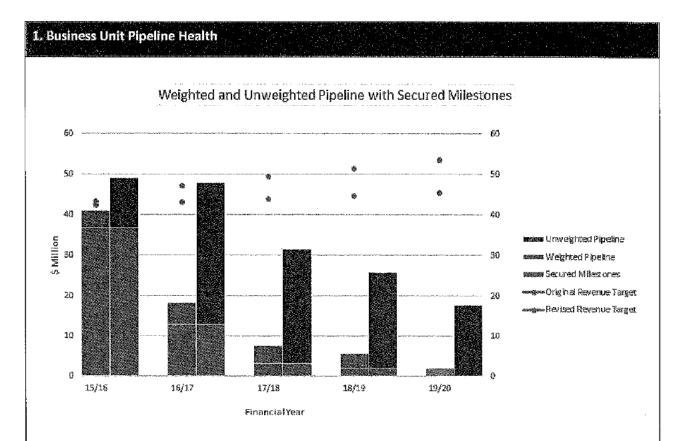
To be completed by BUs ahead of deep dives

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Oceans & Atmosphere	2015/16	2016/17	2017/18	2018/19	Oreans & Atmosphere	2015/16	2016/17	2017/18	2018/19	Oceans & Atmosphere	2015/16	2016
Direct Appropriation	26,321	26,724	26,730	27,418	Direct Appropriation	26,321	l au. Bo	nn <i>i</i> e (Anar		Direct Appropriation	-	
xternal Revenue - CCS	42,554	46,447	48,653	50,594	External Revenue - CCS	42,054	Kensing	Kensington):		External Revenue - CCS	- 500	
xternal Revenue - IP			-	-	External Revenue - IP	-	Based on Nov-15 ERF with			External Revenue - IP	-	
xternal Revenue - Other	700	721	743	765	External Revenue - Other	700		consideration that further pipeline tems will result from		External Revenue - Other	-]	***
otal Revenue	69,575	73,892	76,126	78,777	Total Revenue	69,075	69,075 the FS growth areas.		Total Revenue	- 500		
****			1				Author					
abour	49,692	50,882	50,842	51,859	Labour	49,092	Author	Author:		apon.	- 600	
)perating	19,882	22,156	24,335	26,066	Operating	19,982	Project plans are already over by			perating	100	
Total Expenses	69,575	73,038	75,178	77,925	Total Expenses	69,074	\$1.2M and there could be further collaborator payments fr FY14/15 (~\$1.5M) As at Nov-15, projected savings forecast from Strategic, OCE, CDF was ~\$1.1M so net adjustment is an additional \$100k \$19.982M				- 501	
					Additional Capex				n Strategic,			
					Requirement							
Staffing Levels	2015/16				Staffing Levels	2015/16	2015/17	2017/19	2018/19	Staffing Levels	2015/15	andre a service
Target ASL	38 9			;	Target ASL	386	39 0	390	390	Target ASL	-3	
YTD Actual - 30/09/15	370		et give killet gje ette og fra et eine killegij		YTD Actual - 30/09/15	370		······································		YTD Actual - 30/09/15	0	
					Comments					1	3	
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Brief for Deep Dive Discussions

Oceans and Atmosphere Business Unit



Commentary notes:

The BU will likely reach its original target in 15/16 year but will fall short of revised target. Currently, 85% of revenue (revised target) is secured for this financial year and 12% (revised target) is in pipeline as a weighted value. Performance of individual programs shows normal variability, with two expected to significantly exceed external earnings targets and three currently below.

The situation is anticipated to improve as new projects are coming on line:

- \$7 to ramp up in 16/17 but weighted in the weighted pipeline data.
- ESCC NESP hub to ramp up in 16/17 and weighted in the pipeline data

Changes in government funding for climate research (ACCSP wind up and AUSAID claw back) have impacted on RP1 and RP2 who have traditionally relied on these funds to shore up their pipeline. New funding sources such as the Green Climate Fund (GCF) will assist financial recovery as of 16/17 year; it is currently weighted at 10% in O2D.

2. Big growth opportunities

Oceans and Atmosphere have developed a strategy for sustained growth in external earnings that will enable us to reach the \$54 million target set for 2019/20. This will see incremental increases in our external revenue over the next 4 years. This will be achieved through:

Application of current methods and tools in new markets;

Development of new methods and tools in existing and new markets.

Three growth areas to bring in additional external revenue have been identified:

Integrated assessments for the blue economy – this explicitly couples socio-economic and biophysical considerations. It will require innovative complex systems approaches. It is an area of enormous international focus. Specifically it includes dealing with the "wicked" problem of managing multiple uses, spatial planning, cumulative impacts and Social License to Operate. Target markets are industry and governments in Australia, Asia/Pacific, Canada, the EU and Chile. It is anticipated to deliver additional revenue of up to \$15 million over the next 5 years.

