



Applied Geoscience and Technology Division (SOPAC)
Division Géosciences et Technologies Appliquées (SOPAC)

Second Meeting of the SOPAC Division Noumea, New Caledonia, 3-9 November 2012 (SOPAC-2)

AGENDA ITEM	TITLE
3.	SOPAC DIVISION HIGHLIGHTS AND EMERGING ISSUES
3.1	Ocean and Islands Programme 2011/2012 Report
3.1.2	Full Narrative Report OIP (Information Paper)

PURPOSE

The purpose of this report is to provide the SOPAC Division Meeting delegates with a detailed account of the implementation of the Ocean and Islands Programme (OIP), under its 2012 Work Plan (September 2011 – August 2012).

BACKGROUND AND COMMENTS

The Ocean and Islands Programme role

The Ocean and Islands Programme (OIP) works across a broad range of marine, coastal and island resource use and applied science and vulnerability issues. It offers a range of specialist technical capacities, skills and tools in support of member's contemporary needs. In the context of both the SOPAC Division (Applied Geoscience and Technology Division) and the broader SPC, OIP has a unique role and a diverse technical mandate, delivering a distinct and complementary service to the other Technical Programmes and Sectors of the SOPAC Division as well as the broader SPC (e.g. Economic Development Division, Fisheries, Aquaculture and Marine Ecosystems Division, Land Resources Division, etc).

The OIP technical role is directed towards the collection and analysis of baseline data such as bathymetric products, maritime boundaries data, oceanographic and geophysical data, topographic data, geological and geomorphologic assessments, environmental baseline data such as marine ecosystem habitat mapping. This data collection is usually undertaken at the request of SPC Members to support specific decision making or to evaluate options regarding development, vulnerability or adaptation tasks and projects. OIP uses this data to perform empirical analysis such as hydrodynamic modelling, statistical and quantitative analysis. It then processes the outcomes into reports, charts, recommendations and country briefings as appropriate. OIP is also involved in on-going monitoring such as the Pacific Sea Level Monitoring project (formerly the South Pacific Sea Level and Climate Monitoring Project) and, as this Sector suggests, OIP is heavily engaged in climate change adaptation assessment and project implementation. The OIP also supports improved decision making and policy development in key sector areas. For example, it implements the *Deep Sea Minerals in the Pacific-ACP States: a Legal and Fiscal Framework for Sustainable Resource Management*

Project which is developing fundamental legislative frameworks to guide the conduct of this new and growing industry.

The Ocean and Islands Programme delivers such work through multiple mechanisms including direct capacity supplementation to PICs, partnerships with PI governments and agencies (e.g. SPREP, UNEP, Commonwealth Secretariat, Department of Climate Change and Energy Efficiency, Australia, NIWA, Geoscience Australia, etc.) and through multidisciplinary approaches where OIP delivers “end to end” services or fulfils a portion of a broader programme or project of work. In certain circumstances OIP also competes for commercial contracts where the objectives of those contracts are aligned with country assistance needs and OIP’s existing mandate.

The Ocean and Islands Programme integrates to its work important complementary tools such as resource economics, remote sensing and GIS and maintains a multi-million dollar technical workshop facility which provides crucial support to SOPAC Divisional in-house technical and scientific teams as well as direct support to PICs on technical issues. The active preservation and management of geoscience data, particularly geospatial data sets and information is an important OIP task and OIP continues this work through a web accessible “Geonetwork” data management system: <http://geonetwork.sopac.org/geonetwork/srv/en/main.home>.

The SOPAC 2010 – 2015 Strategic Plan articulates the following three Division-wide key result areas (KRAs):

- Monitoring and Assessment of Natural Hazards, Resources and Processes
- Management and Development of Natural Resources
- Management of Vulnerability and Risks

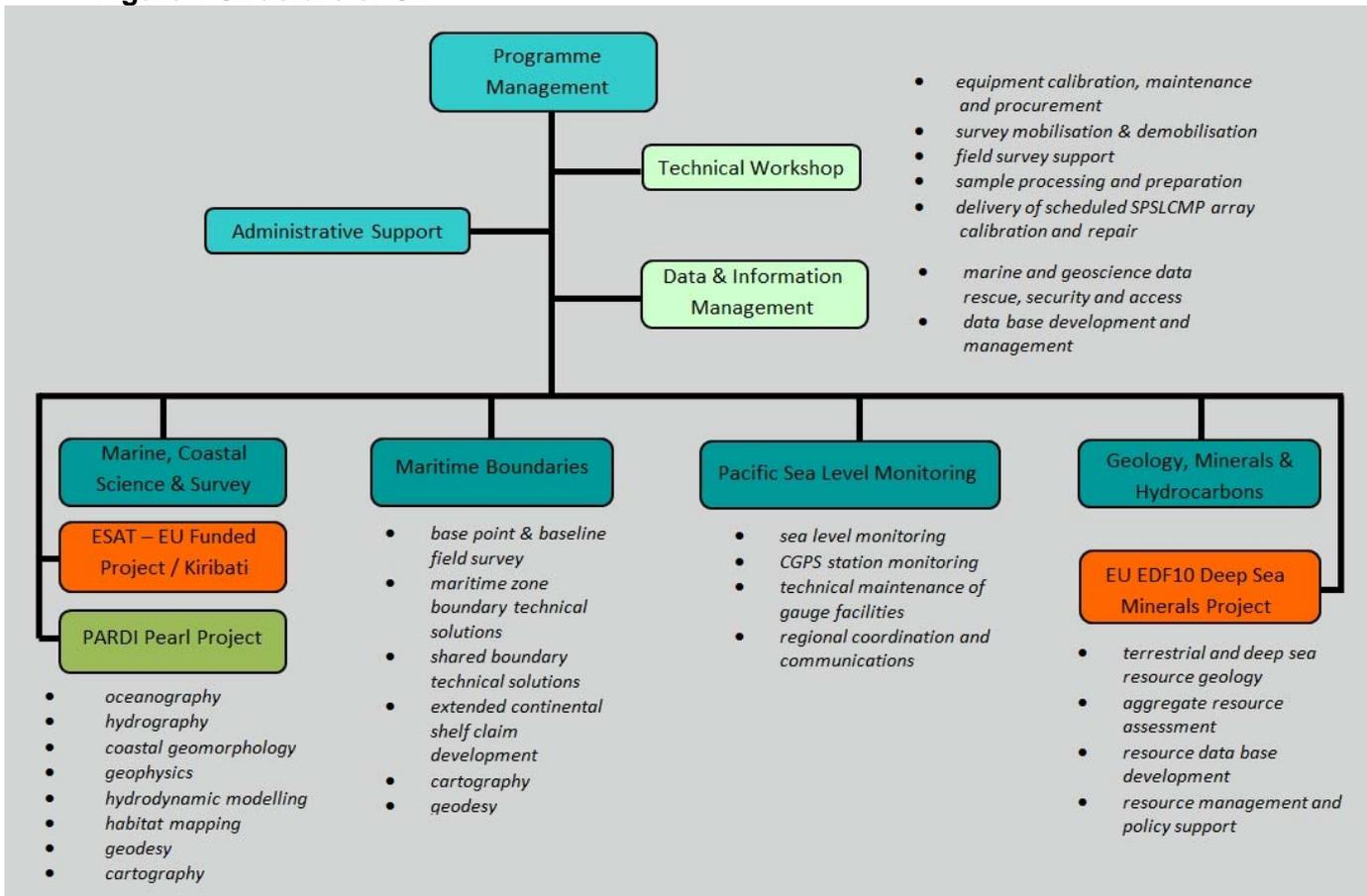
The KRAs present an opportunity to articulate broadly how OIP tasks contribute to development. Nevertheless, the fact that OIP work has multiple applications in practice and that it is also often highly connected with other programmes of the SOPAC Division means that it may contribute to several KRAs simultaneously. Nevertheless, an indication of the contribution of OIP work to the SOPAC KRAs is highlighted in Annex 1 through a column which indicates the KRA(s) to which a task most strongly contributes. In this same column is an indication of the applicability of the task to climate change science and/or adaptation.

Structure

The OIP is organised into 7 main thematic areas or Sectors which provides a useful division of tasks or services. These Sectors also reflect the manner in which Members predominantly articulate requests against OIP’s resources and mandate. Nevertheless, it cannot be stressed enough that the capacities and teams within these Sectors cross and frequently simultaneously work in two or more Sectors. The critical mass of OIP is such that teams can be assembled across several Sectors to deliver against specific tasks and then re-disperse back to their usual areas upon completion. This also occurs at a cross Programme level and OIP routinely joins with WSP and DRP to develop and deliver against member requests and Projects. This is the essence of multi[disciplinary approaches used in the design and delivery of SOPAC Divisional work

The remainder of this narrative reports on the tasks completed and the highlights for the reporting for each OIP Sector. As with any science programme it is redundant to report in great detail as a narrative. Therefore, this report is not intended to cover all the details of each task. Nevertheless this report does emphasise key obstacles and achievements faced in the last 12 months and is accompanied by a matrix (Annex 1) which outlines all OIP tasks undertaken. In turn, the Annex 1 matrix indicates (as appropriate) relevant technical reports, charts, assessments and other products delivered throughout the year.

Figure 1 Structure of OIP



WORK PROGRAMME IMPLEMENTATION

Sector 1. MARINE, COASTAL SCIENCE AND SURVEY (MCSS)

The largest Sector within OIP, 5 staff deliver in the main functional areas of oceanography, hydrography, coastal processes and geomorphology, geophysics, hydrodynamic modelling, habitat mapping and geodetic survey. Additionally, the PARDI (Supporting Cultured Pearl Industries of Fiji and Tonga) project requested in late 2011 that its Pearl Culture Specialist be physically located in OIP to facilitate oceanographic work for the development of the regional pearl industry. This position has also been placed in the MCSS Sector. The Technical Workshop facility is also particularly associated with the MCSS Sector, providing additional personnel and expertise during equipment mobilisation and instrument deployment in the field.

As reported in 2011, there is an increasing trend of requests for OIP, particularly the MCSS Sector, to address issues of climate change adaptation and vulnerability assessments using the Sector's scientific capacity and tools. Of the 23 major tasks and proposals reported this year, 16 are directly relate to climate change adaptation or vulnerability assessment in coastal zones. Seven of these reported tasks are in the proposal stage and being considered for funding and potential implementation. These proposals are also reported as 2012 tasks, in the hope that it will be recognised that proposal development is a huge burden on OIP staff, with a significant proportion of their time and effort spent designing and writing proposals.

Despite continual requests for improved programmatic funding to support OIP's capacity and allow the Sector to expand and increase its ability to accept/design more proposals and implement additional projects, the OIP received a reduction in programmatic funds in 2012. At the time of writing it is important to report the MCSS Sector is now operating at maximum

capacity and will struggle to accept further substantive Projects depending on the outcome of existing proposals (see Annex 1 for details of these).

In response to programmatic funding cuts OIP has been encouraged to take more project orientated work and the Programme has responded positively to this challenge. In 2005, project funding accounted for 62% of the programme total budget whereas in 2012 it accounts for 2.4%. This increasing ratio of project to programme funding brings about constraints because projects often do not cover full-time staff costs and where they do, they rarely provide the flexibility for those staff to support requests for similar work in a complementary areas (those staff are limited to operating only a single project). In turn, OIP has a good reputation for delivering projects effectively however, when the proportion of project funding relative to core funding becomes too high, delivery quality becomes increasingly difficult to ensure. For these reasons the MCSS Sector cannot commit to the development of additional substantive projects until the outcome of present proposals is understood or the core team can be grown through improved programmatic funding.

In spite of this significant challenge to the MCSS Sector, a characteristically diverse range of tasks have been completed to high standard or have been underway through 2012. The range includes near-shore bathymetric/topographic surveys in **Fiji, Cook Islands, Tonga, French Polynesia** and Yap (**Federated States of Micronesia**) and rapid coastal assessment work in **Kiribati** (Kiritimati Island), **Palau** (Rock Islands) and Kosrae (**Federated States of Micronesia**). Associated geophysical surveys have also been completed including outer island dredging and jetty development surveys in Ovalau, Savusavu and Naduri (**Fiji**); reef platform drilling in Yap (**Federated States of Micronesia**) and field and scientific support to the PARDI Pearl development work has been provided in **Tonga, Fiji** and the **Cook Islands**. The MCSS Sector's hydrodynamic modelling capacity continues to grow and storm wave inundation modelling (**French Polynesia, Cook Islands, Tonga**) and *tsunami* inundation modelling is underway.

The MCSS Sector has also completed an intensive schedule of field work in Rangiroa Atoll (**French Polynesia**) under the EDF9 Supporting Disaster Risk Reduction in Pacific OCTs Project (overall implementation responsibility of the Project lying with the Disaster Reduction Programme). The OIP has worked closely with the *Service de l'Urbanisme* in **French Polynesia**, deploying to Rangiroa in May 2011 oceanographic instruments and commencing baseline survey work. This included: water current and wave data collection, offshore and lagoon bathymetry survey, sediment sampling and drop camera benthic surveys and intertidal flat boulder surveys. Data processing is underway now and, once complete, inundation and storm surge modelling tasks will commence. Ultimately, the lessons from this work will be broadly transferable across the region and is expected to contribute to an atoll storm surge hazard regulation framework for the Tuamotu Group.

The MCSS Sector has also completed an intensive schedule of field work in Rangiroa Atoll (**French Polynesia**) under the EDF9 Supporting Disaster Risk Reduction in Pacific OCTs Project (overall implementation responsibility of the Project lying with the Disaster Reduction Programme). The OIP has worked closely with the *Service de l'Urbanisme* in French Polynesia, deploying to Rangiroa in May 2011 oceanographic instruments and commencing baseline survey work. This included: water current and wave data collection, offshore and lagoon bathymetry survey, sediment sampling and drop camera benthic surveys and intertidal flat boulder surveys. Data processing is underway now and, once complete, inundation and storm surge modelling tasks will commence. Ultimately, the lessons from this work will be broadly transferable across the region and is expected to contribute to an atoll storm surge hazard regulation framework for the Tuamotu Group.

Over 2011-2012, the MCSS Sector joined with the Water and Sanitation Programme of the SOPAC Division and staff of the Human Development Division to deliver a comprehensive program of work on coastal vulnerability in Lifuka, **Tonga**. This work – which seeks to improve understanding of shoreline vulnerability – was designed in consultation with the Department of Climate Change and Energy Efficiency (Australia), under the PACCSAP (Pacific Australia

Climate Change Science and Adaptation Planning Program). Similarly, the AusAID funded Tsunami Hazard Assessment Project (Phase III) which is delivered jointly with Geoscience Australia and the Disaster Reduction Programme, has developed highly accurate topographic and bathymetric baselines for Nuku'alofa, **Tonga**; and these are now being used to assess the exposure to tsunamis generated from different sources. This work is also undertaking important comparative work to ascertain what level of resolution and accuracy in baseline data is the minimum required for accurate inundation modelling.

In December 2012, the MCSS will begin implementing the European Union funded Changing Waves and Coasts in the Pacific (WACOP) project. A regional programme implemented by OIP which will support on-going work in shoreline vulnerability by contributing to regional understanding of potential climate change and climate variability impacts related to 'wave climate'. This project has direct links to other proposals in the MCSS Sector, such as the: Operational Wave Forecasting for Early Warning Systems (EU Natural Disaster Risk Reduction Program), Vulnerability Assessment of the Bonriki Freshwater Reserve and International Airport to Climate Variability and Change (DCCEE/PACSSAP), as well as likely regional coastal vulnerability work under the proposed Pilot Program for Climate Resilience (World Bank, Asian Development Bank) and Building Safety and Resilience in the Pacific Project (10th EU EDF Intra-ACP Envelope). This programme also links to on-going efforts to maintain the PRISMS (Pacific Regional Island Shoreline Monitoring System) initiative. A collaborative agreement between the University of Auckland and OIP will also facilitate further work in PRISMS with the analysis of existing historical data over the next two years.

These tasks and proposals highlight the predominance of coastal vulnerability science and climate change adaptation and risk tasks. Whilst demand for these services is high, the MCSS Sector is still delivering against other key result areas. For example, OIP recently completed the geophysical survey of Yap State (**Federated States of Micronesia**) Petroleum Corporation coastal defence works and following the success of this work, Yap State authorities have requested further drilling and testing of several bridge footings. The MCSS also undertook strategic hydrographic and seismic surveys in the outer islands of Fiji in support of improved transport and docking facilities and similarly completed technical assessment work this year following a 2011 assessment of the Port Ronton entrance, Kiritimati Island (**Kiribati**). Additionally, OIP assisted the Rock Island State Authorities, Palau, in collaboration with GIZ (Coping with Climate Change in the Pacific Island Region Project) to undertake a rapid assessment of key tourist beaches in the intensively used and economically important Rock Islands marine park area.

In addition to its scheduled work, the MCSS Sector typically undertakes a range of unscheduled tasks and attempts to remain responsive to Member requests for technical review of documents such as EIAs, coastal engineering plans and development applications and proposals. These requests are numerous and variable in content, size and complexity (see Annex 1). OIP recognises it is the only regional capacity of its type available to Members and thus significant resources are expended to honour unscheduled requests for assistance. Such activities and services in 2012 have been supported through the New Zealand Ocean Sciences Project. Likewise, the MCSS Sector also (by default) provides regional geodetic survey support to Members as it has the only regional capacity in this field. Sustained support from the Membership would greatly facilitate the continuation of such services and responsiveness that OIP can maintain.

Sector 2. GEOLOGY, MINERALS AND HYDROCARBONS

At present, the Geology, Minerals and Hydrocarbons Sector (GMH) has no core staff but houses both the EU-funded Environmentally Safe Aggregates for Tarawa (ESAT) Project, **Kiribati**, with a Project Manager posted in South Tarawa and the EU-funded EDF10 Deep Sea Minerals in the Pacific Islands Region project (with three staff). At both the SOPAC Commission Annual Session of 2010 and the SPC SOPAC Divisional Meeting of 2011, OIP highlighted that it could

not support a core position in the GMH Sector to provide Members with assistance on issues such as aggregates geology or terrestrial minerals geology. This situation has not changed. In fact, with funding for this programme reduced in 2012, there is less likelihood of adequate resourcing for a core position. Nevertheless, the Sector did respond to one urgent unscheduled request to provide expert advice and a site visit to support the **Solomon Islands** Ministry of Mines, Energy and Rural Electrification conduct a preliminary investigation of gold recovery variance at the Gold Ridge Mine. This work was completed and OIP also provided assistance to the Solomon Island Government to develop the terms of reference for a subsequent consultancy and full study.

ESAT Project

The ESAT Project is jointly implemented by OIP and the Government of **Kiribati's** Ministry of Fisheries and Marine Resource Development (MFMRD). This project is designed to protect the vulnerable beach systems of South Tarawa from damage caused by aggregate mining by providing an alternative supply of construction aggregate from the lagoon basin to meet South Tarawa's rapidly growing demands. Large and unsustainable volumes of beach aggregate (sand, gravel and cobble – estimated at 70,000 m³/year in 2006) are removed from South Tarawa's beaches every year at a time when fears over shoreline instability and sea level rise suggest that every possible effort to protect shoreline systems should be made. ESAT offers a pragmatic “no-regrets” climate change adaptation response to this problem by seeking to provide an environmentally sustainable alternative which can reduce pressure on South Tarawa's fragile beaches and bolster resilience in natural beach systems. Day-to-day management of ESAT is provided by a specifically recruited, Tarawa-based Project Manager who in turn is supported by both the broader OIP technical team and MFMRD. The Project also partners with local Tarawa based NGOs and has employed a number of consultants to provide specialist support over the last 12 months.

The single largest budget item in this project is the provision of a purpose built aggregates dredge the *MV Tekimarawa*, a 40-m steel, open-water capable vessel with a shallow draft for lagoon work and a total payload of 300 tonnes. The contract to build the vessel was awarded to Heavy Load Pte. Ltd, Singapore on the 24th June 2011 and significant progress has been made with hull and superstructure of the *MV Tekimarawa* nearing completion and anti-corrosion treatment and painting is now underway. The twin engines and dredge crane system have also been assembled and are expected be fitted during the 4th quarter 2012. The contract completion date has been delayed to November 2012 (1 month delay due to poor weather and flooding at the yard). Quality control on the construction has been maintained by an independently contracted shipwright with routine site and vessel inspections carried out and OIP's estimate of a possible delivery date would be the 1st quarter 2013.

There are many dimensions to the ESAT Project. It is recognised that simply providing a vessel will not likely result in an immediate reduction in beach mining and there remains the important issue of the number of people dependent on beach mining for income in South Tarawa. To this end, ESAT also implements an awareness and behaviour change programme focused at community understanding and participation (*Ara Bike Reirei*) and also undertakes routine awareness events with schools. The project also supports school curriculums through its efforts with the “SandWatch” programme. Comprehensive and strategic efforts to maintain community outreach and consultation are also underway, involving contracts to local NGOs who implement the ESAT Communications Strategy. This work has also included multiple community meetings to discuss the implications of the dredge resource EIA and the associated study on fisheries resources in the aggregate resource area (undertaken collaboratively with the Kiribati Government and the Fisheries, Aquaculture and Marine Ecosystems (FAME) Division of SPC). These documents and process also inform the ESAT Environment Management Plan being drafted now.

The ESAT Manager has also undertaken liaison with major development projects which are planned to become active in South Tarawa (e.g. runway resurfacing, road repair, Temaiku reclamation) to discuss the engagement of the *Atinimarawa* Aggregates Company to provide safe aggregates. Securing such contracts will be vital to the early success of the *Atinimarawa* Aggregates Company and not only support the local economy but also assist to avoid quarantine risks (imported aggregate). In turn, this will also allow the Company to better resource strategies to assist beach miners who presently derive income beach mining. It is planned that the Company can provide raw lagoon aggregate to these miners who can subsequently sort and on-sell the improved product – as they presently do with beach aggregate.

Deep Sea Minerals Project

The EU-funded EDF10 Deep Sea Minerals in the Pacific-ACP States Project is in its second year, with the Project Manager in post since early 2011 and the Project Officer and Legal Advisor joining later in the year. The Deep Sea Minerals (DSM) Project has made impressive headway in 2012, with a highlight being the completion of the Regional Legislative and Regulatory Framework (RLRF). The RLRF has been reviewed and endorsed by all 15 Pacific ACP States and, having been also reviewed by NGOs, the private sector, other regional/international agencies and academia, reflects commentary from multiple interests and stakeholders. The RLRF is the first document of its type in the world and is a first critical step towards assisting the Pacific ACP States to prepare national policy and legal instruments for DSM regulation.

