

Addressing Climate Change and Associated Coastal Hazards in the CNMI:

Assessing coastal vulnerability as part of CNMI climate change adaptation efforts



A proposal for a 2012-2014 NOAA Coastal Management Fellow

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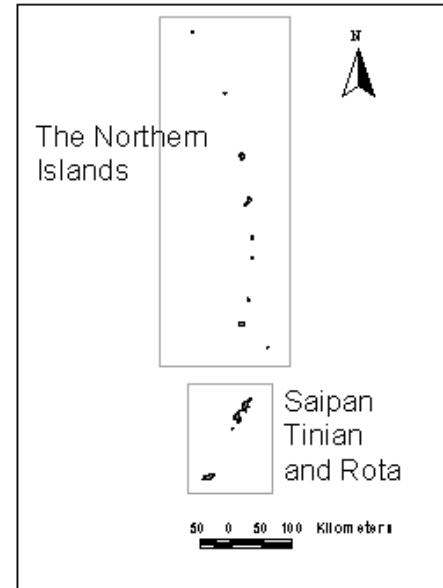
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BACKGROUND AND INTRODUCTION

Introduction to the Coastal Resources Management Office

The Coastal Resources Management Office (CRM) was established in 1983 as the approved coastal zone management program in the Commonwealth of the Northern Marianas Islands (CNMI). Public Law tasks CRM with implementing all aspects of NOAA's CZM program, and gives CRM jurisdiction over the coastal zone which covers all land mass in the territory. The office is divided into coastal planning, marine monitoring, coastal permitting and enforcement sections in order to effectively address coastal management concerns. At the forefront of CRM's program is the permit process which encompasses coastal hazards planning and mitigation among other issues. CRM proposes a NOAA Coastal Fellowship to work toward due consideration being given to climate change in both coastal hazards planning efforts and in the CNMI-wide permit process.



Background of Climate Change Planning Efforts in the CNMI

The effects of climate change are widely recognized as pressing threats in the Pacific island region and around the world. Decreases in freshwater resources, sea level rise (SLR) and associated coastal land inundation, marine ecosystem degradation, increasing pressure on fisheries resources due to coral bleaching and ocean acidification, and changes in tropical storms and flooding are all currently seen or expected in small island nations of the Pacific. If sea levels rise even to conservative estimates, coastal flooding will be exacerbated, shoreline erosion rates will increase, and certain public and private lands will become submerged. These changes will impact private landowners, marine and terrestrial ecosystems and the Commonwealth economy.

Local agencies in the CNMI are poised to begin making substantial and coordinated efforts to predict impacts of SLR and to incorporate these threats into coastal management planning. In the past, it has been difficult to move the issue of climate change to the forefront of management and coastal hazards planning, as CRM and partner agencies are at times under-staffed, over-tasked, and often lack the technical ability to carry out climate change adaptation planning. In addition, the limited information available to planners regarding climate change impacts in the Pacific often lacks the detail necessary to carry out locally-relevant planning, and only gives a very general idea of coastal hazards and SLR expectations. Spatially distant island nations are now focusing on the development of down-scaled models that can better predict island-specific changes and inform localized management.

Information specific to the CNMI is required to begin incorporating SLR projections and increased risk of coastal hazards in the island-wide permitting process and development

regulations. Currently, CRM has policies in place that regulate development in coastal hazards zones (CRM coastal hazard zones mirror FEMA FIRM maps V and VE zones), however, predicted accelerated erosion rates, increased risk of coastal flooding and SLR were not taken into consideration when these maps were made. Education and further research will be required before planners and permit managers are able to effectively use climate change predictions to recommend climate-smart development.

CZMA Section 309 Strategy

CRM recently solidified our commitment to climate change planning with the development of the 2011-2015 CZMA Section 309 Strategy. The implementation of the approved strategy "Preliminary Exploration of Sea Level Rise as a Coastal Threat in the CNMI" began in October of 2011. This strategy is a large step for the CNMI in planning for and easing the potential negative effects of a changing climate. The strategy includes multi-stakeholder involvement in adaptation planning, public outreach to communicate potential effects of climate change in the CNMI, and data compilation and acquisition to allow for inundation mapping and sea level rise modeling for the populated Southern islands of Saipan, Tinian and Rota.