Customers: governments, World Bank, IMF, philanthropic foundations, oil and gas sector, aquaculture industry, specifically:

s7 Integrated Assessments,

- · Spatial planning and livelihoods in Pacific Island Nations
- Cross BU initiative on SLO
- Ecosystem based management in the EU

Oceans and Atmospheric Intelligence - this area will deliver services related to water and air quality, multi-week, seasonal and multi-year forecasting of industry-specific parameters to our climate-exposed economy, using a variety of models, incl. the Australian Community and Earth System Simulator. There will be a clear focus on a variety of sectors, e.g. offshore operations, hazard and emergency response, and disaster risk management. It will build on the game changing Bluelink and eReefs approaches and a significant output in Australia will be an analog of Bluelink/eReefs for the coasts. Target markets include Australia and Chile. It is anticipated to deliver additional revenue of \$10 million over the next 5 years. Customers: oil and gas sector, aquaculture industry, finance and insurance industry, specifically:

- Continuous Water Quality Monitoring, scenarios for Great Barrier Reef, QLD middling Centre -Coastal Intelligence
- Green Climate Fund, RDCs and R&D for Profit: information and services supporting sustainable resilient development in Pacific Small Islands Developing States, Australian and international primary industry
- China interaction with the National Laboratory for Marine Science and Technology

International Fisheries – this area will apply methods developed in Australia (e.g., Atlantis, harvest strategies) to fisheries in Chile, and the Asia-Pacific. It will also see the roll out of new genomic and remote sensing methods in international fisheries. The latter will focus on biomass estimation, chain of custody and provenance, and mitigating illegal, unreported and unregulated fishing activities. Target markets are Chile, the Asia Pacific and Indian Ocean Rim. Anticipated additional revenue is \$15 million over the next 3-5 years.

Customers: international fishing and aquaculture industries, governments, philanthropic foundations, specifically:

- Towards rebuilding Chile's fisheries
- IOTC/EU/FAO stock structure tunas and sharks
- Allen foundation use of satellite tracking to monitor illegal fishing
- Application of Close Kin mark recapture to global tuna fisheries
- Application of gene SNPs technologies to chain of custody and provenance.

In addition we note that:

China is a strategic focus for the business unit. However, additional revenue will be modest in the short term (1-2 years) as relationships are being built along with collaborative programs with government and private sector industries.

Offshore oil and gas – given the downturn in the industry, conservative demands to address knowledge gaps from the regulators, and limited funding available from oil spill response agencies, external earnings are anticipated to be flat over the 4 year period. Our focus will be on continuing building relationships with industry, regulators and spill response agencies to set the BU up for increased revenue in the medium term. Opportunities in metocean services, marine noise, decommissioning and operational discharges are also being explored – in addition to international opportunities under industry led joint venture partnerships.

Several capability and structural opportunities are currently being considered.

A focus on **Climate Services** will see a shift in capability-focus in Programs 1 and 2 from climate change research to meet the growing demand for services for farmers, resource managers, and industries, leading to more efficient primary sectors. Target markets are industries, governments, and EPAs. It is anticipated to deliver over \$20 million over the next 5 years, partially offsetting declines in government funding for climate change research. To realize this it may be necessary to re-shape these programs and this is being actively considered. A reduction in FTEs that are not aligned to these directions is being considered.

RP5 (Engineering and Technology) has a focus on marine infrastructure delivery. While it currently has strong external earnings, it has a small number of large clients (MNF and IMOS). Consequently the costs and benefits of maintaining this program are being evaluated.

3. Portfolio investments shifts

- a) **20% Increase in Appropriation Funding:** Focus on 3 or 4 growth and emerging areas described above would generate a high external earning revenue trajectory. We would proceed with the planned capability reshaping accordingly, and redirect resources to these growth areas.
- b) 20% Decrease in Appropriation Funding:

Option 1: The planned ~20 permanent FTE cuts over this year and next would free up approximately \$2.6 m/year, an equivalent of about 12% of total appropriation. The remaining 8% in option 1 we would anticipate to be replaced by increasing our average external investment ratio.

Option 2: A potential ~34 permanent FTE cuts over this year and next would free up approximately \$4.4 m/year, an equivalent of about 20% of total appropriation. We note that this option would cut into areas which are part of our growth and/or emerging areas, i.e. require a cut to our external targets and as such this option should only be treated as a last resort.