Development of the RLRF is significant for the Pacific since many Members have no experience of industrial mining or their deep sea minerals or deep sea environment potential. It follows that knowledge of deep sea environments, ecosystems and potential impacts of mining such deposits is also poorly understood and in an effort to consolidate all knowledge of these resources and environments to better inform members, the Project has contracted UNEP GRID Arendal to coordinate the compilation of the world's first comprehensive review of all aspects of these deep sea environments and potential resources in the Pacific region. The review includes consideration of ecological, biological, geological, mineral and technological issues and will also consider potential socio-economic and environmental implications and impacts. This review is a major endeavour and brings together data, research and experts from around globe. In turn, this product along with the RLRF will become the cornerstones of policy development for Members.

Intrinsic to development of sound policy decisions is ensuring that all stakeholders are provided with the best possible information. As well as the work already described, the Project has undertaken awareness raising country visits and multi-stakeholder meetings in 13 of the 15 Project countries. (The final 2 visits to **Papua New Guinea** and **Timor Leste** are scheduled for September 2012). Where requested, Project staff have also developed country work plans to progress national policy and legislation as well as build national capacity in this sector.

Over 2011, the Project assisted the International Seabed Authority in the organisation of an international workshop on *Environmental Management Needs of Deep Sea Minerals Exploration and Exploitation*. The workshop was attended by 27 representatives from 9 Pacific ACP States. In July 2012, the Project also organised and hosted a regional week-long workshop on *Geological, Technological, Biological and Environmental Aspects of Deep Sea Minerals*. Attended by member Nations, NGOs and other regional agencies, the workshop brought together world leading geological and biological experts to share their knowledge and hold open discussions with participants. Finally, the Project is also producing country specific brochures explaining what is currently understood of their DSM resources.

At the time of writing, the DSM Project has received requests to undertake legislative reviews and/or drafting of legislation related to DSM for: the **Cook Islands, Fiji, Federated States of Micronesia, Kiribati, Nauru, Niue, Palau, Marshall Islands, Samoa, Solomon Islands,**

Tuvalu and **Vanuatu**. Additionally, legal advisors from **Nauru**, **Tonga**, **Kiribati** and **Fiji** have indicated their interest in drafting national regulations for exploration of the International Seabed Authority's high seas area in the eastern tropical Pacific, the 'Clarion Clipperton Fracture Zone', otherwise known simply as "the Area".

Finally, capacity building is being supported under the DSM Project to ensure skill sharing in all aspects of DSM and a legal internship programme was established in 2012 with nationals from **Tuvalu** (January), **Tonga** and **Vanuatu** (underway) working under the guidance of the DSM Legal Advisor. Interns from **Fiji** and **Kiribati** are also scheduled to join the programme in late 2012. Additionally, a **Kiribati** National was sponsored for marine safety training in preparation of a shipboard attachment/observation.

Sector 3. PACIFIC SEA LEVEL MONITORING (formally the SPSLCMP)

This AusAID-funded sea level monitoring array was originally implemented due to increasing regional concern over climate change associated sea-level rise and the poor understanding of this phenomena and sea-level variability in the region. Gauges were installed between 1991 and 2001 and, since establishment, the array has captured a mostly uninterrupted stream of high quality, accurate data on sea level, temperature (water and air), barometric pressure and wind speed and direction. Associated Continuous GPS (CGPS) stations have also been established in each country to account for any tectonic movement.

On the 1st of July 2012, the Phase IV – *South Pacific Sea Level and Climate Monitoring Project* (SPSLCMP) transferred to the new *Climate and Oceans Support Program in the Pacific* (COSPPac) Project under the *Climate and Ocean Monitoring and Prediction* (COMP) sub component. OIP's role in the sea level monitoring remains largely unchanged with the exception that the Sector is now called the *Pacific Sea Level Monitoring* (PSLM) project.

As with previous arrangements, the entire COSPPac programme, and thus PSLM, remains wholly AusAID funded (approximately AUD32million) and the current cycle of COSPPac will run until December 2016. OIP and Geoscience Australia (GA) are contracted partners with the Bureau of Meteorology Australia (BoMA). Together, these partners take responsibility for the continued calibration, maintenance and, when necessary, unscheduled repair of the 12 PSLM high-resolution sea-level monitoring stations and associated CGPS (Continuous GPS) stations in the **Cook Islands**, **Federated States of Micronesia**, **Fiji**, **Kiribati**, **Marshall Islands**, **Nauru**, **Papua New Guinea**, **Samoa**, **Solomon Islands**, **Tonga**, **Tuvalu** and **Vanuatu**.

In July 2012 the OIP-based SPSLCMP Regional Communications Coordinator position became vacant and due to the transfer of the SPSLCMP to the COSPPac project, there have been minor changes in the position title and terms of reference, with the coordinator now referred to as the *COSPPac Regional Officer*. Recruitment for the Officer position is now underway.

Continuing from last year and now associated with the PSLM is the Australian Government's ICCAI-funded *Operational Network Upgrade Project* (ONUP). ONUP began field work in early 2011 and is refurbishing and upgrading the measurement and communication technologies at all 12 PIC stations to ensure their continued capacity to measure, record and transmit high-quality sea level and climate data for another 10 to 15 years. The upgrade also enhances the array's capacity to detect *tsunami* and other unusual wave conditions. Over the last report period ONUP has completed upgrades in: **Samoa** (August 2011); **Kiribati** (October 2011); **Solomon Islands** (December 2011); **Fiji** (February 2012); **Vanuatu** (May 2012); and **Papua New Guinea** (July 2012). (**Tonga** and **Fiji** were completed last year and reported at the first SOPAC Divisional Meeting held in 2011). OIP's Technical Workshop also provides in-country assistance with the technical retrofitting of the ONUP gauge stations and communications gear.

It is important to note that the work of the OIP and its partners – and consequently the operation of the network – has remained uninterrupted during these changes. Through the Technical

Workshop and the PSLM Surveyor, OIP have continued to provide routine and non-routine maintenance and calibration to the facilities. Over the last reporting period visits have been undertaken to the station facilities in: **Samoa** (November 2011), **Nauru** (February 2012), **Solomon Islands** (March 2012), **Kiribati** (April 2012), **Tuvalu** (May 2012 and August 2012), **Marshall Islands** (June 2012), **Solomon Islands** (Jun2 2012), **Federated States of Micronesia** (August 2012) and **Fiji** (Suva and Lautoka – August 2012). Likewise, the full range of data and analysis and other high quality products remains available via the BoMA web site and the OIP Geonetwork:

<http://www.bom.gov.au/oceanography/projects/spslcmp/spslcmp.shtml>
<http://geonetwork.sopac.org/geonetwork/srv/en/main.home>.

These products include data, country reports, consolidated data reports and tidal calendars. The most recent *2010 – 2011 Consolidated Data Report* is highly recommended reading and includes an interpretation of the recent highest peak sea levels recorded in the PIC region by the array and one of the strongest La Nina events on record.

Sector 4. REGIONAL MARITIME BOUNDARIES

The OIP Regional Maritime Boundaries Sector (RMB) is entirely AusAID funded through both the recurrent programmatic budget and via a number of successful AusAID Pacific Public Sector Linkage Program (PPSLP) proposals. The Sector has been implemented by OIP since 2001 and serves to assist PICs with the technical development of maritime zones, baselines (including archipelagic baselines where applicable) and the computation of subsequent marine zone limits (territorial seas out to 12 nautical miles (NM); contiguous zones out to 24 NM and exclusive economic zones out to 200 NM). The RMB also assists PICs to calculate the technical solutions to overlapping or shared maritime zones and assists those PICs with extended continental shelf (eCS) potential to delineate these areas and submit claims to the UN Commission on the Limits of the Continental Shelf (UNCLCS).

The RMB Sector undertakes all work in accordance with the provisions of the UN Convention on the Law of the Sea (UNCLOS) and ultimately the RMB aims to assist PICs to develop, promulgate and declare their respective boundary information and likewise develop technical solutions towards ratified treaties between PIC neighbours with overlapping marine zones.

Successful maritime boundaries development work is a process which includes technical (geomorphological/geodetic/cartographic), legal (legislative review and legal drafting) and diplomatic understanding and engagement. The processes cannot be brought to a successful conclusion, nor can sustainable progress be achieved, where any one of these three components is absent. Unfortunately, the OIP mandate is restricted to the technical components only and the legal work related to areas such as eCS development (and defence) is extensive and complex. As a result, successful delivery of the PIC maritime boundary programme is only possible through a broad, collaborative network of partners who come together with OIP to provide a complete support mechanism to PICs. These partners (Geoscience Australia, Australian Attorney General's Office, UNEP GRID Arundel, Commonwealth Secretariat and the Forum Fisheries Agency) join OIP to run and resource the Regional Maritime Boundaries Workshop series. These occur approximately every 8 months and the *9th Pacific Island Country Advanced Article 76 (UNCLOS) and Maritime Boundaries Development Workshop* was held from 20 February to 2 March 2012. (The 10th Workshop is scheduled for November 2012).

For the last 6 six years, the University of Sydney has graciously provided a free venue and computer laboratories for these workshops in their Geology Building. The last workshop involved 36 regional participants and 17 facilitators from the technical partnership. As discussed at the SOPAC Divisional meeting of 2011, these workshops have evolved from an earlier specific need to provide intensive training to a select group of PICs who had eCS potential (**Cook Islands, Fiji, Federated States of Micronesia, Kiribati, Palau, Papua New Guinea,**

Solomon Islands, Tuvalu, Tonga and Vanuatu). Last year OIP and GA made the strategic decision to expand both the focus and membership of the meetings to include all PICs (so now includes the **Marshall Islands, Nauru, Niue and Samoa**). This means the workshop series continues to support eCS development but also dedicates time and effort to assist countries to progress their respective maritime zone and delimitation work.

The Forum Fisheries Agency (FFA) is the most recent agency to join the partnership and this coincides with the broadening of the regional workshop focus. The FFA has engaged with both OIP and the Australian Attorney General's Office (AAGO) to focus on the issue of regional shared boundary negotiation and agreement. Excellent progress has been achieved through these coordinated and multi-disciplinary efforts, with seven bilateral and one trilateral treaty being signed by respective leaders at the 2012 Pacific Forum Leaders meeting. This brings the number of ratified treaties in the region from 21 to 28 (20 more remain). The bilateral treaties were signed between **Nauru/Marshall Islands; Nauru/Kiribati; Kiribati/Marshall Islands; Kiribati/Tuvalu; Kiribati/Tokelau (NZ); Kiribati/Cook Islands** and **Cook Islands/Niue**. The trilateral treaty was signed between **Nauru/Marshall Islands** and **Kiribati** and denotes the single point of confluence of their respective bilateral treaties.

At the time of writing, only **Fiji, Nauru and Palau** have declared their maritime baselines, zones and outer limits in accordance with UNCLOS and, following the signing of the above treaties, **Nauru** is the only PIC with complete and declared boundary solutions in place. **Papua New Guinea, Solomon Islands and Vanuatu** have declared only their archipelagic baselines and, of these countries, **Fiji, Solomon Islands and Papua New Guinea** are all the focus of major work by the RMB Sector to review these baselines and improve their accuracy for subsequent declaration. Both **Tuvalu** and **Kiribati** have also been the focus of delimitation work assisted by the RMB Sector in the last 12 months. The Sector, in collaboration with the country technical teams (and funding assistance from the Commonwealth Secretariat to purchase baseline data), has developed complete maritime zone and limit solutions appropriate for declaration. In the case of **Tuvalu**, these boundary solutions have been approved by Cabinet and declaration with the UN is expected soon. Likewise, both **Tuvalu** and **Kiribati** have deadlines for submission of their eCS claims in 2013 (January and March, respectively). **Tuvalu** is developing a joint claim with France and New Zealand and **Kiribati** is working with the Commonwealth Secretariat and UNEP GRID to complete their independent submission.

In collaboration with the AAGO and GA, OIP has also provided assistance to both **Samoa** and **Niue** and both these countries have now completed boundary solutions and updated legislation adequate for declaration. In the last reporting period, the **Marshall Islands** has also engaged with OIP to develop its maritime zones, limits and solutions. This work started with the completion of baselines and computation of the equidistant boundaries to support the treaty work with **Kiribati** and **Nauru** and will now continue with a full review of their existing boundaries data and updating where needed.

Sector 5. DATA AND INFORMATION MANAGEMENT

<http://geonetwork.sopac.org/geonetwork/srv/en/main.home>

The Ocean and Islands Programme made an investment in 2007 into a more strategic approach to data management and, in late 2008, the OIP Geonetwork system became operational and available for public viewing and use. Geonetwork has hugely improved the Programme's data and product visibility, as well as its ability to collate, protect and provide access to its historical and newly collected data and analysis products. The work to continue population of the system and response to increasing volumes of requests grows yearly and it is important to note this strategic response to a web-based data discovery and archiving system is demand (not supply) driven, as evidenced by use statistics. During the 2012 reporting period, Geonetwork content increased 20 per cent from 7,010 items to 8,387 entries, covering products from the entire membership. Bathymetric data entries in particular increased (now 237 records) and about half of this year's written requests were for bathymetry data. Otherwise, the system recorded 407

data set downloads from open records (a 295 per cent increase over last year's total), and 46 written requests for protected data in 2012 (a 21 per cent increase over last year's total of 38).

As reported in 2011, the original Geonetwork server was reaching capacity and OIP had even then invested significant programme funds to purchase of new server array to handle increased capacity needs. Unfortunately, migration of Geonetwork content has been far slower than expected due to unforeseen access issues. Consequently, the Geonetwork upgrade to Geonode is neither complete nor operational at this time. In 2011, OIP gained approval from CRGA to enhance its user interface for specialist geospatial data such as maritime boundary information. Recognising this is a specialist technical/legal area, OIP has collaborated with the UNEP GRID Sydney Office, Geoscience Australia and the SOPAC Division ITC Development team to submit a AUD \$236,390 proposal (AusAID PPSLP) to facilitate UNEP GRID and GA expertise to assist OIP to further develop this interface and discovery platform for geospatial data sets. Otherwise, funding for Geonetwork in 2012 has been maintained with the assistance of the NZ Government's Ocean Sciences grant.

Sector 6. TECHNICAL WORKSHOP

The Technical Workshop plays a significant role in supporting work in the OIP MCSS, Pacific Sea Level Monitoring, GMH and RMB sectors. Other substantive users are the Water and Sanitation and Disaster Risk Reduction programmes. Implicit in the reporting of all OIP and, in fact, most SOPAC Divisional field assessment tasks, is acknowledgment that the Technical Workshop is indispensable to implementation success, particularly where there are substantive mobilisation and deployment tasks are concerned (e.g. geophysical, bathymetric, topographic surveys etc.). The Technical Workshop also has a direct role in the procurement, servicing, modification, repair, calibration and cataloguing of oceanographic, geodetic, climate and geological equipment and instruments held by the SOPAC Division. It deploys, mobilises and demobilises millions of dollars' worth of equipment safely and successfully every year. The tasks of the Technical Workshop are too numerous to fully list here, but the MCSS, PSLM and Technical Workshop sectors reporting in Annex 1 of the full OIP narrative report (Paper SOPAC-2/3.1.2) gives an itemised account. The Technical Workshop facility received a welcome boost to resources in 2012 via the NZ Government's Ocean Sciences grant.

Among its many tasks, the Technical Workshop oversees OHS issues and is instrumental in the upkeep of safety equipment and routine safety training for all field staff. Joining the Bureau of Meteorology in Australia in the delivery of ONUP (Observational Network Upgrade Project), staff also assessed and corrected OHS issues at each PSLM project station and OIP science staff joined with the Technical Workshop to undertake training in small boat safety and handling (March 2012), as well as in Advanced First Aid and Resuscitation (April 2012). A new Technical Officer in the MCSS Sector was also given SCUBA training under the Workshop-managed Taiwan ROC Grant for safety training and equipment improvements. The Workshop has also supported important geodetic work and provided assistance to the PARDI Pearl Development project with fieldwork and oceanographic monitoring in Savusavu, **Fiji**, as well as the repair of water quality monitoring buoys for eventual use in the Pearl industry.

Sector 7. MANAGEMENT/ADMINISTRATION/ADVOCACY/REPORTING

This Sector is responsible for the day-to-day facilitation, management and oversight of the Ocean and Islands Programme, as well as for the longer-term strategic alignment and responsiveness of the Programme's services and work plan. Staff here consists of the Programme Manager (Deputy Director) and the Programme Assistant; however, the size and complexity of OIP has resulted in team leader positions taking responsibility for the immediate management of the MCSS Sector and the Technical Workshop. These sectoral senior staff also take an active role in developing their respective sectors and the Team Leader MCSS is particularly active in developing major sector proposals. The Management Sector is also tasked

to form practical links across programmes and divisions within SPC and interacts closely with Corporate Services, the Divisional Management Team and the broader SPC.

Strategic technical partnerships are crucial to the on-going development and delivery of work in OIP and the Management Sector liaises with other regional and international partner agencies and interest groups on a range of matters within its work mandate and interests, participating in working groups and other regional fora and contributing to regional reporting and strategic planning mechanisms such as the CROP Marine Sector Working Group, SPC CRGA, SPC Joint Country Strategy process, Pacific Plan reporting, regional institutional review processes and so on.

UNSCHEDULED AND AD HOC REQUESTS

Where possible and practical, OIP provides on-going support to countries in response to individual country or regional requests outside of the scheduled work plan and budget. Below are examples of the nature of such requests/obligations over the 2011 – 2012 reporting period. Many of these tasks are covered in more detail in the full narrative report (paper SOPAC-2/3.1.2); with those originating from the MCSS Sector largely funded under the NZ Government 2012 *Regional Ocean Sciences Project* allocation.

Country Support to:

- *Yap, Federated States of Micronesia*: Request to develop work plan and costs for geotechnical survey and drilling to support the design of infrastructure (bridge footings) in Yap State. The OIP drill which is in Yap on a separate task has been placed in storage whilst the proposal development work is completed.
- *Kosrae, Federated States of Micronesia*: Review of a coastal rehabilitation report, site visit and development of specific recommendations for coastal adaptation actions in Kosrae. Subsequent development of collaborative project with NIWA under GIZ funding.
- *Palau, Rapid assessment of shoreline erosion in Omekang, Ngermeaus and Ngerkesill islands, Rock Islands*: OIP was approached for assistance to undertake a rapid assessment of several important recreational beach areas in the Rock Islands area and develop key recommendations for further work and mitigation. Work completed and proposal development for further work underway.
- *Cook Islands, Support Manihiki pearl farms and lagoon management*: Produce a detailed bathymetric map of Manihiki Lagoon for the purposes of lagoon pearl farm management and support on-going work to upgrade lagoon water quality monitoring buoys.
- *Fiji, Support coastal infrastructure development*: OIP was requested to undertake a geotechnical assessment to inform decision making with regard to: dredging in Ovalau; and port development in Savusavu and Naduri on Vanua Levu. Further requests have been received to assess jetty sites in Southern Lau.
- *Niue, Wharf infrastructure upgrade support*: Reef geophysical survey and drilling to support design and decision making for the planned upgrade of Niue's main port facility. Work plan and budget development completed and equipment purchase underway now.
- *Kiribati, Vulnerability assessment of the Bonriki freshwater reserve and international airport to coastal hazards and climate variability and change*: Joint OIP/WSP proposal development.
- *Solomon Islands, Development of adaptation and vulnerability reduction options Taro and Choiseul Bay*: Joint OIP/WSP proposal development.
- *Cook Islands, Review EIA for alternative tourist landing site in Rarotonga*.

- **Marshall Islands**, *Technical advisory to RMI on Ebeye coastal erosion issue.*
- **Papua New Guinea**: Develop costings for a re-survey of Yonki hydroelectric dam to ascertain and monitor siltation rates and dam performance.
- **Fiji**, *Operational wave forecasting for early warning systems, Viti Levu*: Proposal development.
- **Cook Islands**: Requested OIP to rerun the Aitutaki hydrodynamic model to evaluate additional navigation channel designs – results generated and delivered.
- **Kiribati**: Independent assessment and feed back to the Government of Kiribati on three EIAs in Tarawa Kiribati – Ambo Seawall; Maiana Maneaba Reclamation; and Temaiku Reclamation Projects.
- **Solomon Islands**, *Preliminary investigation of gold recovery variance, Gold Ridge Mine*: Site visit and provision of expert advice and support to the Mines Division of the Ministry of Mines, Energy and Rural Electrification.

Regional Support:

- *PRISMS Pacific Regional Island Shoreline Monitoring System*: Advanced with a collaborative agreement between the University of Auckland and OIP completed in June 2012 and will facilitate analysis of PRISM's existing data over the next two years. All processed data products will be returned to OIP for uploading to Geonetwork. The islands of Tuvalu will be the first locations for analysis under this agreement, with other locations to follow.
- *PPCR Pilot Program for Climate Resilience*: Strategic Program for Climate Resilience joint OIP/WSP proposal development.
- *Sub-regional (Tonga, Fiji and Cook Islands), PARDI – Supporting Cultured Pearl Industries of Fiji and Tonga Project*: Support provided by OIP (mainly MCSS and Technical Workshop sectors) to improve understanding of water quality and flow regimes pertinent to pearl culture.
- *Capacity Building in Hydrography for Coastal Development*: OIP proposal development.
- *Building Safety and Resilience in the Pacific Project*: Action fiche development DRP, WSP and OIP.
- *University of the South Pacific*: Cable route survey for new backup fibre optic cable completed field work March 2012.
- Significant in-house development of OIP HD modelling capacity and thus improved regional service has occurred with training and collaboration undertaken with both NIWA and GA.
- UNDP/DRP/Kiribati collaboration in support of south/south country visit and exchange on freshwater and coastal vulnerability issues.
- Support Asia Pacific Regional GNSS Survey Campaign – 9th to 15th September 2012.
- On-going technical support to PACCSAP (AusAID/DCCEE) and contribution to technical think tank on coastal science in PICs.
- Support various regional and international climate change related events and fora such as the Climate Change Round Table, IPCC, etc.
- Support shared boundary treaty signing event, printing, scanning and other logistics for the Forum Leaders meeting, Rarotonga, late August.
- Pacific Islands Marine Spatial Information System. Proposal development.

COMMENTS AND RESPONSES TO ISSUES RAISED AT THE 1ST SOPAC DIVISION MEETING (SOPAC-1)

Following the delivery of the Ocean and Islands Programme 2011 Annual Report at SOPAC-1 a number of comments, questions and queries were provided by the members present.

New Zealand: noted with some concern the recommendation by the Manager OIP to enhance the Programme's hydrographic capacity. NZ wanted to understand what was involved in certification and delivery of a regional hydrographic service and likely impact on the OIP for new requests?

Response: Resourcing for certification is not prohibitive and OIP has already sought funding independently to support such training. OIP services are already under heavy demand but this certification will negate duplication of effort. OIP already collects highly accurate bathymetric data for port development, with certification this same data can be used in navigational chart products.

Tuvalu: gave thanks for OIP's work especially on maritime boundaries and supported OIP request to develop a boundaries data portal.