In January 2012, a NOAA Coral Regional Management Support staff member will begin working with CRM to realize the Section 309 strategy discussed above. This person's primary responsibility in the first year of the strategy will be to mobilize stakeholders and experts in the field to participate in the CNMI Climate Change Working Group, and to facilitate the creation of goals. As the NOAA staff member continues work with the group, he/she will follow steps laid out in "Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments" (Snover et al., 2007) to identify geographic regions and planning areas that are especially vulnerable to climate change. As part of this exercise, risk assessments will be done using best available data. The proposed Coastal Management Fellowship will provide technical expertise to facilitate these planning efforts, and will lead data acquisition and organization efforts that will be necessary to guide the participatory risk assessments to be done. The data collected and organized (along with CNMI-specific SLR projections that the Fellow will prepare for) will later be used to conduct a more detailed Risk and Vulnerability Assessment (RVA) for the CNMI. Groundwork and networking for the acquisition of this data has been made, and CRM expects that an upcoming Pacific Islands Regional Climate Assessment/National Climate Assessment report (to be released in March 2012) will provide resources and guidance for the proposed Fellow.

GOALS AND OBJECTIVES

The major goals of this fellowship will be 1) to strengthen the CNMI Climate Change Working Group by providing technical support and guidance; and 2) to prepare the CNMI for climate change adaptation planning by working toward CNMI-specific data sets, projections and information. To accomplish these goals, the following objectives will be met:

Objective 1 - The Fellow will work in close collaboration with the CNMI Climate Change Working Group to build capacity within local agencies regarding climate change planning and adaptation;

Objective 2 - The Fellow will leverage expertise and support from around the Pacific region to guide climate change planning in the CNMI;

Objective 3 - The Fellow will employ existing federal and local GIS data to identify areas (both communities and ecosystems) in Saipan, Tinian and Rota that are most vulnerable to climate change;

Objective 4 - The Fellow will lead data acquisition and organization efforts in preparation for the development of locally-relevant models of SLR and inundation scenarios; and

Objective 5 - The Fellow will facilitate and lead discussions with the CCWG regarding the development of adaptation strategies.

MILESTONES AND OUTCOMES

Timeframe	Milestones and Outcomes
April 2012	CRM Mentor attends fellow matching workshop.
July 2012	Fellow preliminary visit.
August 2012 - October 2012	Fellowship begins. An orientation will be planned at CRM for fellow to meet all relevant personnel from local and federal agencies. The Fellow will spend the first three months meeting and building relationships with partners.
October 2012	Fellow has a detailed work plan to meet fellowship objectives.
November 2012 - February 2013	Fellow provides expertise for the finalization of a qualitative CNMI Climate risk and vulnerability assessment.
February 2013	Fellow attends NOAA fellows' meeting
March 2013	Fellow has created a database of available data sources and reports, and a timeline for filling identified gaps. This includes the creation of a Dropbox file sharing system that will be used throughout the Fellowship.
Summer 2013	Fellow attends the 2013 Coastal Zone Conference and presents a poster.
February 2014	Fellow attends NOAA fellows' meeting.
April 2014	Fellow conducts a workshop with the CNMI Climate Change Working Group detailing next steps for the development of adaptation strategies.
Summer 2014	Fellow attends the 2014 Coastal Society Conference and presents a poster.

July 2014	Fellow has submitted a complete and detailed report to partners with recommendations for ongoing climate change adaptation planning and stakeholder coordination.
August 2014	Fellowship ends.

PROJECT DESCRIPTION

Task 1: Build climate adaptation capacity within local agencies

To build capacity among the local agencies regarding climate change planning and adaptation, the Fellow will act as a technical advisor to the CNMI Climate Change Working Group. The Fellow's work in this capacity will include, but not be limited to, conducting workshops to highlight various aspects of climate change planning, facilitating and acting as technical advisor during planning meetings, and undertaking data-sharing efforts to ensure that all relevant climate information is available in a usable form to local agencies. The Fellow will work throughout the 2-year term to effectively disseminate all regional climate information to local government staff and planners. This will include full review of soon-to-be-released reports such as the "Pacific Islands Regional Climate Assessment" as part of the National Climate Assessment, and work to insure that these regional documents are made locally-relevant for CRM permit managers and island-wide planning efforts. This task will include the creation of a Dropbox service (web-based file sharing system) to facilitate sharing of important information and documents between local and regional partners.