Cost of these cuts would be approx. \$2 m (option 1) or approx. \$3.4 m (option 2) in redundancy over 2 years, with payback within 1-2 years. This will come from specific capability areas deemed unviable and/or staff numbers in access of requirements in the medium to long term, particularly in base-line climate research, plankton dynamics and Earth system assessment.

The 'rationale' for identifying numbers of redundancies is to release capability that is no longer in demand or consistent with O&A's Strategic Plan to grow the income by the amount required, i.e. we will free up some capability and hire additional capability in specific areas where will achieve that financial growth.

4. Other issues

Cross-BU opportunities: implementation of growth areas offers opportunities for cross-BU collaboration to maximise customer satisfaction and revenue. Examples are:

- O&A's coordinating role in addressing industry-community impacts and social license to operate (Data 61, L&W, Agriculture etc.);
- Expanding environmental assessments to include other BUs, e.g. Manufacturing. O&A would do the environmental assessments of tools and processes developed by Manufacturing.

International: corporate CSIRO and O&A need to actively consider how O&A can operate in EU and China with expected significant returns on investments (overcome organisational hurdles, clarify taxation issues etc.).

Publicly Funded Research Agencies: explore potential for revised relationships and increased collaborative revenue under proposed new bilateral collaboration agreements with GA, BoM, AIMS etc.

Paris Climate Conference 2015: Shifts in RP1 and RP2 capabilities will ensure core climate capabilities in place to pick-up potential funding improvement in the post-COP21 environment.



Handout for Deep Dive Discussions

Oceans and Atmosphere Business Unit

16/17

17/18 FinancialYear

Commentary notes:

15/16

10

The BU will likely reach its original target in 15/16 year but will fall short of revised target. Currently, 85% of revenue (revised target) is secured for this financial year and 12% (revised target) is in pipeline as a weighted value. Performance of individual programs shows normal variability, with two expected to significantly exceed external earnings targets and three currently below.

18/19

10

19/20

The situation is anticipated to improve as new projects are coming on line:

- 57 to ramp up in 16/17 but weighted in the weighted pipeline data.
- ESCC NESP hub to ramp up in 16/17 and weighted in the pipeline data

Changes in government funding for climate research (ACCSP wind up and AUSAID claw back) have impacted on RP1 and RP2 who have traditionally relied on these funds to shore up their pipeline. New funding sources such as the Green Climate Fund (GCF) and other anticipated initiatives from the Paris Climate Conference may assist towards some financial recovery beginning in FY 16/17.

2. Big growth opportunities

Oceans and Atmosphere have developed a strategy for sustained growth in external earnings that will enable us to reach the \$54 million target set for 2019/20. This will see incremental increases in our external revenue over the next 4 years. This will be achieved through realignment of our capability to:

• Expand the use of current methods and tools in new markets;

Develop new methods and tools for application in existing and new markets.

Three growth areas to bring in additional external revenue have been identified:

Integrated Assessments for the Blue Economy – this explicitly couples socio-economic and biophysical considerations. It will require innovative complex systems approaches. It is an area of enormous international focus. Specifically it includes dealing with the "wicked" problem of managing multiple uses, spatial planning, cumulative impacts and Social License to Operate (SLO). Target markets are industry and governments in Australia, Asia/Pacific, Canada, the EU and Chile. It is anticipated to deliver additional revenue of up to \$15 million over the next 5 years.

Customers: governments, World Bank, IMF, philanthropic foundations, oil and gas sector, aquaculture industry, specifically:

s7 - Integrated Assessments in Chile

- Spatial planning and livelihoods in Pacific Island Nations
- · Cross BU initiative on SLO
- Ecosystem based management in the EU

Oceans and Atmospheric Intelligence - this area will deliver "tailored services for customers" related to water and air quality, multi-week, seasonal and multi-year forecasting of industry-specific parameters to our climate-exposed economy, using a variety of models, incl. the Australian Community and Earth System Simulator. There will be a clear focus on a variety of sectors, e.g. offshore operations, hazard and emergency response, and disaster risk management. It will build on the game changing Bluelink and eReefs approaches and a significant output in Australia will be an analog of Bluelink/eReefs for the coasts. Target markets include Australia and Chile. It is anticipated to deliver additional revenue of \$10 million over the next 5 years.

Customers: oil and gas sector, aquaculture industry, finance and insurance industry, specifically:

- Continuous Water Quality Monitoring, scenarios for Great Barrier Reef, QLD Middling Centre -Coastal Intelligence
- Green Climate Fund, RDCs and R&D for Profit: information and services supporting sustainable resilient development in Pacific Small Islands Developing States, Australian and international primary industry
- the eco and geo-engineering sector
- China interaction with the National Laboratory for Marine Science and Technology

International Fisheries – this area will apply methods developed in Australia (e.g., Atlantis, harvest strategies) to fisheries in Chile, and the Asia-Pacific. It will also see the roll out of new genomic and remote sensing methods in international fisheries. The latter will focus on biomass estimation, chain of custody and provenance, and mitigating illegal, unreported and unregulated fishing activities. Target markets are Chile, the Asia Pacific and Indian Ocean Rim. Anticipated additional revenue is \$15 million over the next 3-5 years.