Australia: congratulated OIP's performance and enquired to what extent the recommendations made can be accommodated through existing OIP work plan and budget, without additional funding?

Response: No new sustained programme development is possible under the existing resource dynamic, as shared these are already critically low and cannot meet demand for services. OIP supplements its income through competitive proposal development, however OIP is also at the limit of the number of projects and proposals it can reasonably deliver. Also note that any significant reprioritisation of core resources also needs to be endorsed by members.

Papua New Guinea: Commented that PNG's Maritime Boundaries baseline work requires greater efforts and requests SOPACs assistance.

Response: Fully agree, OIP has released one of its staff for nearly 4 weeks over the last 6 months to join the PNG boundaries team to support the completion of this work.

Samoa: congratulated the OIP and gave thanks for the technical support. Requested capacity building on SPSLCMP data and products; assist to develop a geotechnical testing laboratory in Samoa; and assistance to develop DSM policy to support Samoa's interest in "the Area".

Response: The new COSSPAC Programme once fully underway will have improved facilities to support the SPSLCMP data capacity building requests. OIP does not develop facilities such as laboratories but can offer support to review a Samoan proposal to develop or revitalise such a facility; The OIP Deep Sea Minerals Project has undertaken a visit to Samoa and discussed how the progress policy development.

Nauru: Thanked OIP for its support and noted the regional need for PICs to support their respective Maritime Boundaries technical/legal teams if these wished to complete and declare their jurisdictional boundaries.

Niue: Thanked the Programme for its support and supported the OIP PMEG recommendations.

Vanuatu: Thanked the Programme for its support especially in the areas of maritime boundaries development and their ECS claim. Vanuatu supports OIP gaining hydrographic certification; requested that OIP retain a terrestrial geologist as well as DSM geologist and sought clarification on the implications of the DSM Project also covering PIC interest in "the Area".

Response: As discussed OIP does not have adequate funding to support a terrestrial geologist in the Programme; the inclusion of "the Area" into the DSM Project is not considered an overly arduous matter and given PIC interest in "the Area" it would be a

significant oversight not to include this. In 2012 work has already been undertaken developing “the Area” relevant policy for Nauru, Tonga and others.

Kiribati: gave thanks to the Programme especially on the ESAT Project, Maritime Boundaries and the DSM Project.

Marshall Islands: Gave thanks for the OIP contribution. RMI indicated it had much work to do on the issue of Maritime Boundaries and requested OIP assistance.

Response: OIP managed to secure RMI involvement at its Feb 2011 maritime boundaries workshop and RMI work has progressed very quickly since then. RMI has shared its existing boundaries data and with OIP technical support has completed treaty arrangements with Nauru and Kiribati in Aug 2012. OIP will continue to work with RMI on developing full boundary limit solutions in support of declaration – this will be a multi-year commitment.

Fiji: Congratulated OIP and gave special thanks for assistance in maritime boundaries and the DSM Project.

Tonga: Gave thanks for OIP work programme. Tonga supports OIPs recommendation to enhance its hydrographic capacity; Tonga may request assistance on the issue of hydrocarbons, exploration etc; aggregate supply in Nukualofa remains a problem and Tonga will ask assistance; Tonga intends to re-engage in the OIP led maritime boundaries work.

Response: OIP can assist to make existing hydrocarbons data available but the Programme does not have petroleum geological capacity at this time; likewise, aggregates geology no longer has dedicated support in the GMH Sector (funding limitations and prioritisation) however OIP would try to assist as possible with any specific request Tonga may have on this issue; Tonga has unofficially requested maritime boundaries assistance in mid-2012 and has also shown interest to attend the next MB workshop. OIP has requested but not received any official invitation from the Tongan Govt. to undertake boundaries work and it is doubtful any progress can be made at the next workshop unless delegates have the Govt’s blessing to fully participate and share data etc.

Solomon Islands: Thanked OIP for continued support, particularly maritime boundaries assistance and reiterated Nauru’s calls for improved Govt. support of respective country technical teams. Sought clarification on hydrographic certification and whether any hydrodynamic modelling work had been undertaken in Solomon Is. Noted the load on OIP in terms of unscheduled tasks and indicates OIP should build local capacity to ensure PICs can do their own work.

Response: Only preliminary tsunami inundation modelling has been undertaken in areas of Solomon Is. In respect to building capacity in country, this is implicit in everything OIP does and we support specific capacity building actions; e.g. workshops, training attachments, etc., ultimately however this question deserves greater attention. OIP performs a number of tasks which are clearly recognised as “capacity supplementation”. This is because of their complex scientific or analytical nature or need for instrumentation and expert assessment. OIP maintains such regional services and capacity because in many of our small communities these services cannot be sustained locally. In order to ensure PICs have access to such services these challenges necessitate a regional approach or facility which can be called upon as needed by members. For example; this is the perspective from which OIP views the development of a regional hydrographic service. Many PICTs require access to such services from time to time but intermittent need and economies of scale prevent them from sustaining a dedicated National Hydrographic service. It is however economically viable to pool resources and develop a shared regional facility and in the case of OIP we already possess and maintain the necessary instruments and have the scientific capacity – thus minor realignment and enhanced resources can allow us to fulfil efficiently such regional specialist needs.

New Caledonia (France): Thanked OIP for its regional support and observed that OIP work could now be included in the New Caledonia JCS; particular interest in shallow water bathymetric capacity in OIP.

Response: OIP is amenable to inclusion in any JCS or other PICT planning document or process if local needs align with the Programmes' capacities. Unfortunately, inclusion in any such document cannot be equated to assurance that capacity or resources to undertake such work are available. The New Caledonian authorities would need to work with OIP to identify and schedule specific tasks and sources of funding to support any future work if this was their wish. At the time of writing no further requests have been forthcoming.

Cook Islands: Congratulated OIPs work programme and made special mention of the efforts of the maritime boundaries sector and partners (AusAID, UNEP GRID, GA, AAGO, ComSec and FFA). Cook Is. also made special mention of the support received from the DSM Project and indicated it's sincere appreciation for OIP's joint (NIWA) delivery of coastal vulnerability work in Mangaia Is. Cook Islands is supportive of the development of OIPs hydrographic capacity; and enquired what legal considerations needed to be taken into account as OIP progresses its maritime boundaries data portal.

Response: Following approval by the 2011 HOG meeting and CRGA, the OIP is progressing its development of a geospatial data discovery and sharing portal which will include maritime boundaries and be compatible / complementary with Geonetwork. OIP has joined UNEP GRID (Sydney Uni. Office) and Geoscience Aust. to develop an AusAID PPSLP proposal to enlist the technical and legal expertise of these agencies in the development of the new server system. Thus OIP intends to ensure its treatment of maritime boundaries data is entirely aligned with both the specific information available from each jurisdiction and will also adhere to international and UNCLOS provisions and standards. It is intended to become the single point of entry for authoritative and accurate boundaries data for Pacific Island Countries and other stakeholders and will be routinely reviewed and updated by OIPs internal boundaries expertise.

United States of America: Congratulated OIP on another successful year; enquired why OIP is under such pressure or demand for service particularly in the area of climate change and questions if partnering with other CROP agencies could reduce this pressure and if proposal development is used to supplement OIPs core budget?

Response: It is important to view this answer in light of OIP's background and role. OIP performs a regionally unique range of tasks and services. There is no, and never has been any duplication of OIP's mandate in the CROP mechanism or other regional agency. OIP is the only marine-geoscience CROP Programme which maintains a full workshop facility, instruments and specialist scientific teams to enable the delivery of our mandate areas.

OIP's tools and skills have always been applied effectively to issues of coastal vulnerability however with the recent advent of climate change awareness and subsequent climate change adaptation funding availability (through Projects) these same services are now under intense demand. Thus given OIPs unique capacity, increased interaction with other CROP agencies and Programmes (which already occurs) does not alleviate pressure, it translates to more pressure as these other programmes invariably request our input and assistance. Implementing collaborative works is a very important part of our programming (see details in Annex 1) however, in many cases it is challenging to even try to recoup the full expenses of supporting such work, let alone generating sufficient additional and sustained funding to boost staff numbers and equipment inventories.

OIP has a highly successful history of capitalising on proposal development and project implementation (please see Annex 1) and the greater proportion of work implemented in the MCSS Sector is project generated. It is important to note OIP has again in 2012 tried to highlight it is at maximum capacity in terms of its ability to support more proposal development and project implementation, but demand continues to grow.

Growing demand is gratify as on one level this is evidence of the quality of OIP work, however despite OIPs sincere wish to meet demand we cannot under current funding dynamics. We are aware that any attempt to stretch further our already overstretched teams and equipment inventories will result in degraded delivery quality and that responsible and sustainable growth to meet demand must be facilitated with improved core/programmatic funding.

French Polynesia (France): Gave thanks to the OIP work team and programme and especially in respect to the coastal vulnerability work being undertaken in Rangiroa, Tuamotu. Sought clarification on what the term “baseline” means in respect to the different work areas of OIP, there appears different connotations?

Response: the meaning of “baseline” is similar across the natural sciences and refers to either “steady state” conditions in a dynamic system (e.g. average sea level could be called a baseline). It is also used to describe the fundamental data required for analysis of resources, risk, environmental function, etc. For example; topographic and bathymetric data (accurate land and seafloor mapping) which provides high quality data on position as well as height (often referred to as x, y & z data; where x and y are latitude and longitude and z is height or depth). This data is a fundamental fixed “baseline” for modelling wave inundation or sea level impacts, etc. The baseline data under-pins the ability for any empirical analysis to occur.

In respect to Maritime Boundaries a “baseline” is still the fundamental starting point for any analysis or calculation of maritime zones or limits (EEZ or ECS). However in this field and in respect to tropical Pacific Island environments, a maritime boundary “baseline” almost ubiquitously refers to a line drawn on a map or image product which falls accurately over the outer seaward edge of an island’s reef.

OIP EMERGING ISSUES AND OPPORTUNITIES 2012

Issues and opportunities relevant to the mandate and on-going work of OIP are articulated both within the main dialogue of the OIP report as well as in the 2011 – 2012 Activity Task matrix (Annex 1). Some of the more prominent “headline” issues are discussed here.

Improving OIP’s Hydrodynamic Modelling Capacity

Climate change concern in PICTs frequently translates into consideration of shoreline vulnerability. Shoreline instability, erosion, wave over topping, seawater incursion and shoreline property and infrastructure damage are all major threats due to both on-going climate variability and climate change stress. Development in PICT’s also predominantly occurs in coastal zones and the departure from former more sustainable lifestyles and aspirations combined with rapidly increasing populations, poses increasingly complex challenges. Traditional coping mechanisms are not adequate to address coastal vulnerability issues in urban and peri-urban coastal environments and in many coastal PICT settlements “development” is synonymous with increasing exposure to coastal hazards.

Sound baseline information regarding the physical and built environment, combined with data which describes dynamic processes such as climate and ocean conditions and extremes are fundamental to managing risk and hazards in the coastal zone. Activities designed to build resilience to natural disasters or for example “climate-proof” shoreline infrastructure must be informed by analysis of such empirical baselines. In turn, computer based modelling techniques, which simulate wind, water flow, waves, sediment transport, sea level rise and inundation are capable of showing the interaction of these processes and the outputs provide empirical, data based information to support improved management of hazards and use of coastal resources.

OIP has taken an important step in the continued development of the open source Geonetwork data management system which provides a single point of entry, archive, discovery and data access facility which endures across multiple Projects and data uses, and continues to keep invaluable data in circulation. Conversely, OIP's hydrodynamic modelling capacity has been largely dependent on proprietary software which requires significant investment in licensing (USD75,000 over the next three years). These high costs are a significant risk to sustained service provision and like all propriety software platforms use and even access and ownership of its products are complex and not easily shared.

OIP wishes to transfer its hydrodynamic modelling capacity across to open source alternatives which offer a free and more universal approach to handling data and model outputs. It is instructive to note the United States Govt. requires that all such data, models and tools funded by taxpayers should be available openly and it is OIP's intention to follow this lead and progress our HD modelling capacity in a way that will allow for "parallel computing", whereby a number of computers can be used to reduce processing time and allow for tighter integration with other systems such as Geonetwork, the Pacific Risk Information Systems (PacRIS), OpenEarth knowledge management initiative (www.openearth.eu), and others. Through this approach, OIP can more seamlessly and efficiently continue to develop an integrated approach between data collection, archiving, analysis and sharing with regional and international partners and build a sustained regional facility to provide high quality advice to coastal zone managers and planners. Confronting the challenges of development in coastal zones is crucial for sustainable development in many PICT settings. The present approaches are invariably implemented on a project-by-project basis resulting in inefficiencies in collating information, developing consistent approaches and building crucially important sustained buy-in and use of such tool in country. Individual projects commonly set out to collect their own baseline data and many lessons of implementation dissipate once the projects are completed. Likewise, where projects are delivered by outside interests this can act to limit even further regional progress and in the extreme outside agencies can seek to protect their knowledge capital and impose restrictions in the reuse of data and subsequent value adding.

Changing waves and coasts in the Pacific (WACOP) Project

An information paper on the need for a comprehensive assessment of wave climate in the Pacific was presented to the SOPAC Governing Council at the 39th Annual Session in 2010. This was largely in response to the damaging wave event in December 2008, which displaced more than 75,000 people across the central western Pacific, but also in answer to the call at the international level by the IPCC in the 4th Assessment Report (2007) for climate change impact assessments in the coastal zone to be broadened to include wave climate rather than focus exclusively on sea-level rise. The SOPAC Council subsequently endorsed a proposal for a regional study on wave climate. The information paper was developed into a full proposal and approved for funding under the ACP Caribbean & Pacific Research Programme for Sustainable Development (10th European Development Fund). The Project will commence on 1 December for 36 months, with a focus on the Cook Islands, Fiji, Tonga, Tuvalu, Vanuatu, and Samoa, and the specific objective to improve the technical knowledge base, information and understanding of coastal hazards and wave energy resources at scales relevant to small Pacific islands. [Please see details of the WACOP project in the Annex 2].

Hydrographic surveying – assisting member countries to fulfil obligations for the benefit of maritime safety, protection of the marine environment and sustainable development of ocean and coastal areas, as required under the UN conventions of Safety of Life at Sea (SOLAS) and Law of the Sea (UNCLOS)

The SOLAS convention requires all coastal States to ensure that hydrographic surveys are carried out and that nautical charts are published and kept up to date. Most nautical charts available for PICTs have not been updated since the Second World War, and some contain

information dating back to the 19th century. Insufficient and outdated hydrographic information is a limiting factor in the development and safe use of the port, harbours, and coastal areas in PICTs. Marine charting is also seen as a fundamental enabler and an important boost to many aspects of economic development. An assessment by the International Hydrographic Organisation (IHO) estimates that the return on an investment from having a national hydrographic program is on the order of 1:10. Similarly, a recent socio-economic study commissioned by the National Oceanic and Atmospheric Administration concluded that for every dollar the US spends on coastal mapping, the benefits they receive in return are worth more than US\$35. This demonstrates the contribution of hydrographic surveying to socio-economic development. The large cost-benefit ratio can generally be attributed to hydrography providing the foundation layer through which many other sectors derive second order growth.

Despite these urgent needs and potential benefits, most Pacific Island Countries and Territories lack the national capacity to plan and implement these activities. This is largely due to the fact that hydrographic surveys are expensive, require specialised technical skills, and are therefore beyond the capacity of the majority of Pacific Island Countries. Likewise, the regional hydrographic charting authorities of the US, UK, Australia, New Zealand and France are not substantially increasing resources for surveying in the region. However, SPC-SOPAC currently operates and maintains marine survey equipment worth approximately A\$1M, and routinely conducts several surveys per year for environmental or geosciences applications in member countries. SPC-SOPAC staff are not trained hydrographic surveyors, and the collected bathymetric data are not necessarily adequate for charting purposes. A range of activities are currently planned in order to strengthen the capacity of SPC to meet internationally recognised hydrographic standards.

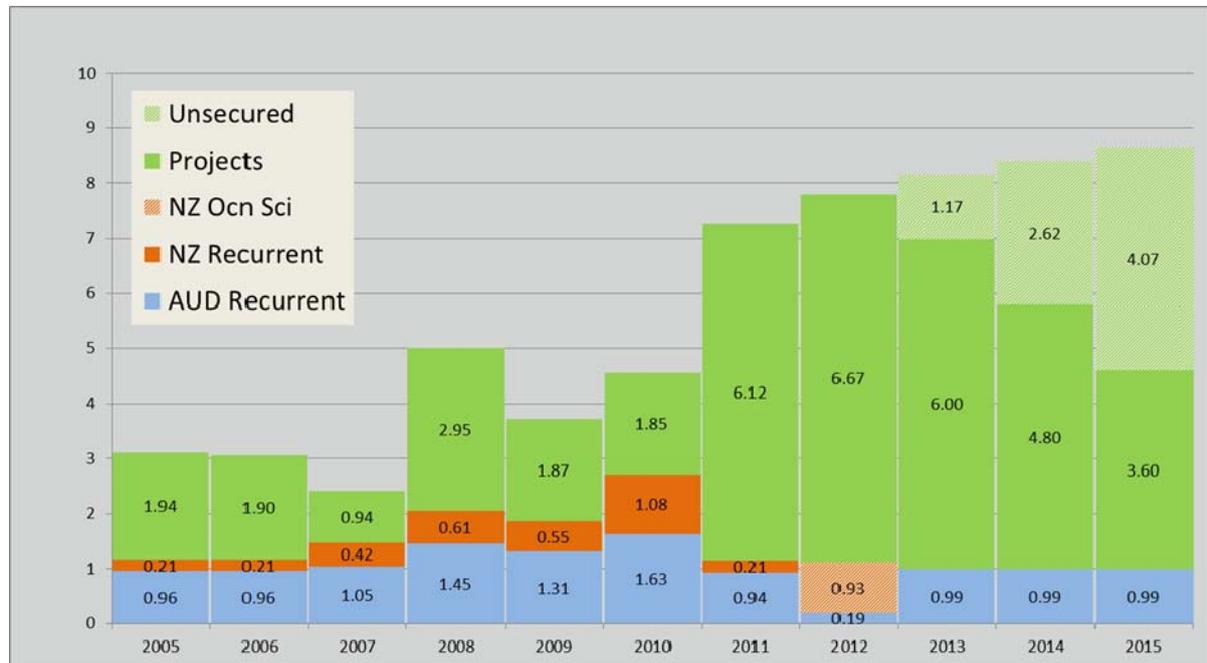
With funding provided by AusAID under the Pacific Public Sector Linkages Program, one experienced SPC staff member will attend the Hydrographic Survey Category B (Cat B) course at the Royal Australian Navy (RAN) Hydrographic School, Sydney, from April 2013. This is a five month course which provides comprehension of hydrographic surveying for individuals with the skill to carry out the various hydrographic surveying tasks to an internationally recognised standard. The Cat B course will be followed up by a 2-3 week long technical attachment of SPC staff to AHS, to further provide the surveyor with experience in the operations of a national hydrographic service. The Activity will also assess SPC's current pool of marine survey equipment and make recommendations on purchases and/or upgrades for additional equipment in order to have full IHO-standard capabilities. AusAID and RAN will also assist by working with SPC to plan and conduct up to two hydrographic surveys based on priorities set by IHO technical visits to Kiribati and Solomon Islands.

The drive to improve the Region's capacity to conduct hydrographic surveying was large initiated through a Memorandum of Understanding (MoU) between the IHO and SPC signed in April 2011. Currently seven States within the SPC region are members of the IHO (France, Fiji, Papua New Guinea, New Zealand, United States of America, Australia, and Tonga), and these are also members of the South West Pacific Hydrographic Commission (SWPHC). All future hydrographic survey activities carried out by SPC will be coordinated with the regional hydrographic charting authorities, the SWPHC, and member countries. This provides the framework for the effective development and coordination of hydrography in the region, and will broaden the marine survey capabilities of OIP to include the supply of hydrographic data for inclusion in nautical charts for the benefit of maritime safety, protection of the marine environment and sustainable development of ocean and coastal areas, as required under SOLAS and UNCLOS.

Ocean and Islands Programme Core Funding

The delivery of OIP's work programme is heavily dependent on project proposals and OIP has a long and successful history in raising the greater part of its yearly budget through competitive proposal development. As with previous years Annex 1 highlights these projects however this

year, all major proposals have also been included in Annex 1 to highlight the scope and magnitude of this potential work. It is often not understood that proposal development is a hugely time consuming task for all Senior staff as, in many cases, the donor agencies require very substantial commitments of time and effort in the design phase. OIP remains committed to strategic proposal development but it should be noted that OIP is rapidly reaching capacity in the number of projects it can implement responsibly under the present recurrent budget dynamic.



Summary of OIP funding dynamic 2005 – 2015 (2013 – 2015 are projected).

In 2012 the Regional Ocean Sciences Project (ROSP) contributed approximately 14% of the total OIP budget or about 17% of the total Project funds for 2012 (see Annex 3). It is important to consider the ROSP funds in the perspective of the broader budget dynamic of the Programme especially given SPC reallocations of AusAID recurrent budget for 2012. Without the ROSP the Ocean & Islands Programme could not have continued to operate effectively in 2012 and OIP staff have already capitalised on the opportunities the ROSP has brought by securing the highest OIP budget on record, and it follows that it has been a successful year of service delivery to members (Annex 3).

OIP's strategic focus towards the assessment of shoreline and coastal zone vulnerability, particularly with reference to climate change adaptation needs in the region has been extremely successful and this is reflected in the growth of project funding. Climate change adaptation assessment and assistance requests by the membership, donors and other regional and CROP agencies has become a substantial component of the Programme's work and present trends would suggest this growth in demand for such services will continue out to 2015 and beyond.

OIP is extremely well placed to sustain the growing demand for coastal vulnerability (climate change adaptation) assessments in the region but only with a requisite increase in core recurrent budget. This is because many technical assessment Projects are short term and many do not allocate (or allow allocation) of funding for salaries. This is particularly the case where PIC members raise funds to cover work costs of a technical assessment but routinely expect that OIP will provide staff time, instruments and equipment and subsequent data analysis and reporting tasks in-kind or free of charge (this is of course the essence of the CROP mechanism).

From this perspective OIP wishes to continue to honour and fulfil these expectations and recognises that OIP's services are unique in the region; i.e. there are no alternatives to providing PICT's with this type of support. The NZ Ocean Sciences Project has greatly facilitated OIP to meet demand in 2012, however there is no indication this project will continue in 2013. Given that OIP, even with the NZ 2012 Grant, has been stretched to its maximum possible capacity in respect to in-kind delivery and project management, design and implementation; OIP requests constructive dialogue on sustained recurrent budget support which will enable the Programme to plan and meet demand.