Task 2: Leverage support from regional experts for climate change planning work

In order to bring a higher level of climate change planning expertise to the CCWG, the Fellow will continue to network in the Pacific region to leverage support for climate planning in the CNMI. The Fellow will be expected to collaborate remotely with various regional experts, and to travel to regional meetings and workshops to ensure that the CNMI is a contributor to Pacific-wide climate efforts, and that the best available science is available to resource managers in the CNMI. As the Fellow identifies gaps in CNMI-specific data and information necessary for prudent planning, the Fellow will aid CRM in identifying ongoing projects and available funding that could assist in filling these gaps. It is expected that the Fellow will work closely with the NOAA Pacific Services Center to coordinate upcoming SLR modeling efforts in the CNMI.

Task 3: Employ existing GIS data to identify potential vulnerable areas in the CNMI

The CNMI and CRM have existing information that will be very valuable to the CCWG as a participatory RVA is conducted. To ensure that this data is available to the group, understood by all partners, and utilized to the fullest extent, the Fellow will analyze coastal habitat and infrastructure maps in relation to existing knowledge of coastal hazards and flood risk. This data will be presented in an understandable form to the CCWG. CRM

expects that this might be done by using global estimates of sea level rise over the next 50-100 years, and developing gross photo maps of the subsequent inundation. These maps can then be overlain with roads, infrastructure and coastal habitats maps to assist in the prioritization of planning sectors (e.g. stormwater infrastructure, roads/transportation, freshwater resources). CRM understands that with available data and resources that these maps will only be useful in assisting with prioritization rather than as concrete estimates and projections of inundation.

As conversations take place regarding climate adaptation priorities in the CNMI, the Fellow may be responsible for utilizing existing GPS information to develop GIS maps and resources. This will be especially relevant in Tinian and Rota where maps and data may not be as recently updated and readily available.

Task 4: Lead data acquisition efforts in preparation for the development of SLR models

In order to develop more locally-relevant climate change predictions, including sea level rise scenarios and inundation models under various SLR scenarios, the CNMI will need to organize and analyze many relevant data sources. Some of the data available for the Marianas, including rainfall data, is likely to contain gaps and inconsistencies that will need to be reconciled before modeling of SLR scenarios can take place. LiDAR data that is available for the island of Saipan may require a small amount of processing, and the Fellow, in partnership with the NOAA Pacific Services Center, will take a lead role in this work. In addition, there may be data that does not exist at a scale that is locally-relevant. The Fellow will work with the CCWG to compile a list of data and information gaps that will include timelines and estimates of resources necessary to fill these gaps.

Task 5: Begin discussions with the CCWG regarding the development of adaptation strategies

In the later stages of the Fellowship, and upon completion of the participatory risk analysis and discussion and agreement upon geographic areas and sectors that are priorities, a next step in planning is the development of a comprehensive adaptation plan. The Fellow will begin this process by organizing (and possibly leading) a training for the CCWG to introduce key concepts and highlight regional adaptation efforts that have been made. A relevant document is being prepared by UH Sea Grant that will provide a basis for this training.

Specific work to be carried out to fulfill this objective will largely depend on decisions made by the CCWG as the Fellowship takes place. For instance, if the group determines that a top priority is the prediction of future erosion rates to ensure preparedness among the tourism sector, the Fellow may become involved in the preliminary compilation of BMPs for existing large coastal developments that could later be part of a comprehensive adaptation plan.