Customers: international fishing and aquaculture industries, governments, philanthropic foundations, specifically:

- Towards rebuilding Chile's fisheries
- Indian Ocean Tuna Commission (IOTC)/EU/FAO stock structure tunas and sharks
- Allen foundation use of satellite tracking to monitor illegal fishing
- Application of Close Kin mark recapture to global tuna fisheries
- Application of gene SNPs technologies to chain of custody and provenance.

In addition we note that:

China is a strategic focus for the business unit. A number of LOIs and MOUs have recently been signed (e.g., Chinese Academy of Sciences, State Oceanic Administration. Ocean College, Zhejiang University, etc.). Serious consideration is being given to establish an office in Qingdao — China's emerging centre for marine science and technology. While external revenue will be modest in the short term (1-2 years), it is expected to increase with the establishment of joint collaborative programs with government and private sector industries.

Offshore oil and gas – given the downturn in the industry, conservative demands to address knowledge gaps from the regulators, and limited funding available from oil spill response agencies, external eargings are anticipated to be flat over the 4 year period. Our focus will be on continuing building relationships

with industry, regulators and spill response agencies to set the BU up for increased revenue in the medium term. Opportunities in metocean services, marine noise, decommissioning and operational discharges are also being explored – in addition to international opportunities under industry led joint venture partnerships.

Several capability and structural opportunities are currently being considered.

A focus on **Climate Services** will see a shift in capability-focus in Programs 1 and 2 from climate change research to meet the growing demand for services for farmers, resource managers, and industries, leading to more efficient primary sectors. Target markets are industries, governments, and EPAs. It is anticipated to deliver over \$20 million over the next 5 years, partially offsetting declines in government funding for climate change research. To realise this it will be necessary to re-shape our existing programs under RP1 and RP2. A reduction in FTEs that are not aligned to these directions is being considered. Two options are provided for the ET's recommendation:

- I. Reshape RP1 and RP2 to better align with our strategy of "tailored services for customers" and international business opportunities, especially in China.
- II. Merge both programs after reshaping of capabilities.

RP5 (Engineering and Technology) has a focus on marine infrastructure delivery. While it currently has strong external earnings, it is primarily funded by a small number of large clients (MNF and IMOS) and its core deliverables are not aligned with CSIRO's KPI metrics. Three options are provided for the ET's recommendation:

- Maintain the status quo
- II. Disband the program and distribute the capability across the remaining four programs in O&A.
- III. Revise CSIRO KPI's as they are not aligned with the operational framework of RP5.

3. Recommended Portfolio investments shifts

a) 20% Increase in Appropriation Funding:

Focus on 3 or 4 growth and emerging areas described above - would generate a high external earning revenue trajectory. We would proceed with the planned capability reshaping accordingly, and redirect resources to these growth areas.

b) 20% Decrease in Appropriation Funding:

This move would cut into areas which are part of our growth and/or emerging areas, i.e. require a cut to our external targets. Loss of core scientific expertise will impact the capability of the BU to respond to emerging challenges and financial growth opportunities. This option should only be treated as a last resort.

Support of redundancy measures to support capability realignment.

The Business Unit is requesting permission and financial support to action 30 redundancies to release capability that is no longer in demand or consistent with O&A's Strategic Plan. To meet our new external revenue targets there is a need to stop projects with little customer demand/low ROI potential (e.g., in capability areas like base-line climate change research, plankton ecology and Earth system assessment). Similarly, we will hire staff with the capability required in specific (growth) areas linked to customer need, scientific impacts and financial growth.

4. Other issues

Cross-BU opportunities: implementation of growth areas offers opportunities for cross-BU collaboration to maximise customer satisfaction and revenue. Examples are:

 O&A's coordinating role in addressing industry-community impacts and social license to operate (Data 61, L&W, Agriculture etc.); • Expanding environmental assessments to include other BUs, e.g. Manufacturing. O&A would do the environmental assessments of tools and processes developed by Manufacturing.

International: corporate CSIRO and O&A need to actively consider how O&A can operate in EU and China with expected significant returns on investments (overcome organisational hurdles, clarify taxation issues etc.).

Publicly Funded Research Agencies: explore potential for revised relationships and increased collaborative revenue under proposed new bilateral collaboration agreements with GA, BoM, AIMS etc.