ANNEX 1 – OIP Activities Report 2011-2012

Reference	Activity/Task	Indicators	Work Status	KRA/status	Comments	Donor/RB	Balances T6
1. Marine, Coastal Science and Survey – Sector							
Fiji OI 1.1.7	Coastal geomorphology / hazard maps in the Navua Delta & nearshore environs, Viti Levu, Fiji. Collaborative work between OIP & Govt of Fiji. Bilateral funding from KIGAM FJ Govt. for implementation costs only.	Develop understanding of vulnerability in the Navua Delta and coastal environs to provide Govt. FJ and local authorities with improved decision making and planning tools for this rapidly developing catchment.	Technical work and reporting completed; <ul style="list-style-type: none"> • Marine bathymetric, seismic and oceanographic surveys completed. • Data processed. • GPS survey completed and current meter data collected. • Sediment sampling and satellite image acquisition undertaken. • Historical image analysis completed. • Smith, R. 2012 Technical Report <i>Coastal geohazards associated with the Navua River, Rovondrau Bay and offshore areas</i> SPC-SOPAC Division Published Report. 	Completed 1, 2 & 3. CC Related	Whilst the tasks under this project are complete aspects of this work have now transferred and the assessment in Navua is being further expanded under the "Assessment of Climate Change Impacts on Drainage Networks & Infrastructure: Rewa and Navua Delta's", project – see below.	FJ Bilateral KIGAM FJ bilateral (KIGAM) (Yr 2008 US\$50k) Recurrent budget - Project design, oversight staff costs and Prog. support.	GO-117-FJ-09-01 FJD20 919 as at 31/8/12
French Polynesia OI 1.1.8	Reducing the risk to cyclone waves in the Tuamotu Archipelago. Supporting Disaster Risk Reduction in Pacific OCTs Project (EDF C Envelope). The DRP delivers this project in French Polynesia, New Caledonia, Wallis & Futuna and Pitcairn Is. OIP partners to implement technical work in the Tuamotu Group, French Polynesia.	Improve the geospatial baselines for some atolls in the Tuamotu Archipelago and use this data to quantify the risk of cyclone wave inundation and impact. Activities will include the acquisition of bathymetric and topographic data to create seamless coastal terrain models. This data will support numerical modelling of extreme waves and inundation. OIP will also produce inundation maps and assessments to inform decision making.	Mobilisation of the MCSS team to FP began in May 2011 and the deployment of oceanographic instruments has been underway since June 2011. All field work was completed by June 2012 and baseline data including: <ul style="list-style-type: none"> • Water current and wave data. • Offshore and lagoon bathymetry. • Sediment sampling and drop camera benthic surveys. • Intertidal flat boulder surveys. Data processing of multibeam data underway now as are parts of the inundation and storm surge modelling tasks. Data reports are also underway.	Ongoing 1, 2 & 3. CC Related	New positional and survey equipment purchased last year in part to support this major programme of work in FP has been used with excellent result during the Rangiroa surveys.	<u>Refer to DRP for budget figure</u> EU EDF9 C Envelope Recurrent budget - Project design, and Prog. support.	
Tonga Regional / OIP development OI 2.6.1	Tsunami Hazard Assessment Project - Phase III. This is a collaborative program of work implemented by Geoscience Australia	Phase III aims to build regional tsunami modelling capacity in OIP. The 3 rd Phase of a multi-year programme to build OIP in-house tsunami modelling capacity and is implemented collaboratively between OIP, DRP and Geoscience Australia. This phase	<ul style="list-style-type: none"> • LiDAR data finally became available in May 2012 and has been integrated with the 2011 deep water bathymetry and topographic survey data to produce a continuous high quality DEM. • Data report and map for Northern Tongatapu Platform bathymetry completed; 	Ongoing 1 & 3 CC Related (same baselines)	Approximately 6 months delay caused by the late arrival of the Australian Govt. funded (DCCEE) LiDAR data acquisition of Nukualofa. Once all tsunami scenarios have been run the next component of work will be undertaken with DRP, Tonga	AusAID FJD120,000 Recurrent budget – Project design, oversight and Prog. support.	GO262-TO-11-01 (FJD217,794) as at 31/8/12

	and OIP and is funded by the AusAID, Pacific Public Sector Linkages Programme (PPSLP).	of work is concentrated on the development of an improved inundation model for Nukualofa Tonga and will answer broad scale questions regarding baseline data quality needs to support tsunami inundation modelling and evacuation mapping.	<p>Smith, R., 2012, Technical Report – <i>Multibeam Bathymetric survey of the Tongatapu-Eua block</i> (RESTRICTED). SPC-SOPAC Division Published Report 22.</p> <ul style="list-style-type: none"> • Produced Bathymetric chart; Smith R 2012 <i>Bathymetry map Tongatapu –Eua shelf</i> SOPAC BM. • Data report for RTK topographic data of Tongatapu and data analysis / comparison with previous available dataset. Damlamian, H. & Raj Amrit 2011: <i>Topography data acquisition in Tongatapu using Real Time Kinematic GPS., Tonga</i>. AusAID Tsunami project Phase 3. SOPAC Division Report. • OIP HD Modeller completed 6 week attachment in Geoscience Australia to develop modelling techniques. • Tsunami inundation modelling to support evacuation planning in Tongatapu, in progress now. • Additional earthquake scenarios being generated by GA and subsequent modelling tasks planned to be completed before Nov. • Sensitivity analysis in progress now; including 8 DTM datasets comprised using all available datasets from Lidar to SRTM and Marine Charts. This will model sensitivity to topography and bathymetry data quality and provide empirical guidance on minimum needs for modelling PIC environments. Work ongoing. 		<p>Meteorology Office and GA to develop hazard and evacuation map products and deliver these in-country.</p> <p>It is also important to note that significant progress has occurred in OIPs inundation modelling capacity with a gradual movement towards open source platforms. Commercial software modelling platforms have high licencing costs which are challenging for OIP to maintain a move to open source where possible provides practical solutions in regards to sustainability.</p>		
Regional	<p>PRISMS Pacific Regional Island Shoreline Monitoring System.</p> <p>Developed due to regional demand to understand shoreline change in response to sea level rise. This monitoring framework</p>	<p>Improved understanding of the response of PIC soft shoreline environments to stress such as;</p> <ul style="list-style-type: none"> • Climate change / sea level rise • Climate & sealevel variability. • Development pressure in coastal zones. • Resource use and settlement patterns in coastal environments. <p>Provision of guidance and high</p>	<p>Existing results continue to be used to inform improved data base decision making with regards to coastal vulnerability and adaptation response and whilst unsecured funding issues have prevented systematic work in 2012 significant new data has been retrieved and uploaded to the OIP Geonetwork for later analysis.</p> <p>A collaborative agreement between the University of Auckland and OIP completed in June 2012 will facilitate analysis of PRISMS</p>	<p>Ongoing 1,2 and 3</p> <p>CC Related</p>	<p>OIP participated in the Australian Government (DCCEE) Climate Change & the Coast in Small Island States <i>Experts Workshop</i> to plan potential future work of the Pacific Australia Climate Change Science and Adaptation Planning Program (PACCSAP). There was significant interest and support for the continuation of PRISMS by the experts present however thus far an effective mode to</p>	<p>Recurrent Budget</p>	-

	can detect soft shoreline response to climate variability, development pressure and sea level rise and other coastal development stress.	quality data to inform decision makers. Support the appropriate design of shoreline adaptation responses and engineering.	existing data over the next two years. All processed data products will be return to OIP for uploading to Geonetwork. The islands of Tuvalu will be the first locations for analysis under this agreement.		sustainably fund these efforts is elusive.		
Tonga	<p>Assessing Vulnerability and Adaptation to Sealevel Rise in Lifuka Is., Ha'api - Tonga.</p> <p>Funded by the DCCEE (Dept. of Climate Change & Energy Efficiency - Australia), PACCSAP (Pacific Australia Climate Change Science and Adaptation Planning Program). Implemented by OIP, WSP and the Human Development Division in partnership with the govt. of Tonga.</p>	<p>The project will deliver an evidence-based adaptation strategy with options to reduce the impacts of coastal vulnerability on the western shores of Lifuka Island. It also supports interagency planning in Tonga, practical on the ground capacity build opportunities and will provide data as a basis for decision-making at the national and sub-regional level. OIP will deliver topographic surveys, oceanographic survey, beach profiling, shoreline mapping and assessment. OIP will also integrate LiDAR data to produce a 3D bathymetric model and produce wave inundation modelling. (WSP will also undertake linked groundwater mapping and water resource assessments).</p>	<ul style="list-style-type: none"> Community engagement and surveys of the social impacts and implications of response and adaptation have been undertaken by the Human Development Division in collaboration with OIP and WSP. OIP has completed oceanographic survey components and deployed instruments have been retrieved. Likewise, habitat mapping baseline data has been collected. Data processing, GIS map products and reports are underway now. Some field work such as beach profiling will be completed later in 2012. Development of Lidar DEM and inundation modelling is underway now. 	Ongoing 1, 2 & 3 CC Related	The SOPAC Division was instrumental in the conception and development of this multi-disciplinary / cross SPC Programme project. This provides a model for future multidisciplinary efforts.	OIP component, AUD220,735 AusAID / DCCEE (Aust.) ICCAI; PASAP	Recurrent budget - Project design, oversight and Prog. support.
Cook Is. 2011.001	<p>Benthic Habitat Mapping and Water Circulation in Muri Lagoon, Rarotonga, Cook Islands.</p> <p>Work requested by and implemented in collaboration with the Cook Islands Ministry of Marine Resources (MMR).</p>	<p>The CK MMR has requested a baseline benthic habitat map of Muri Lagoon, Rarotonga and an associated desk top review of existing data to determine and monitor change in reef and algae coverage over time.</p> <p>The MMR has also requested an investigation of baseline water flow characteristics (speed and direction) through Muri Lagoon. These are required to monitor and observe possible changes expected with removal of existing engineered structures (fish traps).</p>	<ul style="list-style-type: none"> The desktop review of existing SOPAC data holdings as well as all field work has been completed in respect to this project. Likewise a baseline benthic habitat map of Muri lagoon has been produced and delivered to MMR Cook Is. The technical report pertaining to the oceanographic data collected has also been completed and delivered. Kruger J., Sharma A., George N., and Robinson A., 2011. <i>Marine Habitat Map of Muri Lagoon, Rarotonga Island, Cook Islands</i>. SOPAC Division Graphic Report 34. OIP staff travelled to Rarotonga to provide a final briefing in respect to this work in Nov 2011 and this included presentation of the final habitat map and water circulation 	Complete 1, 2 & 3 CC Related		CK (MMR) NZD 14,022 NZD 8,720	Recurrent budget - Project design, staff costs, oversight and Prog. support.

Cook Is.	<p>A Geospatial Framework for Climate Change Adaptation in the Coastal Zone of Mangaia Island, Cook Islands.</p> <p>Jointly implemented by OIP and NIWA (National Institute of Water & Atmospheric Research Ltd. NZ). Funded under a contract to SPREP's Pacific Adaptation to Climate Change Project (PACC).</p>	<p>This study is designed to provide timely and actionable geospatial information for the management and planning in the coastal zone of Mangaia Is. CK. The project will enhance the capacity of the Cook Islands to adapt to climate change and climate variability in selected coastal areas. Work includes the collection of nearshore bathymetric data, and topography, the collection of oceanographic data and wave inundation modelling.</p>	<p>report.</p> <p>The field work component of this project including the collection of oceanographic, bathymetric and topographic baselines to support assessment and modelling has been completed.</p> <p>All technical reporting and chart products have been also been complete and have been sent for review in the 2nd quarter 2012. These include;</p> <ul style="list-style-type: none"> • Damlamian, H., Kruger, J., and Sharma, A., 2012. <i>Topographic data acquisition survey in Mangaia, Cook Islands</i>. SOPAC Division Technical Report PR83. • Kumar, S., Kruger, J., and Begg, Z., 2012. <i>Single beam bathymetric survey of Mangaia, Cook Islands</i>. SOPAC Division Technical Report PR82 • Kruger, J., 2012. <i>Coastal Terrain map of Mangaia, Cook Islands</i>. SOPAC Division Map GR19 	<p>Complete 1 & 3</p> <p>CC Related</p>		<p>FJD\$361790</p> <p>Contract SPREP – PACC Project</p> <p>Recurrent budget - Project design, oversight and Prog. support.</p>	<p><u>GO11A-CK-10-01</u></p> <p>FJD42, 74 as at 31/8/12</p>
Regional	<p>WACOP Changing Waves & Coasts in the Pacific</p> <p>Funded by the EU/ACP Research Programme for Sustainable Development. This proposal developed in collaboration with USP and UNESCO-IHE, will seek to improve understanding of regional wave dynamics and their influence on shoreline processes</p>	<p>The project outcomes will contribute to regional and global understanding of potential climate change and climate variability impacts with respect to wave climate and provide information for improved understanding of coastal vulnerability and adaptation responses in PICs.</p>	<p>Proposal was developed and submitted in the 1st quarter 2011 and was accepted in mid-2012.</p> <p>OIP submitted a request to defer the start date for the project until 1st Dec 2012 which was accepted. Thus recruitment and work will be underway by the 1st quarter of 2013.</p>	<p>Start date Dec 2012.</p> <p>1 & 3</p> <p>CC Related</p>	<p>OIP submitted a request to defer the start date for the project until 1st Dec 2012 which was accepted. Thus recruitment and work will be underway by the 1st quarter of 2013.</p>	<p>FJD596,516</p> <p>EU/ACP Research Programme for Sustainable Development</p> <p>Recurrent budget - Project design, oversight and Prog. support.</p>	<p>TBA</p> <p>FJD596,516 as at 31/8/12</p>
Fiji & Tonga	<p>PARDI - Supporting Cultured Pearl Industries of Fiji and Tonga Project.</p> <p>Joint, James Cook University and OIP (and</p>	<p>To strengthen the pearling industry associations in Fiji and Tonga by; Conducting training and workshops relating to economic capacity building for farmers in Fiji and hold workshops on half-pearl seeding techniques for farmers in Tonga.</p>	<p>Summary outputs over last reporting period;</p> <p>Fiji</p> <p>2nd Draft of Industry Development plan in Fiji.</p> <p>Disease testing for Pearl Farms in Fiji;</p> <p>Mapping the hydrodynamics of Savusavu Bay;</p> <p>In conjunction with OIP, the Project deployed acoustic and mechanical current meters and</p>	<p>Ongoing 1 & 2</p>	<p>The PARDI Project Scientist has made significant progress in 2012 and excellent interaction and assistance from the technical and administrative staff of OIP / SOPAC Division. OIP has made significant commitments with instrumentation and field deployment</p>	<p>ACIAR/PARDI FJD193,234</p> <p>OIP assistance - recurrent budget</p>	<p><u>GO-RT-11-17</u></p> <p>(FJD65,822) as at 31/8/12</p>

	SPC Aquaculture Sector) Pacific Agribusiness Research for Development Initiative (PARDI).	The Project scientist sits within OIP and is provided with logistical and administrative support to implement the work program. Support also provided by OIP (mainly MCSS and Technical Workshop facility) to improve understanding of water quality and flow regimes pertinent to pearl culture.	<p>wave height sensors around Savusavu Bay (July 2012); Supporting ACIAR PhD. Student Pranesh Kinshore's work of the environmental effects of pearl quality; Identification of villages for spat collection assessment in conjunction with the Fiji Fisheries Division; Assistance to new industry entrant at Namarai on North Eastern Viti Levu.</p> <p>Tonga Hatchery seawater system upgrade in the MAFF aquaculture facility at Sopu, Tongatapu; Trial of high density rearing system at the Sopu facility to facilitate higher production volume (up to 20 fold) from a reduced tank volume; Assist ACIAR MSc. scholarship holder (Jerome Taoi), to review the system at the Sopu facility; Completion of a successful hatchery run in Vava'u; A guide for half pearl seeding completed and circulated to MAFF and Vava'u stakeholders; PARDI project has purchased and distributed half pearl seeding tools; Initiated the production of an Industry Development Plan for Tongatapu and Vava'u; Collaborative work with USP to map the value chain of the Mabe industry in Tonga undertaken.</p>		etc. as in-kind contribution to the PARDI Project for these services.		
Fiji	<p>Assessment of Climate Change Impacts on Drainage Networks & Infrastructure; Rewa and Navua Delta's. Jointly implemented by NIWA (National Institute of Water & Atmospheric Research Ltd. NZ) and OIP at the request of the Ministry of Primary Industries, Fiji. Funded under a contract to SPREP's Pacific Adaptation to Climate Change Project (PACC).</p>	<ul style="list-style-type: none"> • Proposal development, NIWA, OIP MWH (FJ Govt.), Agresearch Ltd (NZ) and Fiji National University. • Develop baseline information necessary to support a risk-based approach to CCA. • Assess the impact of sea-level rise and climate change on the frequency, magnitude and extent of inundation on the agricultural drainage schemes in the Rewa & Nauva. • Provide objective, evidence-based framework for CCA strategies to develop and demonstrate drainage 	<p>Work completed during the last reporting period.</p> <ul style="list-style-type: none"> • Bathymetric surveys completed and data analysis underway. • Topographic surveys completed and data analysis underway. • Water level instruments deployed and maintained. • Compilation of a DTM (digital terrain model) underway to support drainage modelling. • Scanning, geo-correction and analysis of historical aerial photography underway. • Support NIWA staff's site visits, ongoing liaison and collaboration with NIWA technical teams and progress reporting. 	<p>Ongoing 1, 2 & 3</p> <p>CC Related</p>	<p>The contract was signed in the 2nd quarter 2011. Excellent, collaboration between NIWA scientists and OIP, some delays with field work due to weather and routine issues with instrumentation.</p>	<p>FJD103,956 Contract SPREP – PACC Project</p> <p>Recurrent budget - Project design, oversight and Prog. support.</p>	<p><u>GO-FJ-11-02</u> (FJD95,067) as at 31/8/12</p>

		guidelines. Demonstrate an approach that is scalable and transferrable to other areas in Fiji.					
FSM (Yap)	Geotechnical survey to support the design and appropriate construction of a seawall / bund at the Yap State petroleum storage facility Colonia. Work undertaken under contract to the FSM Petroleum Corporation.	The Petroleum Corporation terminal in State of Yap is constructed on reclaimed land in the main harbor of Colonia. The existing protecting seawall has suffered damage from wave action, particularly extreme events and the Corporation is commencing works to upgrade and rehabilitate the Yap facility. OIP has been contracted to undertake geotechnical drilling at the site as well as to provide bathymetric and topographic surveys and analysis of these data products.	This task has been completed with the following work undertaken and delivered: <ul style="list-style-type: none"> • Develop the proposal / work plan and subsequent contract. • Mobilization of the OIP drill rig and equipment. • Completion of 5 boreholes. • Completion of near-shore bathymetric, seismic surveys. • Completion of associated topographic survey. • Data analysis and reporting completed and report delivered; • Smith, R., Lal, A., 2012, <i>Technical Report – FSM Petroleum Corporation Yap terminal geotechnical investigations</i> (RESTRICTED). SPC-SOPAC Division Published Report 35. 	Complete 1 & 3 CC Related	The OIP drill rig has been placed in storage in Yap as the FSM Govt. has indicated an interest to undertake further geotechnical studies to support infrastructure development (bridge footings). The rig is expected to return to Suva in the first quarter 2013.	Contract FJD 152,000 FSM Petroleum Corporation. Recurrent budget - Project design, oversight staff costs and Prog. support.	GO-FM-11-01 FJD1827.55 as at 31/8/12
FSM (Kosrae)	Review of a Coastal Rehabilitation Report, site visit and Development of specific recommendations for coastal adaptation actions in Kosrae. Undertaken by OIP in partnership with NIWA. A CCCPIR funded assessment undertaken for the SPC/GIZ Coping with Climate Change in the Pacific Island Region Project.	An unscheduled task. Kosrae State Authorities requested the GIZ CCPPIR Project to undertake a review of their existing coastal management plan. GIZ in turn approached OIP and NIWA for assistance to undertake the review, site visits and provide recommendations to the Kosrae Authorities.	The ToR for the Project was developed in consultation with GIZ and NIWA, and the review and site visit was undertaken in July. The review and assessment was completed with the assistance of the Kosrae State Authorities and a further proposal for work is being developed now. The OIP, NIWA and GIZ team also presented the findings of the review and assessment to stakeholders and agreed on the plan to develop a further full proposal for work.	Complete 2 & 3 CC Related		Recurrent budget GIZ covered travel costs only.	
Palau	Rapid assessment of shoreline erosion in Omekang,	An unscheduled task. Koror State Authorities and	The ToR for the Project was developed in consultation with GIZ and a rapid assessment was undertaken in July.	Complete 2 & 3		Recurrent budget GIZ covered travel	