FELLOW MENTORING

The fellow will be housed at the Coastal Resources Management Office in Saipan, and directly supervised by the Administrator of CRM, Ms. Rita C. Chong-Dela Cruz. The primary mentor for the fellowship will be David Benavente, CNMI Marine Monitoring Team. Dave has experience with benthic habitat mapping and climate change science, and is well-suited to mentor the fellow as they adapt to the Saipan working environment. The fellow, however, will work closely with many members of the natural resources community in Saipan, and will gain significant experience through working with the following individuals: Fran Castro, Coral Reef Initiative Point of Contact and Nonpoint Source Pollution Division Manager; Dr. Dana Okano, NOAA Coastal Program Liaison; Steven McKagan, NOAA Habitat Conservation Specialist; and the NOAA Coral Regional Management Staff who will also be sitting at CRM. In addition, CRM has a large network of climate change experts and professionals from around the Pacific that have been consulted in the writing of this proposal. These people will be available to the Fellow as outside contacts for technical expertise and/or evaluation of project plans and deliverables. The following regional experts have agreed to be in close contact with the Fellow and assist in this scope of work: Dr. Mark Lander, University of Guam Professor of Water Resources Engineering; Dr. Melissa Finucane and Dr. Victoria Keener, East-West Center/Regional Integrated Sciences and Assessments; and Dolan Eversole, University of Hawai'i Sea Grant and NOAA Coastal Storms Program Pacific Island Regional Coordinator.

The fellow will also have the opportunity to work on a diverse range of other coastal management projects if time permits and the fellow wishes to become involved. The Fellowship will provide the following professional and educational benefits for the Fellow:

- Working at the forefront of climate change planning in the Western Pacific, and the opportunity to network with professionals and experts across the region
- Exposure to climate change adaptation frameworks from around the Pacific region, and experience utilizing these frameworks in a novel environment
- The opportunity to work as a key contact for climate change planning in the CNMI and gain experience leading and facilitating a climate change planning group of experts and professionals
- The probable opportunity to be involved in regional SLR mapping efforts for CNMI in collaboration with NOAA's Pacific Services Center

PROJECT PARTNERS

The fellow will work very closely with the NOAA Coral Regional Management Staff member and serve as a key point of contact for the CNMI Climate Change Working Group. As such, the fellow will also work closely with numerous agencies including the CNMI NOAA Field Office, the CNMI Emergency Management Office, the Division of Environmental Quality, the Department of Land and Natural Resources, the Department of Public Works, the Northern Marianas College land grant program (NMC-CREES) and others. The fellow will also be expected to work closely with professionals at the NOAA Pacific Services Center, especially when planning for RVA and SLR modeling work. As much climate change work in the

Pacific is done at a regional level, the Fellow will work in collaboration with the following programs: Pacific Climate Information System (PaCIS), Pacific Regional Integrated Sciences and Assessments (RISA), Climate-Smart Fagatele Bay National Marine Sanctuary in American Samoa, the Pacific Islands Climate Change Cooperative (PICCC), and research programs at both the University of Guam and the University of Hawai'i.

COST SHARE DESCRIPTION

The required \$15,000 non-federal fellowship match will be provided by the Coastal Resources Management Office, through territory revenue. The fellow will be provided a work station in the CRM office, including a personal computer equipped with Microsoft Office and ArcGIS software, a CNMI government email address, all necessary office supplies, and associated computer equipment (e.g. flash drive, external hard drive, etc.). The fellow will also have access to shared equipment including heavy-duty scanners, a fax machine, projectors, office printers and a map plotter, GPS units, office laptops, and office vehicles (including a boat). The CRM office will provide for all secretarial and administrative support that is necessary for the fellow to complete his/her work. Through the position with CRM, the fellow will have access to all local government offices, data (e.g. high-resolution LiDAR data and aerial photography, historical tide data, etc.), and trainings that may be provided.

STRATEGIC FOCUS AREA

The proposed fellowship directly addresses Focus Area II: Changing Climate - Projects related to climate change adaptation planning and risk assessment. Work included in the proposed fellowship will not only significantly advance the CNMI in climate change planning, but lead to expanded climate change information in the Pacific region. Tools and resources developed by the Fellow will serve to guide climate change adaptation decision-making in the future, and a capacity building component to the Fellowship will aim to ensure that local resource managers have the tools necessary to continue adaptation planning efforts.

SOURCES CITED

Snover, A.K., L. Whitely Binder, J. Lopez, E. Willmont, J. Kay, D. Howell, J. Simmonds. 2007. *Preparing for Climate Change: A Guidebook for Local, Regional and State Governments*. In association with and published by ICLEI - Local Governments for Sustainability, Oakland, CA.