	<p>Ngermeaus and Ngerkesill Islands, Rock Islands, Palau.</p> <p>A CCCPIR funded assessment undertaken for the SPC/GIZ Coping with Climate Change in the Pacific Island Region Project.</p>	<p>National Government had expressed concern over the instability of tourist beach areas in the Rock Islands marine park area and requested the GIZ CCPIR Project for assistance.</p> <p>GIZ in turn approached OIP for assistance to undertake a rapid assessment of several important recreational beach areas in the Rock Is. and develop key recommendations for further work and mitigation.</p>	<p>The assessment was completed with the assistance of the Koror State Authorities and the technical report recommendations has been delivered to GIZ; Webb, A. 2012 <i>Technical Report - Rapid assessment of shoreline erosion in Omekang, Ngermeaus and Ngerkesill Islands, Rock Islands, Palau.</i> SPC-SOPAC Division Published Report PR112.</p>	CC Related		costs only.	
Cook Islands	<p>Support Manihiki pearl farms and lagoon management, Cook Islands.</p> <p>Unscheduled request for assistance from Cook Islands Govt. undertaken in collaboration with PARDI.</p>	<p>Generate a detailed bathymetric map of Manihiki Lagoon for the purposes of lagoon pearl farm management.</p> <p>Related is ongoing work to upgrade lagoon water quality monitoring buoys.</p>	<p>A digital and hard copy large scale map with very high resolution has been produced and delivered. This incorporates satellite image backdrops as well as OIP multibeam bathymetric data.</p> <p>Cook Is. had historically invested in water quality monitoring in Manihiki and this upgrade project is working closely with the OIP based PARDI to improve regional monitoring and pearl management information.</p>	Ongoing 1 and 2		Recurrent Budget	<u>GO184-CK-01-02</u> FJD2274 as at 31/8/12
Kiribati	<p>Rapid assessment of Ronton Port, Kiritimati Is. Kiribati.</p> <p>Undertaken as a component of a bilateral Kiribati / NZAid funded study to investigate options to improve Ronton's port facility.</p>	<p>At the request of NZAid and the Govt. of Kiribati, Kiritimati Is. authorities, complete a rapid assessment of the Ronton Port entrance and wharf facility. This was undertaken to assist decision making and identify development options for this important infrastructure – the main port of entry in the Line Islands Group.</p>	<p>The ToR for the Project was developed in consultation with NZAid and their contractors Tonkin and Taylor International as well as the Govt. of Kiribati.</p> <p>The assessment was completed March 2011 and the final technical report and recommendations was delivered in October 2011; Kruger, J. and Begg, Z. 2011 <i>Technical Report – Coastal processes at Port of Ronton Kiritimati Island, Kiribati.</i> SPC-SOPAC Division Published Report PR8.</p>	Completed 1, 2 & 3		Recurrent Budget	NZAid covered travel costs only.
Fiji	<p>Support coastal infrastructure development, Fiji.</p> <p>Unscheduled Fiji Govt. requests for bathymetric and geophysical survey</p>	<p>Marine geophysical survey is crucial for a number of development needs in the near shore / coastal zone. The Govt. of Fiji requested assessment to inform decision making in regards to; dredging in Ovalau; port</p>	<p>Survey equipment has been mobilised and all tasks have been completed. Likewise the following charts and reports have been delivered; Smith R. 2012 <i>Bathymetry map Yaswa Shelf</i> SOPAC BM44 map series; Smith R 2012 <i>Habitat Map Yasawa Shelf</i> SOPAC BM45 map series; Smith R. 2012 <i>Cable route</i></p>	Completed 1, 2 & 3 CC Related	<p>A formal request has also been received from the Department of Roads to undertake 4 jetty site surveys in Southern Lau. including; Mola, Cicia, Qilaqila Vanuabalavu and Lakeba. This would include single channel seismic surveys to map bedrock for foundation</p>	Recurrent Budget Mobilisation and survey costs IK Fiji	<u>GO-FJ-11-01</u> : FJD14,751 as at 31/8/12 <u>GO-FJ-12-01</u> FJD4059 as at 31/8/12

	assistance in support of infrastructure development. Task costs have been met independently by in-kind funds from the Fiji Government.	development, Savusavu and Naduri.	<p><i>survey map for USP Fibre Optic.</i> Smith R., 2012 <i>Technical Report Dredging Assessment Survey Buresala, Ovalau Fiji.</i> SPC-SOPAC Technical Report PR100.</p> <p>Smith, R., 2012, <i>Technical Report – Multibeam bathymetric and seismic survey for port development, Valaga Bay Savusavu, Fiji Islands.</i> (RESTRICTED). SPC-SOPAC Division Published Report 94.</p> <p>Smith, R., <i>Technical Report – Multibeam bathymetric and seismic survey for port development, Naduri, Vanua Levu, Fiji Islands</i> (RESTRICTED). SPC-SOPAC Division Published Report 36.</p>		<p>conditions.</p> <p>OIP will develop a budget for this continued work and forward to the Fiji Govt.</p>		GO13D-FJ-09-02 FJD827 as at 31/8/12
Niue	<p>Wharf infrastructure upgrade support, Niue.</p> <p>Govt. Niue request for geophysical survey and drilling to support port of entry infrastructure development.</p> <p>Task costs will be met independently by in-kind funds from the Niue Government.</p>	<p>Reef geophysical survey and drilling to support design and decision making for the planned upgrade of Niue's main port facility. Previous upgrades have failed and Niue has been subject to extreme wave conditions during tropical cyclones and thorough testing and geophysical examination of the reef platform is required.</p> <p>The Govt. of Niue has requested assessment independently and OIP is working closely with Niue to develop this work plan.</p>	<p>Costing and logistic planning for survey has been completed. OIP will also make a significant equipment investment with new portable drilling system to facilitate this logistically challenging work.</p> <p>OIP is awaiting the Govt. of Niue's final decisions on funding and time lines to implement this work.</p>	Proposal 1, 2 & 3		<p>Unsecured FJD 260,000</p> <p>Recurrent budget Proposal development</p>	
Fiji	<p>Operational wave forecasting for early warning systems, Viti Levu, Fiji.</p> <p>This proposal has been developed as part of the broader DRP lead proposal against the GFDRR (Global Facility for Disaster Risk Reduction & Recovery), funded by the ACP-EU</p>	<p>Proposal still in development and not yet accepted.</p> <p>This proposal has two components: 1) Wave hazard assessment & monitoring, and 2) Wave forecasting system development. These components will aim to increase knowledge of risk in coast environments and seek to develop improved communication and response actions in collaboration</p>	<p>The development of this proposal has been an ongoing collaborative effort between OIP and DRP and if successful it will be implemented jointly by OIP, DRP and the Fiji Meteorological Service.</p> <p>The proposal has been submitted along with an initial log frame of tasks and associated budget. Depending on the outcome of the initial Stage One Application document, OIP will provide further inputs into the next component of the proposal development process.</p>	<p>Proposal 1, 2 & 3</p> <p>CC Related</p>	<p>Subject to approval this initiative may become operational in 2013.</p> <p>It is important to note that the development of such proposals requires very significant commitment from Programme staff beyond their normal inline duties. Despite continual reporting this burden is not understood and remains an over looked aspect of OIP work. OIP has reached its maximum sustainable level of proposal development and whilst</p>	<p>Unsecured USD 1.1million</p> <p>Recurrent budget Proposal development</p>	

	Natural Disaster Risk Reduction Program.	with the Fiji Meteorological Service.			demand for growth by members and donors is high, OIP cannot respond further unless improved programme resources are made available.		
Kiribati	<p>Vulnerability assessment of the Bonriki freshwater reserve and international airport to coastal hazards and climate variability and change.</p> <p>Proposal invited by DCCEE (Dept. of Climate Change & Energy Efficiency - Australia), PACCSAP (Pacific Australia Climate Change Science and Adaptation Planning Program). Implemented by OIP and WSP.</p>	<p>Proposal still in development and not yet accepted.</p> <p>The proposal work intends to ascertain the relative risks of wave over topping on the Bonriki Oceanside coast under present and future ocean conditions. This shore protects the Bonriki freshwater reserve which provides the greater percentage of urban South Tarawa's reticulated fresh water supplies. It is hypothesised that the risk / incidence of wave overtopping will increase and the subsequent impact marine water infiltration into the freshwater lens is at this time poorly understood. The study will provide empirical baselines to assess the risk and assist to develop mitigating strategies.</p>	<p>The development of this proposal has been an ongoing collaborative effort between OIP, WSP and the Resource Economic Sector of SOPAC through 2012.</p> <p>OIP has undertaken site visits to Bonriki and met with Tarawa stakeholders as well as continued dialogue with DCCEE to develop this program of work.</p> <p>At the time of writing the draft proposal has been completed and the log frame of tasks and associated budget have also been finalised. This will be reviewed by DCCEE and it is expected that an agreement will be reached in the 3rd quarter 2012.</p>	<p>Proposal 1, 2 & 3</p> <p>CC Related</p>	<p>Subject to approval this Project is anticipated to run from September 2012 to June 2014.</p> <p>It is important to note that the development of such proposals requires very significant commitment from Programme staff beyond their normal inline duties.</p> <p>Despite continual reporting this burden is not understood and remains an over looked aspect of OIP work. OIP has reached its maximum sustainable level of proposal development and whilst demand for growth by members and donors is high, OIP cannot respond further unless improved programme resources are made available.</p>	<p>Unsecured <i>ca</i> AUD 1.4 million.</p> <p>Recurrent Budget Proposal development</p>	
Solomon Is.	<p>Development of adaptation and vulnerability reduction options Taro and Choiseul Bay, Solomon Islands.</p> <p>Proposal invited by DCCEE (Dept. of Climate Change & Energy Efficiency - Australia), PACCSAP (Pacific Australia Climate Change Science and Adaptation Planning Program). Implemented by OIP and WSP.</p>	<p>Proposal still in development and not yet accepted.</p> <p>This proposal is poorly developed at this time however it is expected that it will address issues of vulnerability for the low-lying community of Taro (the provincial capital of Choiseul and site of the airstrip). It is also proposed that the assessment will consider and assess adaptation options and use resource economics and other tools to relay the relative merits of adaptation options to the Taro community to support planning and decision making.</p>	<p>The development of this proposal has been an ongoing collaborative effort between OIP, WSP and the Resource Economic Sector of SOPAC through 2012.</p> <p>This proposal originally focused on the Lungga River delta area east of Honiara and was written to a first order draft stage. Subsequent consultations with the Solomon Island Government shifted the focus to Choiseul Province.</p> <p>Planning for a reconnaissance / scoping mission is currently being prepared to allow the proposal development team to ascertain the issues of vulnerability, environment and local community perceptions.</p>	<p>Proposal 1, 2 & 3</p> <p>CC Related</p>	<p>Subject to approval this Project is anticipated to run from Dec 2012 to June 2014.</p> <p>It is important to note that the development of such proposals requires very significant commitment from Programme staff beyond their normal inline duties.</p> <p>Despite continual reporting this burden is not understood and remains an over looked aspect of OIP work. OIP has reached its maximum sustainable level of proposal development and whilst demand for growth by members and donors is high, OIP cannot respond further unless improved programme resources are made available.</p>	<p>Unsecured <i>ca</i> AUD 1.0 million.</p> <p>Recurrent Budget Proposal development</p>	

Regional	<p>PPCR Pilot Program for Climate Resilience</p> <p>Proposal invited by World Bank / Asian Development Bank. To deliver SPCR (Strategic Program for Climate Resilience). Implemented by OIP and WSP.</p>	<p>Proposal still in development and not yet accepted.</p> <p>This proposal is poorly developed at this time and work in 2012 has centred on the development of a two country concept, nominally a high island and low island scenario which will deliver multi-disciplinary vulnerability assessment and consider adaptation options related to the identified risks.</p>	<p>The development of this proposal has been an ongoing collaborative effort between OIP and WSP.</p> <p>The concept for PPRC is targeted at component 2; <i>Identifying and implementing practical climate change adaptation and disaster risk reduction knowledge and experience.</i></p> <p>Initially, it is hoped the preliminary document can secure seed funding for full proposal development.</p>	<p>Proposal 1, 2 & 3</p> <p>CC Related</p>	<p>Subject to approval this initial concept development is expected to trigger full proposal development in early 2013.</p> <p>Whilst a complex and time consuming process it should be noted that in this initiative an initial USD320,000 can be made available for proposal development. This highlights the disparity between this and other donor modes of operations and CROP expectation.</p> <p>Potential PPCR funding for broader SPC implementation ca USD 6 million</p>	<p>Unsecured USD 320,000 for proposal development.</p> <p>Recurrent Budget Concept development</p>	
Regional OIP development	<p>Capacity Building in Hydrography for Coastal Development.</p> <p>A collaborative program of work implemented by OIP and the Australian Hydrographic Service. Funded by the AusAID, Pacific Public Sector Linkages Programme (PPSLP).</p>	<p>Proposal still in development and not yet accepted.</p> <p>This proposal intends to strengthen the capacity of SPC/OIP to meet internationally recognised hydrographic standards and in turn assist members to fulfil hydrographic obligations under the United Nations Convention on the Law of the Sea (UNCLOS) and the International Convention of Safety of Life at Sea (SOLAS V). Appropriate and certified hydrographic charting is fundamental to the maintenance of shipping services in the region and underpins continued economic development, trade, food security, tourism, security, etc.</p>	<p>The development of this proposal has been an ongoing collaborative effort between OIP and the Australian Hydrographic Service since late 2011. It recognises that OIP already operates and maintains approximately AUD 1million of hydrographic survey equipment routinely but OIP does not have certified hydrographers on staff thus this data cannot easily be incorporated into chart products.</p> <p>OIP produced an unsuccessful concept for PPSLP in 2011 and this further attempt in 2012 has successfully gone to the second round.</p> <p>A full proposal is being developed by OIP now and log frame of tasks and associated budget have not yet been finalised. This will be submitted to AusAID in the 3rd quarter 2012.</p>	<p>Proposal 1, 2 & 3</p>	<p>Subject to approval this Project is anticipated to start in the 4th quarter 2012.</p> <p>OIP MCSS staff attended and presented at the SWPHC meeting in Brisbane Feb 2012 and presented on OIP hydrographic capacity and work.</p> <p>OIP MCSS Sector is collaborating with EDD and UKHO to conduct an IMO sponsored 2-week hydrographic training course for PICs as well as Bangladesh, Myanmar and Sri Lanka, in Oct 2012. Several key OIP staff will attend.</p> <p>In respect to proposal development it is important to note that such proposals require very significant commitment from Programme staff beyond their normal inline duties.</p>	<p>Unsecured AUD 200,000 AusAID, PPSLP</p> <p>Recurrent Budget Proposal development</p>	
Regional	<p>Building Safety and Resilience in the Pacific Project.</p> <p>Funded under the 10th EU EDF Intra-ACP envelope.</p>	<p>Action fiche submitted to the EU by DRP and full proposal development is subject to acceptance of the fiche.</p> <p>The project aims to reduce the vulnerability as well as the social, economic and environmental costs</p>	<p>This proposal is led by DRP with input from OIP and WSP. OIP is expected to deliver under Result Area 4; Improved understanding of natural hazards and reduction of underlying risk;</p> <ul style="list-style-type: none"> Number of countries with expanded risk profiles. 	<p>Proposal 1, 2 & 3</p> <p>CC Related</p>	<p>Subject to approval this initial action fiche is expected to trigger full proposal development.</p> <p>It is important to note that the development of such proposals requires very significant commitment from Programme staff beyond their</p>	<p>Unsecured 10th EU EDF Intra-ACP envelope.</p> <p>OIP budget subject to nature of country requests.</p>	

	Proposal lead by DRP but incorporates work and support from OIP and WSP.	of natural disasters thereby achieving regional and national sustainable development and poverty reduction goals. This work will also strengthen the capacity of PICs to address existing and emerging challenges with regards to the risks posed by natural hazards and related disasters, while maximising synergies between Disaster Risk Reduction (DRR) strategies and Climate Change Adaptation (CCA).	<ul style="list-style-type: none"> • Number of DRM applications developed in connection with expanded risk profiles. • Coastal hazard assessment and tools for adaptation and DRR for 4 locations in the Pacific (one per year). • Studies on hazard risks and impacts to key infrastructure and communities including gender based studies in 30% of PICs. • Number of countries develop new/updated urban plans/land use plans, building codes and regulations and legislation developed. 		normal inline duties. Despite continual reporting this burden is not understood and remains an overlooked aspect of OIP work. OIP has reached its maximum sustainable level of proposal development and whilst demand for growth by members and donors is high, OIP cannot respond further unless improved programme resources are made available.	Recurrent Budget Proposal development	
Regional	<p>Marine geo-science technical advisory services.</p> <p>Ongoing unscheduled / ad hoc advisory service to PICs.</p>	In support of improved marine / geo-science decision making and planning in member nations, OIP provides year round technical advisory services to members in response to technical queries and requests. These typically include the assessment of EIAs and DAs, support at local and regional meetings and initiatives and provision of independent assessment or technical review of reports and proposals for members.	<p>Support activities in the last report period have included;</p> <ul style="list-style-type: none"> • Provision of data for the Suva, Kinoya outfall which is suspected of breakage or leakage. • USP cable route survey for new backup fibre optic cable completed field work March 2012 • Assist research project with Victoria University NZ - lagoon sand salinity assessment. • Production of 2 maps of Yasawa platform Fiji in collaboration with JICA. • Review EIA for alternative tourist landing site in Rarotonga, Cook Is. • Technical advisory to RMI on Ebye coastal erosion issue. • Develop costing's for a re-survey of Yonki hydroelectric dam PNG. • Cook Is requested a rerun of the Aitutaki HD model to evaluate additional navigation channel designs – results generated and delivered to Cook Is. • Significant in house development of OIP HD modelling capacity has also occurred with training and collaboration undertaken with both NIWA and GA. • Independent assessment of three EIAs in Tarawa Kiribati; Ambo Seawall; Maiana Maneaba Reclamation and Temaiku Reclamation Projects. 	<p>On going service to membership 1,2 and 3</p> <p>CC Related</p>	<p>This list is not exhaustive and generally this form of work does not generate a full technical reporting or similar products since they are largely unscheduled, are shared among the MCSS Sector staff and are not supported by specific funding.</p> <p>It is important to note however that very significant time and effort is expended to undertake these technical briefings, reviews, maps and products and to engage in advisory consultations. OIP supports this work through its recurrent budget.</p> <p>These responsive services are highly valued by members and OIP will continue to seek to support such requests on an ad hoc / as needed basis.</p>	Recurrent Budget	GO321-RT-97-07 FJD324,063 as at 31/08/12

			<ul style="list-style-type: none"> • UNDP / DRP / Kiribati collaboration in support of Sth/Sth country visit and exchange on freshwater and coastal vulnerability issues. 				
Regional	<p>Geodetic science and survey advisory services.</p> <p>Ongoing advisory service to PICs.</p>	<p>Requests to OIP for support in the distinct technical area of geodetic science and survey are common.</p> <p>Whist survey tools are commonly used by many Divisional Sectors for the collection of baseline data there remains strong demand for specialist, high quality geodetic / survey support for OIP tasks, broader Divisional requests and by our members.</p>	<p>Specialist survey tasks completed in the last period include;</p> <ul style="list-style-type: none"> • Yap Topographical Surveys (FSMPC Oil Depot) – December 2011 & January 2012; Real Time Kinematic GNSS Surveys; Processing of Topographical Survey Data; Preparation of Survey Plans; Completion of Technical Report with Robert Smith • Post Processed Static GPS Survey Data of Nadi (Photo Control and Ground Control Points for Calibration Nadi LIDAR Surveys for DRP and Real Time Kinematic GPS Surveys of Nadi (Topographical Surveys using GPS for USP and DRP) – April 2012. • Providing technical advice (geodetic surveys) to Control Section, Lands Department– March 2012. • Providing assistance to Marine Team for Post Processing Lifuka GPS Surveys – May 2012. • Real Time Kinematic GNSS Surveys of Ba (Topographical Surveys for DRP) – June 2012. • Navua Topographical Surveys using RTK GNSS Technology (NIWA) – January to July 2011. • GPS Base Station Set up in SOPAC. • Rewa Topographical Surveys RTK GNSS Technology (NIWA) – June to July 2012 • Asia Pacific Regional GNSS Survey Campaign – 9th to 15th September 2012. 	<p>On going service to membership 1,2 and 3</p> <p>CC Related</p>	<p>Combined, these tasks amount to a substantive additional work load on existing Programme resources and they can not be sourced from any other Sector / Division in SPC or indeed CROP.</p> <p>OIP highlighted the need to monitor this situation and implement a more sustainable solution if the current trend of requests for OIPs geodetic and survey services particularly in relation to coastal vulnerability and climate change adaptation continues. Demand has grown and again OIP requests consideration of improved CROP resources to support this demand.</p>	Recurrent Budget	As above

2. Geology, Minerals and Hydrocarbons – Sector							
Kiribati OI 1.2.9	<p>Environmentally Safe Aggregates for Tarawa, Kiribati (ESAT).</p> <p>This EU funded Project is jointly implemented by OIP and the Govt. of Kiribati's Ministry of Marine and Natural Resource Development.</p> <p>ESAT is designed to protect the vulnerable beaches of South Tarawa from damage caused by aggregate mining and to provide an alternative appropriate supply of aggregate sufficient to meet South Tarawa's growing construction demands.</p>	<ul style="list-style-type: none"> • Replace / reduce the volume of aggregate mined from South Tarawa's vulnerable beach environments. • Develop an economically sustainable and environmentally acceptable lagoon basin aggregate dredging operation. • Establish this under corporate / governance structures appropriate to the local legal, institutional and social conditions. • Development operational and environmental monitoring systems appropriate to local conditions and needs. • Public awareness and behavior change to gain support of communities to cease beach mining. • Offshore aggregates are used for the greater majority of domestic and public construction needs in urban South Tarawa. • Minimising the economic impact on households currently dependent on income from unsustainable beach mining. 	<p>Substantial progress over the last reporting period includes;</p> <ul style="list-style-type: none"> • Construction of the <i>MV Tekimarawa</i>, (dredge ship) continues with the hull and superstructure completed. Corrosion treatment and painting are underway now. Engines and dredge crane are complete and will be fitted in late 2012. • Oversight and construction QC maintained via the services of a qualified shipwright. • Continued coordination of the ESAT TCC (Technical Coordinating Committee). • Continuation of the community participation ("Ara Bike Reirei") and behaviour change programme as well as support to the school curriculums via the "SandWatch" Programme. • Development of strategies to mitigate the socio-economic impact of replacing beach mining activities. • Formulation of the "Atinimarawa" Aggregates Company in South Tarawa. • Comprehensive EIA undertaken. • In response to EIA review; dedicated fisheries resource assessment completed and operation management plan drafted. • Comprehensive community outreach and consultation process undertaken on Tarawa on EIA and Fisheries assessment. • Ongoing liaison with major development projects (e.g. runway resurfacing, road repair, Temaiku reclamation) to engage the Atinimarawa Company to provide aggregates. 	<p>Ongoing 1, 2, and 3</p> <p>CC Related</p>	<p>The ESAT Project has been an evolutionary process. Originally conceived following technical work undertaken by SOPAC in the early 1990's which even then clearly outlined the dangers of unmanaged beach mining in South Tarawa. The EDF8 and 9 SOPAC implemented Reducing Vulnerability Project facilitated the development of the ESAT Project funded under the EDF9 Envelope C. Delayed gestation (RIF), changes in the design/construction costs of the barge vessel and rapid shifts in currency exchange resulted in a further successful funding request to the EDF10 Envelope B.</p> <p>The need for sustained community outreach and close management of the Project as the Atinimarawa Company becomes active, combined with the need to accommodate additional environmental concerns, comprehensive monitoring regimes and UXO survey has again over stretched existing resources. A further request by the Govt. of Kiribati to the EDF10 Envelope B will be submitted to further bolster budgets and allow this crucially important programme of work to become operational in 2013.</p> <p>The success of this complex Project has only been possible due to the close collaborative working relationship between the Government of Kiribati, the European Commission and the SOPAC Division.</p>	<p>EU funded</p> <p>Total present budget. FJD1,681,043</p> <p>Recurrent budget support.</p>	<p>GO129-KI-09-01 FJD560,564 as at 31/8/12</p>
Regional OI 3.3.1	<p>Deep Sea Minerals in the Pacific Islands Region: a Legal and</p>	<p>Few PICs have legislative frameworks and policy in place to adequately guide the fledgling deep</p>	<p>KRA 1</p> <ul style="list-style-type: none"> • The Regional Legislative and Regulatory Framework (RLRF) has been prepared with 	<p>Ongoing 1, 2 & 3</p>	<p>KRA 4; in many ways is a culmination of the activities undertaken in 1,2 and 3,</p>	<p>EU EDF10</p> <p>FJD2,790,911</p>	<p>GO12D-RT-10-04 (FJD224,118)as</p>

<p>Cook Is. Federated States of Micronesia Fiji Kiribati Nauru Niue Papua New Guinea Marshall Is. Samoa Solomon Is. Timor Leste Tonga Tuvalu Vanuatu</p>	<p>Fiscal Framework for Sustainable Resource Management.</p> <p>The "DSM Project" is EU funded EDF10 Regional Project implemented within OIP.</p>	<p>sea minerals industry.</p> <p>This Project seeks to provide comprehensive assistance to PICs to develop regional and national legislative, fiscal, environmental guidelines to protect PIC community interests and the environment and guide the conduct of research and industry.</p> <p>It will deliver this work via 4 key result areas;</p> <ul style="list-style-type: none"> • Produce a Regional legislative and regulatory framework (RLRF) for offshore minerals exploration and mining. • Develop subsequent National policy, legislation and regulations. • Assist to building national capacities and support active participation of P-ACP nationals in the offshore mining research, legislation development and industry. • Establish the frameworks for effective management and monitoring of offshore exploration and mining operations. 	<p>input and endorsement of all 15 P-ACP countries as well as some 40+ other comments from various experts from NGOs, the private sector, regional / international agencies, academia.</p> <ul style="list-style-type: none"> • Feedback to the RLRF has been overwhelmingly positive and the final version will be presented at the Pacific Island Forum Leaders Meeting in Rarotonga Cook Islands (Aug/Sept 2012). • The RLRF will become key to the preparation of national policy and legal instruments in P-ACP States. <p>KRA 2</p> <ul style="list-style-type: none"> • National Stakeholder Consultation Workshops have been held in 13 of the 15 Project members. PNG and Timor Leste are scheduled for Sept/Oct. • These visits are also used to research current state of legal frameworks and relevant national policy and to identify the gaps and develop a county specific work plan. • A meeting with legal advisors from Nauru, Tonga, Kiribati and Fiji was held in Fiji in October 2011 to discuss drafting national regulations for exploration in "the Area". • Provision of drafting instructions for a regulatory regime both for national jurisdiction and activities in the international seabed area developed for Tonga (Jan), and Nauru (Mar). • Review of draft national policy or strategy documents for Kiribati (complete) and Cook Islands and Vanuatu (underway). • Completed drafting and submitted the Tonga Seabed Minerals Bill and provided draft regulations for DSM licensing and environmental protection, in Tonga. • Requests received for legislative review and/or drafting for: CK, FJ, FSM, KI, NR, NU, PW, RMI, SA, SI, TV and VU. • Preparation of a draft exploration contract agreement at the request of FSM. 	<p>Ongoing 1, 2 & 3</p>	<p>e.g.</p> <ul style="list-style-type: none"> • The completion of the RLRF and the UNEP-Grid Arendal Assessment as well as fora such as DSM Project / ISA workshop are major contributions to the provision of guidance for improved management of DSM activities by States. • Collaboration with SPREP to produce a guidance note to implement and practice the 'precautionary principle', for DSM activities. • On-going provision of advice and review to members on DSM issues / regulations. 	<p>Recurrent budget support.</p>	<p>at 31/8/12</p>
--	--	---	--	---------------------------------	---	----------------------------------	-------------------

	<p>Cont'd</p> <p>Deep Sea Minerals in the Pacific Islands Region: a Legal and Fiscal Framework for Sustainable Resource Management.</p>		<p>KRA 3</p> <ul style="list-style-type: none"> • Jointly organised workshop <i>Environmental Management Needs of Deep Sea Minerals Exploration and Exploitation</i> with the ISA and Govt. of Fiji (Nov 2011). • 4 Member Nationals sponsored in collaboration with the HDP (SPC) to attend the <i>Pacific Mining Symposium</i> Noumea NC. • National Stakeholder Consultation Workshops are also outreach opportunities where the country specific DSM potential, benefits, challenges and needs are discussed • Where appropriate National Offshore Minerals Committee's (NOMC) established. • A legal internship programme established with Nationals from TV (Jan), TN and VU (underway) working with the DSM Legal Advisor. FJ and KI scheduled for late 2012. Additionally, a KI National sponsored for marine safety training in preparation of a shipboard attachment / observation. • Six DSM information brochures have been prepared and disseminated. • Five country-specific DSM information brochures completed and disseminated (FJ, KI, RMI, SA, TN). • Guest DSM lectures delivered at USP. • The production of a DSM Documentary is in progress. • UNEP/GRID-Arendal is contracted to compile a major report on the state of knowledge of marine minerals in the Pacific; expert technical steering group established 80% of ZOD chapters submitted. • A DSM Project web site under development. • Organised and ran regional workshop on <i>Geological, Technological, Biological and Environmental Aspects of Deep Sea Minerals</i> Aug 2012. 	<p>Ongoing 1, 2 & 3</p>			
--	---	--	--	---------------------------------	--	--	--

Solomon Islands.	Preliminary investigation of gold recovery variance, Gold Ridge Mine, SI. Unscheduled task and site visit undertaken at Solomon Islands Govt. request.	Provision of expert advice and support to the Mines Division of the Ministry of Mines, Energy and Rural Electrification, to conduct a preliminary investigation of gold recovery variance at the Gold Ridge Mines Limited.	The preliminary investigation has been undertaken and report has been delivered to the SI Govt. OIP has subsequently assisted to develop a TOR for a consultant metallurgist to be contracted to carry out a full independent investigation at the request of the SI Govt.	Complete 1 & 2	It is important to note that the Geology, Minerals and Hydrocarbons, Sector of OIP has no dedicated Geologist on staff. It is impossible for OIP to support a further technical position in the Sector without improved programmatic funding.	Recurrent budget	
3. Pacific Sea Level Monitoring (Climate and Oceans Support Program in the Pacific – COSPPac)							
Regional OI 2.2.1 Cook Is. Federated States of Micronesia Fiji Kiribati Nauru Papua New Guinea Marshall Is. Samoa Solomon Is. Tonga Tuvalu Vanuatu	Pacific Sea Level Monitoring – PSLM. On the 1 st July the Phase IV - South Pacific Sea Level and Climate Monitoring Project (SPSLCMP), transferred to the Climate and Oceans Support Program in the Pacific (COSPPac), within the sub component, Climate and Ocean Monitoring and Prediction (COMP). The SPSLCMP is now known as the Pacific Sea Level Monitoring (PSLM) project. OIP and Geoscience Australia are contracted partners with the Bureau of Meteorology Australia in the uninterrupted delivery of PSLM to 12 locations across the region. The entire COSPPac Programme, and thus PSLM, remains AusAID funded with the current	The PSLM array is one of the few sustained regional monitoring systems in the Pacific region which collects crucially important data in support of improved understanding of climate change impacts. Implemented and maintained due to increasing regional concern over climate change associated sea level rise and the poor regional understanding of sea level variability, between 1991 and 2001 the initiative established a network of high resolution sealevel monitoring stations in CK, FSM, FJ, KI, RMI, NR, PNG, WS, SI, TN, TV & VU. Overall administration for PSLM (COSPPac) is provided by BoM Aust. However, PSLM's on-going works are implemented in partnership with Geoscience Australia and OIP. Since establishment, the stations have captured a mostly uninterrupted stream of extremely high quality, accurate data on sealevel, temperature, barometric pressure and wind speed and direction.	Data collection has been maintained at all stations over the last reporting period. The data continues to be processed and made available via the Project web site (and OIPs Geonetwork site) along with annual country status reports, consolidated reports and other associated products such as the popular PSLM (SPSLCMP) tidal calendars. Associated with the PSLM is the ONUP (Operational Network Upgrade Project) which started implementation of the array upgrade in early 2011. OIP supports ONUP with the technical retrofitting of the gauge stations and communications gear and the facilitation of contract arrangements of local service providers and communications with relevant Ministries and stakeholders.	Ongoing 1 & 3 CC Related	The COSPPac Regional Officer for 5 years (Ms Tagaloa Cooper) has moved to Samoa (SPREP) in July '12 and recruitment for the position is now underway. PSLM and OIP management supports the broader Technical Coordination Committee and design of PSLM / COSPPac through routine meetings and document review.	BoM Aust. AusAID FJD818,963	GO221-RT-01-13 FJD453,185 as at 31/08/12

	cycle completed 30 th June 2016.	Associated CGPS (Continuous GPS) stations have also been established in each country to account for tectonic movement (vertical ground movement). The CGPS in combination with the sealevel stations also provide an invaluable contribution to understanding of MSL and datum information for geodetic and hydrographic survey.					
	1) PSLM - Array calibration, maintenance and data comm's support.		Ongoing scheduled (and unscheduled) maintenance of SPSCMP gauges and associated climate monitoring sensors, power and communications systems. Through the last reporting period visits have been made to the gauges in, SA Nov '11; VU May '12; SI June '12; PNG July '12; TV Aug '12; FJ (Suva & Lautoka) Aug '12. This work includes both scheduled and "emergency" maintenance visits.	Ongoing 1 & 3 CC Related	Implemented through the OIP Technical Workshop (see 6. Technical Workshop). The OIP Engineer / Team Leader is contracted 50% to PSLM and 50% as Team Leader of the Technical Workshop facility. Thus this position has a substantive input into tasks reports in the MCSS Sector as well as the Technical Workshop outputs.	As above	
	2) PSLM - Precision levelling of gauges and associated CGPS stations.		Routine precision levelling surveys and maintenance of gauge and associated CGPS facilities undertaken in: SA Nov '11; NR Feb '12; SI Mar '12; KI Apr '12; TV May '12; RMI Jun '12; FSM Aug '12. Fieldwork is undertaken in partnership with GA and all survey reports have been completed. Counterpart training is also provided in country where there is interest in these field activities. In Mar '12 the OIP Surveyor also undertook reconnaissance trip to the Lautoka CGPS station to assist the ONUP project.	Ongoing 1 & 3 CC Related	Implemented by OIP Survey Advisor in partnership with Geoscience Aust. technical staff. The OIP Surveying Advisor is contracted 50% to PSLM and 50% to maritime boundaries and contributes substantially to work reported in the Maritime Boundaries Sector particularly in regards to field survey / geodetic data processing components.	As above	
	3) PSLM - Coordination and communications component.		Data and information from PSLM project uploaded to OIP Geonetwork database. Represented OIP/PIC interests at the routine TCC (Technical Coordinating Meetings) and participation at regional climate change fora to participate and highlight the profile of PSLM. Monitoring of the array communications system's accounts and regular liaison with country Project focal points continued. Budget development for OIPs components of the	Ongoing 1,2 & 3 CC Related	The OIP based COSPPac Regional Officer Position became vacant in July '12 and recruitment for the position is now underway.	As above	

			PSLM and ONUP and ongoing routine liaison with BoM and member countries on the roll out of the ONUP and PSLM / COSPPac.				
	4) ONUP - Operational Network Upgrade Project. Funded by AusAID under the Aust. Dept. of Climate Change & Energy Efficiency - ICCAI Project.	The ONUP is refurbishing and upgrading the measurement and communication technologies at all 12 PSLM and associated CGPS stations. This provides improved monitoring capacity to measure, record and transmit high quality sea level, climatic and tectonic data including improved tsunami sealevel signal detection. The ONUP is also auditing occupational health and safety standards at each site and carrying out remedial work at the same time.	OIP has provided support including in-country assistance with the technical retrofitting of the stations and communications gear and the facilitation of contract arrangements of local service providers and communications with relevant Ministries and stakeholders. OIP supported ONUP work in: KI Oct '11; SI Dec '11; FJ Feb '12; VU May '12; PNG Jul '12 over the last reporting period. At the time of writing the following stations have been completed; TN, SA, KI, SI, PNG, FJ (Suva & Lautoka) and VU. With CK and RMI planned for completion in late 2012 and TV, NR and FSM through 2013.	Ongoing 1 & 3 CC Related	Implemented by BoM Aust., GA and OIP. OIP has allocated an additional staff member to assist with ONUP work to reduce the burden on the Workshop Team Leader and ensure familiarity with the new PSLM technology across the Technical Workshop team.	As above	<u>GO223-RT-11-03</u> FJD53,435 as at 31/8/12
4. Regional Maritime Boundaries – Sector							
Regional	Regional Maritime Boundaries.	The provision of appropriate maritime boundaries data consistent with the provisions of UNCLOS (UN Convention on Law of the Sea, 1982).		Ongoing 1 & 2 CC Related		Recurrent Budget FJD202,325 AusAID annual grant.	<u>G0141-RT-00-48</u> FJD1,137,125 as at 31/8/12
OI 1.4.1 OI 3.1.1 Cook Is. Fiji Kiribati Nauru Niue Palau Papua New Guinea Marshall Is. Samoa Solomon Is. Tonga Tuvalu Vanuatu	1) EEZ (Exclusive Economic Zone) Delimitation. EEZ here refers to work on base-points and baselines, territorial sea limits (12 nautical mile), contiguous zone limits (24 nautical mile and EEZ limits (200 nautical mile). Using this information the assessment of the potential for archipelagic status is also undertaken and it also supports the computation of equidistant lines or	Tasks include; maps, charts, imagery, digitised GIS coverage and other data collected and processed for use in boundary development. High precision geodetic field surveys undertaken in collaboration with members – capacity building of local survey teams to continue the collection of supporting baseline data. Post-processing of GPS survey data in collaboration with country technical teams and compilation of multiple data sources for boundary zone and limit computation. Production of boundary data reports which are consistent with the provisions of UNCLOS and are adequate for countries to lodge and	<u>Country Highlights 2011 - 2012</u> SI – Following 2011 completion of archipelagic baselines verification, OIP has subsequently produced new Maritime Boundary Charts for SI Govt. No update at this time regarding SI progress on declaration of their new baseline information, legal assistance being provided by ComSec (Commonwealth Secretariat). FJ – Technical work to complete the review of Fiji's archipelagic baselines is completed and the associated schedule of coordinates has been delivered. OIP has completed new Maritime Boundaries Charts and assisted in the preparation of the Cabinet Submission for Gazettal of Fiji Islands revised baselines and archipelagos. OIP continues to provided technical support at FJ Maritime Affairs Coordination Committee meetings. PNG – Baseline kinematic GNSS survey data processing (Phase 1, 2 & 3) completed and complete verification against field survey, existing topographical, hydrographic & satellite data. Completion of the main group archipelagos and baselines, schedule of coordinates and charts. OIP has also provided approximately 3 weeks dedicated support working in-country with the PNG		<u>Regional Highlights 2011 - 2012</u> OIP's mandate is technical yet finalised maritime boundary solutions requires 3 distinct capacity areas 1) technical, 2) legal and ultimately 3) diplomatic. OIP has developed excellent relationships with the following agencies who partner with and assist OIP to provide world class technical and legal support to PICs in the development of the maritime boundary solutions and eCS claims; Geoscience Australia; Australian Attorney General's Office; Commonwealth Secretariat; UNEP GRID Arundal and Sydney Office; Forum Fisheries Agency and the University of Sydney. At the 2012 Forum Leaders meeting 7		

	<p>shared boundary solutions between countries. It should also be noted that baselines, archipelagic status and 200M limits are also a fundamental prerequisite to successful eCS (extended continental shelf) claim development.</p>	<p>declare their marine zones and limits. All data uploaded and secured on the OIP - Pacific Islands Regional Maritime Boundaries Information System (PIRMBIS). Training of technical counterparts is embedded in all aspects of this work through hands-on collaboration in the development of each country's boundary solutions.</p>	<p>boundaries team to complete this work. KI – Imagery acquired (ComSec funded) for Phoenix, Line and some islands of the Gilberts Group processed in collaboration with KI boundary's team - attachments hosted by OIP in Oct '11; April '12 and June '12. The technical solutions, lists of coordinates and new charts for all three groups have been completed and delivered to KI Govt. At the Feb '12 boundaries workshop OIP requested to develop technical solutions for equidistant treaties between KI, NR and RMI, in May '12 OIP in collaboration with FFA & AAGO hosted trilateral negotiations between KI, NR and RMI to finalise technical and legal work for equidistant treaty solutions. A dedicated visit to discuss the progression of KI's boundaries work was also undertaken May '12. CK – Imagery acquired (ComSec funded) for Penrhyn and Palmerston Is. In Oct '11 OIP supported CK technical team attachment to digitise new baselines and facilitated the technical development of the equidistant line between CK and KI (Line Group). Both countries returned with complete equidistant technical treaty solutions. The CK Govt. also requested OIP to calculate their outer limit chart coordinates – completed. NU – In Nov '11 OIP assisted NU and CK technical teams to develop the equidistant technical treaty solution between NU and CK; legal drafting assistance provided by (AGO Aust.). At the Feb '12 boundaries workshop further technical / legal work was updated and completed for this treaty. Legislative review (also AGO) of OIP's baseline and maritime zone information and existing NU legislation also completed last year but has not been declared by NU Govt. as expected. TV – OIP & AAGO visited TV in Sept '11 to assist with legislation and submitting boundary solutions for declaration. Tuvalu technical team attachment with OIP in Dec '11 to complete archipelagic baseline work. OIP in collaboration with FFA hosted a negotiation meeting between TV and KI (Jul '12) to agree on the equidistant solution between TV and KI. A further request has been received for OIP to update and incorporate new data into legal orders towards declaration (3rd quarter 2012). OIP supported at a technical meeting between TV and FJ and has facilitated TV discussions with France (treaty). SA – OIP completed technical work developing baseline, territorial and contiguous zone limits. Coordinates and new charts completed and submitted to the SA technical / legal boundaries team. SA indicate they will declare their 12 & 24 NM zones. RMI – Since RMI's involvement in the trilateral discussions hosted by OIP, FFA and AAGO in Feb '12 and the further negotiations meeting held in May '12 RMI has made excellent progress. RMI is</p>	<p>new bilateral treaties (NR/RMI; KI/NR; KI/RMI; KI/TV; KI/CK; CK/NU; TV/NZ (Tokelau)) and 1 trilateral agreement (KI/NR/RMI) will be signed. This is the culmination of years of background work by OIP to ensure the necessary technical data is complete to support such treaties. The treaty negotiation process has been a collaborative effort by OIP, FFA and AAGO and the respective PIC boundaries teams. OIP has also supported the final printing, binding and presentation of these documents in Rarotonga. This will increase the number of completed shared boundary treaties in the region from 21 to 28, leaving a further 20 to complete.</p> <p>The 9th two week long Maritime Boundaries Development Workshop was held in Feb 2012 (the 10th is scheduled for Nov 2012). OIP, our technical partners and country teams remain committed to the new format where one week is dedicated to ECS development and the second week prioritises maritime baseline, zone and limits work. All PICs are expected at the next workshop to work on their respective needs, except Nauru who with the treaty signing will become the first PIC in the region (and one of the few coastal states in the world) to have finalised and declared all of its maritime boundary information and thus has no further work to complete (congratulations Nauru!).</p>		
--	---	--	---	--	--	--

			<p>now requesting assistance to review existing data and OIP has received a number of preliminary data products for review. Once these have been fully reviewed (1st quarter 2013) OIP will develop a work plan to complete baseline and computational work towards full boundary solutions for RMI. OIP produced RMI's southern baselines to support treaty negotiations with NR and KI.</p> <p>NR – NR and RMI rely heavily on OIP for technical support and both NR and RMI were hosted and supported at the Feb and Mar '12 treaty negotiations meeting by OIP, FFA and AAGO.</p> <p>FSM – No progress; on the back of similar discussions with the FSM technical team in Feb '12, a dedicated OIP visit to FSM was undertaken in July to discuss progressing FSM's boundaries work. During this visit it was not possible to secure a meeting with the FSM boundaries task force, only individual meetings were possible. At this time and despite best efforts the status of FSM's boundaries work remains unclear and OIP cannot progress this work without clear and sustained cooperation from the FSM Govt.</p> <p>PW – A dedicated OIP visit was undertaken to Palau in Jul '12 to discuss boundaries development. Excellent discussions were held with the PW boundaries task force and as a result OIP is now working closely with FFA to provide technical and legal support.</p> <p>TN – In Aug '12 discussions were had between OIP and the new Deputy Secretary, Ministry of Lands, Environment, Climate Change & Natural Resources. It is anticipated that TN may now start to engage with the OIP to progress work in relation to EEZ and eCS solutions.</p>				
<p>Regional</p> <p>OI.1.4.2</p> <p>OI 3.1.2</p> <p>Cook Is.</p> <p>Fiji</p> <p>Federated States of Micronesia</p> <p>Kiribati</p> <p>Palau</p> <p>Papua New Guinea</p> <p>Solomon Is.</p> <p>Tonga</p> <p>Tuvalu</p> <p>Vanuatu</p>	<p>2) eCS (Extended Continental Shelf) Delineation.</p> <p>eCS (UNCLOS Art. 76) refers to the potential for countries to develop and claim additional sea bed territory beyond their 200 nautical mile EEZ limits.</p> <p>There are complex combinations of geodetic, legal and geomorphologic criteria prescribed by Art. 76 of UNCLOS which govern the potential of coastal</p>	<p>Provide the necessary support to PICs to assess their potential for eCS and assistance to delineate the extent of those claims.</p> <p>Assistance provided to those countries with eCS potential. Development respective eCS claims and ensure these are lodged in accordance with Art. 76 / SPLOS/183e by the prescribed deadline. SPLOS/183e is a provision which allows the submission of partial claims. However, these must be completed before review by CLCS (many PIC claims took advantage of this provision).</p>	<p>With the support of OIP and its technical partners the countries of PW, PNG, FSM, SI, VU, FJ, CK & TN have all lodged their respective and in some cases joint eCS submissions totalling some 1.8 million km² (by May 2009).</p> <p>TV and KI have deadlines for submission in 2013 (January and March, respectively). TV is developing a joint claim with France and NZ and KI is working with ComSec and UNEP GRID to complete their independent submission.</p> <p>Submissions which are essentially complete include the joint Ontong Java submission (PNG, FSM and SI); Eauripik Ridge (FSM); Manihiki Plateau (CK); Palau-Kyushu Ridge</p>	<p>Ongoing</p> <p>1 & 2</p>	<p>OIP receives no sustained resourcing to support specific work around eCS development. Following the planned Nov 2012 workshop the present collaborative proposal between OIP and GA (AusAID PPSLP) will be exhausted. AusAID advises that the PPSLP facility will no longer be available. Thus OIPs ability to organise future boundaries development workshops is at this time unknown.</p> <p>eCS claims and ongoing delimitation work will require continued resourcing over the next 5 – 10 years. Whilst OIP joins with PICs to thank AusAID for their continued support up to this point again we appeal sustained resourcing</p>	<p>AusAID PPSLP (Geoscience Australia).</p> <p>Recurrent Budget AusAID annual grant.</p>	<p>GO311-RT-08-25</p> <p>FJD501,406 as at 31/8/12</p>

	<p>states to claim eCS territory. All eCS claims must be lodged by their prescribed deadlines to the Commission on Limits of the Continental Shelf (UNCLCS). Two PIC have deadlines in early 2013.</p>	<p>Assist to provide support to those countries with claims to ensure their respective submissions are updated and complete and countries are prepared to defend their claims to the UN CLCS.</p> <p>Provision of these services is beyond the capacity of the OIP Boundaries Sector alone and OIP takes regional responsibility for the continued maintenance and coordination of a technical consortium of international partners who combine resources with OIP to provide a comprehensive support service to PICs in the continued development and defence of their respective eCS claims. These partners include; Geoscience Australia; Commonwealth Secretariat; UNEP GRID Shelf Programme and the Australian Attorney General's Office.</p> <p>The funding to facilitate our main eCS workshop series has been provided through the AusAID PPSLP facility and all partners also provide "in-kind" inputs with the Commonwealth Secretariat providing substantial ongoing legal capacity to assist PIC eCS submission development.</p>	<p>(PW); Lau-Colville / Kemedec Ridge (TN) and (FJ). The CK Maniniki submission now has an UNCLCS (UN Commission on Limits of the Continental Shelf) Sub-Commission formed to review the claim. Otherwise, the exact dates for review of other claims are estimated to start in mid-2013.</p> <p>Otherwise, FJ, PW, PNG, SI and VU have additional individual and joint incomplete submissions which need finalisation before review by the UNCLCS. A variable combination of technical, legal and geological tasks remain on these submissions and these were progressed and reviewed at the Feb 2012 Maritime Boundaries Development Workshop which are a collaborative effort between OIP, GA, UNEP GRID Arundal, ComSec. In response to the need to complete the various ECS submission the technical partners but particularly ComSec has made significant legal / technical resources available to assist these countries towards completion of these remaining submissions.</p> <p>A number of important data gaps remain in some submissions and OIP and the technical partners continue to search existing data archives as well as monitor potential opportunities associated with new surveys. To this end, improved information sharing from member Nation's to OIP regarding notification of marine scientific research opportunities in their waters would be invaluable.</p>		<p>of our core efforts in this work over a suitable time frame.</p>		
5. Data & Information Management – Sector							
<p>Sub regional OI 1.7.1 Fiji Papua New Guinea Solomon Is. Tonga</p>	<p>PIC Petroleum Data Base Database of hydrocarbon information and products maintained for FJ, PNG, SI, TO and VU.</p>	<p>The PIC Petroleum Data Base is maintained for all relevant membership countries. Information products provide to countries and approved clients on request. Products also now discoverable via the OIP Geonetwork.</p>	<p>OIP in collaboration with GA has completed further organisation of data digitised from the original hard copy sources of the PDB. The PDB hard copy materials will be transferred to the SOPAC Division in 2012 and this will effectively close off transcription and rescue work.</p>	<p>Ongoing service to membership 2</p>		<p>Recurrent Budget</p>	<p>FJD39,815 as at 31/8/12</p>

Vanuatu							
Regional/ OIP development OI 2.4.1	Geonetwork OIP based and administered data and information system for geoscience, marine and related geospatial data sets and products.	The OIP Geonetwork system provides easy and secure access to ocean, coastal, hydrographic and other geoscience observational data and products both collected by OIP and other agencies. This initiative also collaborates in the wider SOPAC efforts to rescue, digitise and collate historic data held by OIP the Division and member countries and is an ongoing commitment by OIP.	Data and information statistics and request highlights of the last reporting period include; <ul style="list-style-type: none"> • A 20% increase in content since last report with approximately 360GB of data and 8,400 items achieved. • Data downloads have increased nearly 300% in the last 12 months from 103 items to 407. • The number of written requests for protected data has risen over 20% from 36 in 2011 to 46 in 2012. 	Ongoing service to membership 1, 2 & 3 CC Related		Recurrent Budget NZ & AusAID	FJD60,123 as at 31/8/12
Regional OIP development	Pacific Islands Marine Spatial Information System. Funded under the AusAID Pacific Public Sector Linkages Program (PPSLP). Proposal lead by UNEP GRID Sydney Office in collaboration with OIP and Geoscience Australia.	Initial concept has been successful and a detailed proposal has been developed and submitted in Aug 2012. This project aims to develop a Pacific Island Marine Spatial Information System to improve access and provide a single authoritative point of entry for high quality geospatial data. Improve PIC access in turn supports development and resource management within the maritime jurisdictions of the Central and Western Pacific region.	The system is intended to provide regional and international access to marine spatial information such as maritime boundaries which are vital to many marine management issues including, fisheries management, marine research and exploration and spatial planning, including marine protected areas. Presently no accurate and authoritative regional point of entry for such data exists yet such marine spatial information is crucial to improved decision making and governance of the marine environment. Raised by OIP last year as a priority issue at the SOPAC Division meeting and subsequently approved by CRGA. OIP will collaborate with UNEP GRID and GA to develop such a system and provide this regional service.	Proposal 1, 2 & 3 CC Related	Subject to approval this detailed proposal may start implementation by late 2012 if successful. It is important to note that the development of such proposals requires very significant commitment from Programme staff beyond their normal inline duties.	Unsecured AusAID PPSLP (UNEP GRID/Uni. Sydney) AUD 236K Recurrent Budget Proposal development	
6. Technical Workshop							
Regional OI 1.5.3	Technical Workshop Services. Provision of specialist technical support to procure, maintain, calibrate, mobilise/demobilise	Provision of technical support during OIP (and SOPAC Divisional) field and technical surveys. Mobilisation and demobilisation of equipment and transport logistics. Preparation and preservation of field samples. Work with OIP / SOPAC Divisional scientific staff to	As well as the routine ongoing upkeep of equipment, calibration and repair within the workshop, the facility and staff also supported the following field surveys (further details are reported in Section 1 MCSS Sector); French Polynesia Multibeam survey; Jun-Dec '11. FSM – Yap	1, 2 and 3 Ongoing service to technical programmes and membership CC Related	The technical workshop is effectively a support service which contributes substantially to the successful implementation of OIPs technical Programme works in particular the Marine Coastal Science and Survey Sector (see Section 1). The vast majority of the MCSS Sector tasks	Recurrent Budget NZ & AusAID Taiwan	<u>GO253-RT-00-50</u> FJD174,197 as at 31/8/12

	oceanographic, hydrographic, geophysical, hydrological, geological and other technical equipment and instrumentation.	undertake surveys, deploy and retrieve instruments and trouble shoot and maintain equipment in the field. Maintain a full inventory of calibrated, functional, contemporary equipment for technical teams. Maintain stocks of consumables and provide expert advice on the state of contemporary technology to assist with strategic updating of instrumentation. Assist to procure appropriate systems for deployment in PIC environments. The workshop is also responsible for the ongoing scheduled (and unscheduled) maintenance of PSLM gauges and associated climate monitoring sensors, power and communications systems across 12 PICs (see Section 3. PSLM for details).	Geotechnical drilling and survey Nov '11. Fiji Navua & Rewa delta topographic survey Jul '12. Cook Is. Mangaia oceanographic survey Feb '12. Tonga / Fiji / Cook Is. - PARDI Project Deploy instruments in Savusavu / assist with equipment for Tonga. Maintenance of WQ buoys Manihiki, Cook Is. Fiji Outer Is. jetty / wharf survey,		reported are only possible if a functional, well equipped and staffed workshop is adequately resourced and in place. The technical workshop also provides equipment and field support to the other SOPAC Division's technical Programmes WSP and DRP. The workshop has also assisted to deliver the Pacific Sea Level Monitoring project upgrade (ONUP) over the last 12 months (see 3 Section PSLM for details of these scheduled country works and visits).		
OIP Development	Small Boat Safety Project	During 2010 OIP developed a successful (Taiwan funded) project to provide small boat safety training for all workshop and marine science staff as well as upgrade existing marine safety equipment.	The Technical Workshop with OIP science staff undertook a small boat handling and safety training / workshop in Mar '12 and a further Advanced Training in First Aid and Resuscitation Apr '12. The new Technical Officer in MCSS Sector was also given SCUBA training. These training course were funded under the Taiwan ROC Grant.	OIP Development 4		Taiwan (ROC) (USD9K)	<u>GOTT-RT-11-11</u> FJD4595 as at 31/8/12
7. Management / Administration / Reporting / Advocacy							
Programme Administration	Management and strategic leadership of the OIP mandated task areas. Also including advocacy of PIC interests in related OIP Sector areas and particularly ocean and island geoscience	Routine strategic planning, leadership and day to day oversight of the Ocean & Islands Programme, work teams, budgets and programme work and development plans. This Sector also provides support, leadership and high level advisory to national, regional and global fora	Beyond the routine day to day activities, some specific contributions at programmatic, agency and regional level include; development of the 2012 CRGA Reporting; SOPAC HoGs Annual Report and Budget; Proposal Development in Sector areas of OIP; Responding to the SPC for Programme financial mgt and reporting; SPC / JCS reporting and scoping; Pacific Plan Reporting; SPC Climate Change focal point in ocean/coastal geosciences; multiple other	1, 2 and 3 Ongoing service to technical programmes and membership. CC Related	Technical contributions in the coastal science sector over the last reporting period include; a rapid assessment of coastal vulnerability in FSM, Kosrae and in the Rock Is. Palau; USP Post Grad marine science student co-supervision; peer review of SPC and international marine science and climate change reports and papers; contribute to marine/coastal	Recurrent Budget FJD257,400	

	<p>and technology applicable to regional needs and issues.</p>	<p>other agencies and stakeholder groups and contributes to a range of aligned initiatives and issues.</p> <p>OIP manager is also expected to hold related marine / geoscience expertise and contribute at a technical level within the Programme. Presently, this lays in the Coastal Science Sector.</p>	<p>routine agency reports, matrices, documents, etc. which require OIP input. OIP also contributes to the CROP Marine Sector Working Group; the Development Partners on Climate Change and other Sector group meetings.</p> <p>Contributions at an international level include; representation, liaison and input to a range of fora, e.g. Regional Universities / Research Groups, Global Coasts & Oceans Conference, UNICPOLOS initiatives; UNCLCS, UNDAOLOS, IOC, ISA, Uni. of the Sea, CSIRO Hobart, Geoscience Australia, Australian Attorney Generals Office, GNS, NIWA, Dept. of Climate Change & Energy Efficiency Aust., UNEP GRID Arendal; Commonwealth Secretariat, KIGAM, Forum Secretariat, Forum Fisheries Agency, SPREP, etc. OIP also liaises directly with a range of donors (AusAID, NZ Foreign Affairs, European Union, JICA, World Bank, Asian Dev. Bank, etc.) at both an advisory level, as a technical support authority and in relation to proposal development.</p> <p>OIP also provides input to the important international climate change science initiatives such as the IPCC (Intergovernmental Panel on Climate Change) by providing Lead Authorship on the 5th Assessment Report – Small Islands Chapter and as a member of the IPCC TGICA (Task Group on Data and Scenario Support for Impact and Climate Analysis).</p>		<p>development EIA review; participate in expert advisory role at the NCCARF; ICCAI Coastal Science Workshop; University of Queensland think tank on coastal science and CC vulnerability.</p>		
--	--	--	--	--	--	--	--

ANNEX 2 – Changing waves and coasts in the Pacific (WACOP) Project Concept Note

Part A. CONCEPT NOTE

1. Relevance of the Action

Provide a general presentation and analysis of the problems and their interrelation at all levels.

The Pacific island countries (PICs) are facing serious and immediate challenges from climate change and a high dependence on imported fossil fuels. Both of these problems can be attributed to the smallness of the islands and geographic isolation of PICs. In terms of climate change, a specific disadvantage that arises from the smallness of the islands is a greater coastline to land-area ratio. The majority of population centres and infrastructure are located in coastal areas. The shorelines of PICs are therefore vulnerable areas with the greatest risk of displacement and loss of livelihood assets through coastal erosion and inundation. These two major coastal hazards are projected to become more frequent and intense with climate change. However, current coastal vulnerability and adaptation assessments still focus mainly on sea-level rise, with less attention paid to other important coastal change drivers such as ocean surface waves. Waves wear away land and remove beach sediments, and also cause coastal inundation and salinisation of ground water and soils. Wave climate research is very limited in the PICs, which is a major constraint to underpinning adaptation, particularly given their dependence on the coast. In terms of fossil fuel dependence, the insularity of PICs results in high costs of petroleum products and trade deficits, with a significant negative impact on the supply and affordability of electricity and small island socio-economic development. Energy security in PICs can only be achieved by increasing the contribution for electricity production coming from renewable energy sources. Given the close proximity to the ocean, wave energy presents an abundant resource that holds great potential for wave power applications and reduced greenhouse gas emissions, but has yet to be assessed at island scales. Information on the reliability of wave energy under climate change scenarios is important in order to demonstrate the long term commercial viability of wave energy to policy makers and prospective developers.

Identify clearly specific problems to be addressed by the action.

Although the Intergovernmental Panel on Climate Change (IPCC 2007) lists wave climate as one of six major climate drivers for coastal systems, there has been no formal assessment of baseline wave climate or climate change effects on wind-waves at scales relevant to PICs. PICs have to rely on global wind-wave models that operate at spatial resolutions of ~100 km. PICs are not resolved in these models as island groups (10s of kilometres) can fall within one grid cell at these coarse scales. This represents a key uncertainty for climate change adaptation and energy security as the wave climate around individual islands (10-100s of metres) varies according to the nearshore water depths and shorelines react according to differences in reef shape and sediment supply (1-10s of meters). The limiting factor in assessing the effects of climate change on coastal areas is therefore insufficient information on the variability and trends of ocean waves and how they impact on the 45,000 kilometres of PIC coastline. This is a major knowledge gap which will be addressed by the Action.

Improved wind data, nearshore bathymetry, and a computer cluster have recently become available to the Applicant, as have state of the art open source models that can compute wind-waves from the offshore (Wavewatch III model), through to nearshore wave transformations (SWAN model), to coastal erosion and overtopping (the XBeach model). Accordingly, the Action will focus on using existing data and tools in combination with field investigations to provide solutions at small island scales, and at scales where decisions about adaptation and energy security need to be made. However, the XBeach model presents a very specific problem, as XBeach was developed for the open sandy coasts found on continental shorelines following the devastating hurricane Katrina in 2005. The majority of PIC coasts however are fringed by coral reefs, where dominant hydrodynamic and morphological processes are significantly more complex than

those operating at sandy coasts. Modifying and validating XBeach to suit small-island tropical coastal systems will involve relevant and original research through this Action.

Include a brief description of the target groups and final beneficiaries.

Ocean waves are trans-boundary and a large proportion of the PIC population and assets are concentrated in the coastal zone. The project therefore has a regional approach and final beneficiaries are spread over a large geographic area that encompasses all people of the PICs that live on the shoreline, especially those in Cook Islands, Fiji, Tonga, Tuvalu, Vanuatu, and Samoa – the target countries of the Action. The Action involves novel research, and the target group therefore includes educational organisations (academic staff and students at universities), research organisation and researchers. Due to the multi-sectored approach of the Action the target groups are also diverse and include local authorities, resource managers, and other decision-makers from relevant government sectors (environment, maritime transport, lands, infrastructure, and energy). In addition to this, the resultant information on wave energy resources is also expected to foster interest from the private sector as well as development partners with an interest in renewable energy.

Demonstrate the relevance of the proposal to the needs and constraints in general of the target country(ies) or region(s) and to the target groups/final beneficiary groups in particular.

According to the World Bank (1950-2004 data, excluding Papua New Guinea), cyclones, surges and waves have reportedly directly affected more than 2.4 million people and led to more than 1,380 deaths in the PIC region. More recently in December 2008, a damaging wave event caused widespread coastal flooding, erosion, and salinisation of food gardens, and the displacement of more than 50,000 people across the western equatorial Pacific. Preliminary analysis shows that this was a one-in-20-year event, but that no wave climate information was available to disaster managers to reduce risks. Similarly, 70% of the PIC population currently lack access to modern forms of energy, and are seriously disadvantaged by having to pay an estimated 200-300% above the world average for petroleum. This helps to quantify the number of final beneficiaries and demonstrates the relevance of a comprehensive assessment of wave climate, coastal hazards, and wave energy potential in the Pacific to both target groups and final beneficiaries.

Demonstrate the relevance of the proposal to the objectives and priorities and requirements of the call for proposals.

The Proposal is for a multi-sectoral project and addresses two of the four priority areas given in the call for proposals. The primary priority of the Proposal is **climate change**, with the Priority of **renewable and sustainable energy** also being addressed. Specifically, the Proposal focuses on wave climate as a driver of change and supports detailed coastal mapping and modelling that can predict and assist adaptation to coastal erosion resulting from climate change and natural disasters, as well as identify the right renewable energy mix by assessing wave energy resources (specifically mentioned under 2.1.3 in the call). Three factors regarding wave climate are especially relevant to the objectives of the call for proposals. Firstly, **the project contributes to sustainable development**. Wave climate information is critical baseline information needed for the management of coastal resources, as sustainable livelihoods are dependant on biophysical processes and productivity of coastal systems. For example, coral reefs provide a multitude of goods and services such as food security through fisheries, and shelter through mitigating wave attack. Modelling and visualizing the effect of healthy coral reefs on coastal stability, through providing shelter and by acting as sources of sediment, will add to the support base for protecting coral reef environments. Wave climate also has an impact on inter-island transportation options, as the inability to leave port may increase under climate change conditions. Infrastructure is a major focal area of the Millennium Development Goals, which includes increasing access to energy. Wave climate information can demonstrate the feasibility of harnessing ocean power in PICs. Research into wave climate, and impacts on coastal vulnerabilities and wave energy, will therefore contribute directly to the overall objective of sustainable development. Secondly, **the project**

contributes to the fight against poverty. PICs have been characterised by a high urban growth rate since independence, which peaks at more than 4%, effectively doubling the population of many major coastal centres in the next 16 years. Since urbanisation is often ad hoc and poorly regulated, inappropriate coastal development has increased the exposure of PIC people to hazards such as extreme wave events. Many of the informal settlements are of sub-standard structures located in deforested mangrove swamps. There is empirical evidence for the PICs that poverty exacerbates the impact of climate extremes, and vice versa, in these marginalised urban areas. Outer island communities still enjoy secure if relatively basic livelihoods (35% of the households in Fiji's coastal villages fall below the poverty line), but climate change may put these ways of life at risk. Decision makers and planners lack the information to improve land-use planning regulations, define coastal setback rules, and design standards for safe building practices. The Project will directly address these knowledge gaps and thus help to reduce poverty by providing information that can improve living standards for marginalised coastal populations. Thirdly, **the project improves resilience.** Historically, PIC people have adapted and responded to environmental change and natural disasters. But traditional coping mechanisms are not always adequate to address exposure in urban centres. There is a need for PIC to improve their level of adaptive capacity in coastal areas to increase the likelihood of being able to respond to the impacts and remain resilient. Since resilience and adaptive capacity are linked, these improvements can in part be achieved through better information on climate change at scales that are relevant to small islands. However, climate change information for coastal systems is largely limited to sea-level rise projections. Hence, by providing targeted research in the critical area of wave climate in PICs, the Action broadens our knowledge of climate change impacts and builds science-based resilience against stresses from coastal hazards, which would otherwise not be possible using traditional knowledge alone.

2. Description of the action and its effectiveness

Description of the overall objective of the action, duration, expected results.

An information paper on the need for a comprehensive assessment of wave climate in the Pacific was presented to the SOPAC Governing Council at the 39th Annual Session in 2010. This was largely in response to the damaging wave event in December 2008, which displaced more than 75,000 people across the central western Pacific, but also in answer to the call at the international level by the IPCC in the 4th Assessment Report (2007) for climate change impact assessments in the coastal zone to be broadened to include wave climate rather than focus exclusively on sea-level rise. The SOPAC Council subsequently endorsed a proposal for a regional study on wave climate, and implementation is sought through this Action. Therefore, the **overall objective** of the Action is to contribute to adaptation and energy security in the Pacific Islands region, with the **specific objective** to improve the technical knowledge base, information and understanding of coastal hazards and wave energy resources at scales relevant to small Pacific islands. The duration of the Project is 36 months, with the following expected results: **(1)** Present wave climate and wave energy resources for islands assessed, **(2)** Coastal systems mapped and coastal hazards measured, **(3)** Coastal systems and coastal hazards modelled, **(4)** Projected wave climate and wave energy resources for islands assessed, **(5)** Projected wave climate impacts on coastal systems assessed.

Description of the proposed activities and their effectiveness.

The progression of the individual activities is sequenced into three main components to ensure an effective implementation of the Project. These components are: hindcasting (activities under Result 1), validating (activities under Results 2 & 3), and projecting (activities under Results 4 & 5). The first two components are prerequisites to the final component, as they establish a method and suite of models calibrated against historical and present-day conditions. This is required as a proof of concept and to increase the reliability and accuracy of the subsequent climate change information. First, the hindcasting component involves a reanalysis of the decadal wave climate using the latest high-resolution winds to compute offshore wind-waves in the Pacific Basin by running the WW3 model. A nested SWAN model (i.e. coupled to the WW3 model) comprising bathymetry collected during an EDF8&9 funded project will transform offshore waves into the nearshore and provide higher resolution details of the wave climate around the

capital islands of Cook Islands, Fiji, Tonga, Tuvalu, Vanuatu, and Samoa. The wave models will be calibrated against historical wave buoy data collected by SOPAC at these islands from 1987-92. Output from SWAN will be used to calculate wave flux and the spatial distribution and seasonal variability of wave energy at these locations (Result 1). An economic cost-benefit analysis on options to harness the wave energy potential will complement the research activities at this stage of the Action. Second, validating the morphological model XBeach will require detailed surveys and mapping of coastal systems through field visits (Result 2). These data will be used in an iterative process to extensively test and calibrate the XBeach computer model in order to confirm that the model successfully reproduces measured wave characteristics and morphological responses typical of tropical small islands (Result 3). Third, projected wind data will be used to re-run the WW3 and SWAN models previously developed under the first hindcast components. This will provide projected wave climate, wave flux and wave energy data for the years 2030, 2055 and 2090, under three different greenhouse gas emissions scenarios (Result 4). Finally, these projected data will serve as boundary conditions to the XBeach model in order to assess impacts of the projected wave climate on coastal systems in terms of erosion and inundation under climate change (Result 5). This validated modelling suite will be an effective tool that lends itself to possibilities for replication and extension of the Action outcomes to other tropical small island countries (multiplier effect).

Involvement of any implementing partners, their role and relationship to the applicant, if applicable.

The Proposal includes two partners (the University of the South Pacific, USP, and the UNESCO-IHE Institute for Water Education) and two Associates (University of Auckland, UoA, and the Commonwealth Scientific and Industrial Research Organisation, CSIRO). SPC has enjoyed a long history of working with USP, and both organisations belong to the Council of Regional Organisation in the Pacific. There is close collaboration between the SPC-Applied Geosciences Division (SOPAC) and USP's Faculty of Science and Technology on aspects of academic teaching (guest lectures and student supervision) as well as a project based technical partnership (sharing of expertise and equipment). USP will largely contribute to Result 2, through expertise and equipment from the School of Marine Studies as well as Result 1 and 3 through the School of Computing, Information and Mathematical Sciences and their Cloud Computing Facility, where the Project's Post Doctoral Fellow will be placed. The relationship with UNESCO-IHE is a recent one, and a direct result of the call for proposals. Senior staff at UNESCO-IHE led the development of XBeach, and their involvement will therefore be essential to Results 3 and 5. UoA and SPC-SOPAC have collaborated over the last three years, which has resulted in peer reviewed work in high-impact journals. UoA will actively participate in the field data collection, contribute to the equipment pool under Result 2, and assess model output and provide guidance under Result 3 and 5. CSIRO has provided technical expertise to the Pacific region under AusAID funding for many years, and attended SOPAC's STAR conference and wave climate working group in 2010. CSIRO's expertise with wave climate modelling and climate change projections will factor under Results 1 and 4. CSIRO are also coordinating an international working group on global wave climate projections sponsored by the World Climate Research Programme, which will link the Project to the international wave climate research community.

Other possible stakeholders.

A proposal for a "Regional Study on the Impact of Wave Climate Change on Coastal Areas" was endorsed by the SOPAC Governing Council in October 2010 (*i.e.* implementation is sought through this proposal), as it contributes to a number of regional frameworks including the "Pacific Islands Regional Ocean Policy", the "Framework for Action on Energy Security in the Pacific", the "Framework for Action on building the Resilience of Pacific Nations and Communities to Disasters", and the "Pacific Islands Framework for Action on Climate Change". By doing so, the Action is in line with the wishes and directives of the Pacific leaders and ministerial officials. Result area 2 of the Action involves field visits to Fiji and Tuvalu. A positive attitude toward the Project by local authorities and communities will be essential for the success of the Project. The Project team will work in close collaboration with the community at those sites, as well as the

national government focal points. There will be a need to discuss and elaborate the role and participation of specific actors and stakeholders for each of the four field sites at the beginning of the project.

3. Sustainability of the action

Provide an initial risk analysis and possible contingency plans

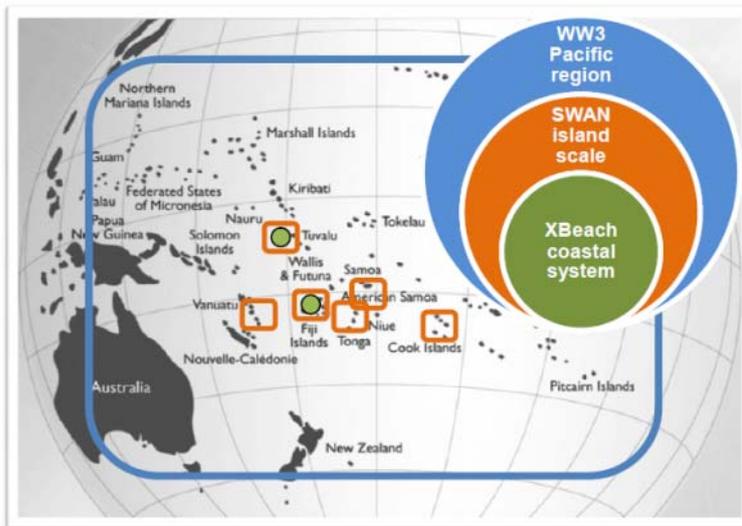
Main activity	Risks	Mitigating measures
Overall	Political instability in Fiji	Relocate Project team to other SPC country offices
Project team	Inability to recruit or retain staff	Recruit internationally; robust project management system
Hindcasting	Models fail to install or run	Contract specialist (budget item 5.13) to set up models
Validating	Negative attitude toward Project by communities	Hold stakeholder meetings inclusive of women and youth, church groups, etc.; relocate survey to an alternative site
Projecting	Large model uncertainties	Document uncertainties; use empirical relationships or neural network models

Give the main preconditions and assumptions during and after the implementation phase.

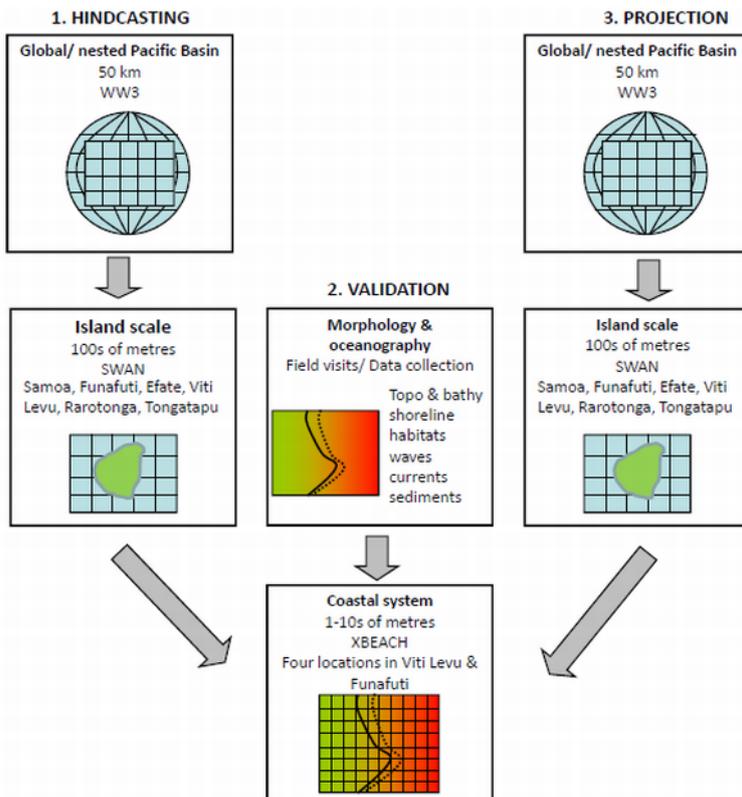
Preconditions: Pacific island governments in target locations grant research permits; PCCSP downscaled climate data is available by end 2011; USP's new Cloud Computing Facility is operational by the start of the Project. **Assumptions:** Survey equipment operates reliably and is not vandalised; local conditions (water and sanitation, fuel and transport, electricity) at field sites are suitable to conduct fieldwork; research into wave energy conversion devices continues and become commercially viable for PICs; improved information on coastal hazards is mainstreamed into national adaptation and disaster risk reduction planning; high-resolution wind data continues to be publically available.

Explain how sustainability will be secured after completion of the action.

The Action will use public domain data and open source software, thereby eliminating ongoing costs arising from data or software licensing. The SPC-SOPAC Division is the region's lead agency in providing coastal geoscience and disaster management services and policy. The Action's strategy is for SPC-SOPAC to take ownership of the Action's coastal modelling tools and results, and to utilise them to support countries in science-based approaches to adaptation and disaster risk reduction. USP and SPC both have the proven in-house capacity to carry out computer modelling, and will undertake follow-up activities by updating the models as new data or code becomes available. As the regions leading tertiary institution with courses in renewable energy, USP will integrate results into the teaching material and encourage postgraduates to conduct research in their home PIC. The results will also be a valuable resource to USP's Pacific Centre for Environment and Sustainable Development, which facilitates in issues of environmental and sustainable development by working with communities to help them adapt to climate change. The SPC-Economic Development Division (EDD) is the region's lead agency in the Energy Sector as mandated by the Pacific Energy Ministers. SPC-EDD is well placed to take the Action's results of the wave energy assessment forward in addressing energy security issues through continuing technical and policy advice. USP and SPC also host many conferences and workshops, and are well placed to continue disseminating the Action's results to target groups. For example, in 2010 USP hosted the "International Conference on Renewable Energy and Climate Change: Focus on the Pacific", and a "Regional Training Climate Change Workshop".



Schematic shows the interrelation of the modelling activities. Each step in the modelling suite provides increasingly higher resolution information. First, a Pacific region WW3 model will encompass all PICTs at a resolution of 50 km or better. Second, island scale wave climate (model grid size of 10-100s of metres) will be resolved with nested SWAN models of the capital islands of Tuvalu, Vanuatu, Fiji, Tonga, Samoa, and Cook Islands. Third, representative coastal systems will be modelled using XBeach at four locations across Fiji and Tuvalu at scales of 1-10s of metres.



Schematic showing the sequencing of the modelling activities. The progression of the individual activities is sequenced into three main components to ensure an effective implementation of the Project. These components are: hindcasting (activities under Result 1), validating (activities under Results 2 & 3), and projecting (activities under Results 4 & 5). The first two components are prerequisites to the final component, as they establish a method and suite of models calibrated against historical and present-day conditions. Projected wind data will be used to re-run the wave models previously developed under the first hindcast components, providing wave climate, wave stress and wave energy data for the years 2030, 2055 and 2090, under three different greenhouse gas emissions scenarios. Finally, these data will serve as boundary conditions to the XBeach model in order to assess impacts of the projected wave climate on coastal systems (Result 5).

ANNEX 3 – Regional Ocean Science Programme Progress Report

NZ Ministry of Foreign Affairs and Trade: SPC 2012 Grant Regional Ocean Science Programme – Progress Report October 19th 2012

Ocean & Islands Programme (OIP)

SOPAC Division, SPC

Agreed project budget – Regional Ocean Science Programme (ROSP)

Agreed Services	NZD Grant Total	7% deduction SPC Administration, New Caledonia NZD	Residual amount for OIP delivery NZD	Approximate FJD equivalent for OIP delivery
20. Marine Hazards & Coastal Hazards	330,000	23,100	306,900	434,300
21. Marine Survey & Instrumentation	285,000	19,950	265,050	375,000
22. Regional Marine Data Hub	95,000	6,650	88,350	125,000
Total	710,000	49,700	660,300	934,300

In late 2011 the New Zealand Government advised that it would no longer provide recurrent budget support through its traditional modality to SPC in 2012. Alternatively, the New Zealand Government requested SPC to provide specific proposals to support 6 strategic mandate areas of SPC. In this case the Ocean and Islands Programme (of the SOPAC Division) was requested to provide a proposal which was titled the *Regional Ocean Sciences Programme* (ROSP) and covered three main areas;

- Marine Hazards and Coastal Impacts Assessments.
- Marine Survey & Instrumentation.
- Regional Marine Data Hub.

These equate to 3 main sectoral areas of OIP which are also dealt with in detail in the OIP annual report narrative document (this paper – SOPAC-2/3.1.2) and Annex 1 of the same:

- Marine, Coastal Science and Survey – Sector
- Technical Workshop – Sector
- Data and Information Management – Sector (“*Geonetwork*”)

The proposal was successful and following allocation to the SPC by the NZ Govt. The Ocean & Islands Programme (OIP) received a total equivalent of NZD 660,300 to support works in these agreed Sectors and the budget allocations are shown in the table above.

The NZ Government funding arrangement document indicates a possible requirement for a “Progress Report” to be made available on the 30th October 2012. Whilst no official request has been forthcoming in this respect, the OIP has provided this summary report in good faith and will include this as a routine component of its annual reports assuming the facility is granted again in 2013. This is also a convenient juncture to consider the impact of the NZ ROSP against the broader backdrop of OIP work plan and revised budget for 2012 – 2013.

This annex provides a summary of the multiple contributions of the NZ ROSP into SOPAC Marine Sciences through 2012. The facility has provide crucially important flexibility in resourcing which is highly valued as it cannot otherwise be provided through traditional proposal/project cycles which are very restrictive in nature and cannot support other unscheduled country requests. Thus the NZ ROSP has facilitated and augmented a diverse range of tasks, the details (activity titles in the left-hand column) of which can be matched to Annex 1 of this paper, as well as the associated narrative documents.

It must be noted that a number of these tasks have multiple funding partners which include AusAID recurrent budget; other international donors; in-kind country support and in some cases are co-implemented projects with other SPC Divisions or agencies (such as SPREP). The ROSP has been key to OIPs support across many of these tasks and has been used strategically to implement work outlined mainly in Marine Hazards & Coastal Impacts (~OIP – Marine, Coastal Science and Survey sector). The

Technical Workshop facility is also a fundamental support mechanism for all these field assessments and surveys (deployment, maintenance, calibration and mobilisation/demobilisation of equipment). Finally the Regional Marine Data Hub (~OIP-Data and Information Management sector or “Geonetwork”) recognises that data is collected at huge expense and effort and it is critical that such data is archived and protected appropriately and in turn is “discoverable” and available to member Nations on request. To this end the NZ ROSP has maintained the OIP Geonetwork system and effort through 2012 and has facilitated significant improvements in the range and number of data holdings and our ability to service membership requests.

Together these three activities translate as a complete service or the foundation of the SOPAC Marine and Coastal Science sectors. The ROSP has been the critical element in 2012 which has supported our ability to deliver such services and this is evidenced through both the highly successful 2012 OIP annual report and the fact that the 2012 budget and rate of delivery is the highest on record.

The following table provides a brief profile of tasks where the NZ ROSP provided significant support.

SERVICE	TASKS COMPLETED / UNDERWAY	BROADER IMPLICATIONS
20. Marine Hazards & Coastal Impact Assessment Support.	Expert advice and decision support for coastal planning, infrastructure development and management as well as tourism development.	Allocation NZD \$306,900
<i>Coastal geomorphology / hazard maps in the Navua Delta & nearshore environs, Viti Levu, Fiji.</i>	Developed understanding of vulnerability in the Navua Delta and coastal environs to provide local authorities with improved decision making planning tools for this rapidly developing catchment.	Routine flooding has significant economic impacts in this catchment. Improved understand of flood risks supports planning and disaster reduction response.
<i>Tsunami inundation model development, Nukualofa, Tonga.</i>	On-going development of an improved inundation model for Nukualofa Tonga. The ROSP facilitated the completion of a 40 day survey to collect high quality bathymetric data to allow accurate modelling.	Nukualofa is the capital of Tonga and main port of entry. Much of the township is very low lying and exposed to tsunamis, improved understanding of impacts will reduce damage and save lives.
<i>PRISMS Pacific Regional Island Shoreline Monitoring System.</i>	Monitoring framework to detect soft shoreline response to climate variability, development pressure and sea level rise and other coastal development stress. In 2012 work on Tuvalu’s 9 atolls has been underway in cooperation with the University of Auckland.	Presently, out dated and inappropriate models are used to predict shoreline response to sea-level rise. PRISMS is the first and only systematic work to improve understanding and provide empirical facts to PICs on this issue.
<i>Benthic Habitat Mapping and Water Circulation in Muri Lagoon, Rarotonga, Cook Islands.</i>	Baseline benthic habitat map of Muri Lagoon, Rarotonga, completed.	Muri lagoon is critically important to supporting tourism in Rarotonga. A habitat map acts as a baseline to monitor ecological change through improved management.
<i>Geotechnical survey to support the design and appropriate construction of a seawall / bund at the Yap State petroleum storage facility</i>	OIP has undertaken geotechnical drilling at the site as well provided bathymetric and topographic surveys and analysis of these data products to rehabilitate the Yap facility. Plans are now underway to survey bridge footings on Yap’s major road network using the OIP Marine Science capacity & tools.	The Yap State petroleum facility is a key piece of infrastructure providing for the energy and transport needs of the entire community. Likewise the major road links in Yap requires improvements to several bridges, geotechnical testing underpins appropriate design.
<i>Review of a Coastal Rehabilitation Report, site visit and Development of specific recommendations for coastal adaptation actions in Kosrae</i>	Kosrae State Authorities requested the OIP to undertake a review of their existing coastal management plan and a site visit / rapid assessment. Undertaken collaboratively with NIWA.	The greater majority of Kosrae’s population live within metres of the shore in highly exposed conditions. OIP and NIWA are working with local authorities to implement adaptation plans to reduce the vulnerability of the community and infrastructure.
<i>Support Manihiki pearl farms and lagoon management, Cook Islands.</i>	Generate a detailed bathymetric map of Manihiki Lagoon for the purposes of lagoon pearl farm management and upgrade water	Key to successful pearl culture is maintaining the environmental integrity of the lagoon. Mapping products and WQ monitoring are

	quality monitoring buoys.	fundamental baselines.
<i>Support coastal infrastructure development, Fiji.</i>	Bathymetric and geophysical survey assistance in support of infrastructure development to inform decision making in regards to; dredging in Ovalau; port development, Savusavu and Naduri	Shipping services are a crucial lifeline in outer island communities. Many such port facilities are poorly mapped and designed posing a significant obstacle to development and ship safety.
<i>Wharf infrastructure upgrade support, Niue.</i>	Design for reef geophysical survey and drilling to support decision making for the planned upgrade of Niue's main port facility.	Niue's main shipping port is hazardous particularly in poor sea conditions. Geotechnical testing will facilitate the design of an improved port facility.
<i>Alternative tourist landing site in Rarotonga, Cook Islands.</i>	Review EIA and development design at the request of the Cook Islands Govt. for an alternative tourist landing site in Rarotonga.	Tourism is key to the Cook Islands economy. Poor weather can prevent tourists landing and thus impacts revenue generating opportunities.
<i>Ebye generator and fuel storage facility coastal erosion issue.</i>	Technical advisory to support the Ebye community to assess coastal erosion and develop options for coastal defence.	Reliable energy and fuel supply underpin vital services and development, left unchecked this erosion issue threatens these critical facilities.
<i>Assess sedimentation in Yonki Hydroelectric dam Papua New Guinea.</i>	Develop aquatic geophysical survey plan for Yonki hydroelectric dam to ascertain and monitor siltation rates and dam performance.	Yonki dam provides clean energy and water to local communities. Routine survey warns of potential changes in performance and design life of this important facility.
<i>Evaluation of additional navigation channel designs, Aitutaki, Cook Islands.</i>	The Cook Is Govt. requested a rerun the Aitutaki hydrodynamic model to generate new guidance for the redesign of the main Aitutaki shipping channel.	Aitutaki is a designated tourist development Island and has a single very hazardous shipping channel, increased tourism can only be supported with improved communications / transport facilities.
<i>Expert assistance to the Govt. of Kiribati to review EIAs in South Tarawa.</i>	Provided expert multi-disciplinary review and feedback on the; Ambo Seawall; Maiana Maneaba Reclamation and Temaiku Reclamation development Projects.	EIA is the fundamental planning and assessment tool used by PICs to guide sustainable development. Expert review is an import step in this process of improved decision making.
<i>Capacity Building in Hydrography for Coastal Development.</i>	Support Marine Science staff to improve technical capacity in the area of hydrographic survey.	Certified hydrography underpins the production of all navigation charts. Many locations in PIC do not have adequate charts to support improved access and shipping safety.
21. Marine Survey & Instrumentation	Providing access to properly maintained specialist marine survey tools and instruments deployed in support of PIC requests.	NZD \$265,050
<p>It is important to note that in many cases it is impossible to differentiate between the tasks supported by the technical workshop and those tasks outlined above in Marine Hazards & Coastal Impact Assessment Support. It is implicit that all tasks involving field survey, deployment of instruments, sampling and testing will necessarily also draw on the resources of the Technical Workshop. Thus whilst the workshop is treated both in OIP and NZ ROSP as a separate Sector all tasks completed within the Marine Hazards & Coastal Impact Assessment Support section which are not desk-top in nature (i.e. EIA review) are equally dependant on an adequately resourced and staffed Technical Workshop facility.</p>		
<i>Technical Workshop Services.</i> <i>Provision of specialist technical support to procure, maintain, calibrate, mobilise/demobilise oceanographic, hydrographic, geophysical, hydrological, geological and other technical equipment and instrumentation.</i>	Provision of technical support during OIP (and SOPAC Divisional) field and technical surveys. Mobilisation and demobilisation of equipment and transport logistics. Preparation and preservation of field samples. Work with OIP / SOPAC Divisional scientific staff to undertake surveys, deploy and retrieve instruments and trouble shoot and maintain equipment in the field. The workshop facility is called upon for	As with the Sector above a significant allocation of the ROSP for the Technical Workshop is used for ad hoc or unscheduled marine science assessments. Please note individual tasks are not listed here as the services of the Technical Workshop are inextricably linked to the field assessments and tasks discussed above (Marine Hazards). It is also instructive to view Annex 1 of the OIP 2012 annual report for more details.

	<p>every field survey and assessment undertaken by OIP and supports with staff and logistics during major surveys (bathymetric, drilling, topographic, etc.). Some of these are mentioned here but they are otherwise too numerous and the inventory of equipment too exhaustive to list but further details can be provided on specific request.</p>	
<p>22. Regional Marine Data Hub</p>	<p>Maintenance of the regional data service providing secure access to ocean, coastal, hydrographic and observational data and products to PICs.</p>	<p>NZD \$88,350</p>
<p>It is hoped that it is apparent the three sectors (ROSP activities 20, 21 and 22) are inextricably linked and form the foundation of the Marine Science capacity in SOPAC. Sections 21 and 22 (above) ultimately expend very significant resources, effort and time to collect data to support PI Governments in improved marine resource management, design of infrastructure and in the characterisation of coastal hazards. Invariably this data is collected for a specific Project or task, yet the data if collected in accordance with international protocols of quality (which OIP does) can be re-used multiple times for a great many additional purposes. This is value adding; an excellent example is the digitised historical aerial photo holdings of Geonetwork. Previously unused, these photos have now provided unprecedented improvements in understanding environmental change by comparing them to state-of-the-art satellite imagery. This example underlines the importance of data preservation, access and security. Geonetwork secures many millions of dollars' worth of such data and is continually updated and improved with OIP's new data collection efforts.</p>		
<p><i>Geonetwork</i> <i>OIP based and administered data and information system for geoscience, marine and related geospatial data sets and products.</i></p>	<p>The OIP Geonetwork system provides easy and secure access to ocean, coastal, hydrographic and other geoscience observational data and products both collected by OIP and other agencies. Data and information statistics and request highlights of the last reporting period include;</p> <ul style="list-style-type: none"> • A 20% increase in content since last report with approximately 360GB of data and 8,400 items achieved. • Data downloads have increased nearly 300% in the last 12 months from 103 items to 407. • The number of written requests for protected data has risen over 20% from 36 in 2011 to 46 in 2012. 	<p>An important responsibility of OIP is to ensure that Marine Scientific data is held securely and in contemporary, universal formats which allow easy discovery, access and use. This ensures that the data value is not lost and that duplication of effort is does not occur. Furthermore this same facility also stores "analysis products" such as hydrodynamic model outputs. Again, such datasets are the culmination of huge effort and their cumulative value is in the order of millions of dollars. Geonetwork seeks to protect and maintain all new data collected during surveys such as those highlighted here and continuously mines historical data to ensure it is upgraded to contemporary universal formats and remains in circulation available for PICs and international development and research interests.</p>