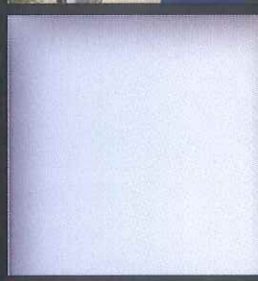


# A STRATEGIC PLAN TO IMPROVE FISHERY DATA COLLECTION AND COORDINATE RESEARCH: WESTERN PACIFIC 2014-2019

FISHERY DATA COLLECTION AND RESEARCH COMMITTEE



OCTOBER 06, 2014





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## STATEMENT OF COMMITMENT

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I UNDERSTAND THAT MY ROLE AS A MEMBER OF THE FISHERY DATA COLLECTION AND RESEARCH COMMITTEE is a significant responsibility and will commit to the elements described in this Regional Strategic Plan for Data Collection and Research (hereafter *Plan*). Specifically, I:

- Support the Mission, Vision, Goals of the *Plan*;
- Acknowledge that the strategies described in the *Plan* are aligned with my agency's priorities and internal plans;
- Will offer my agency's expertise to help ensure the success of this endeavor;
- Will contribute significantly to the achieving the objectives of the Plan, including seeking funding support for the task elements described herein;
- Will oversee the implementation of the task elements within my own agency/jurisdiction and report the progress to the FDCRC at its annual meeting and at Western Pacific Regional Fishery Management Council meetings;
- Will actively participate in all requests for my assistance and response.

I have read and agree to this Statement of Commitment and look forward to assisting the Committee fulfill its objectives.

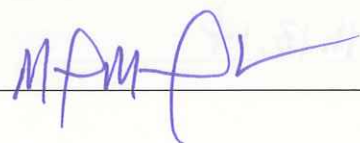
**Ms. Kitty Simonds: Western Pacific Regional Fishery Management Council**

Signed  Date                     

**Dr. Ruth Matagi-Tofiga: American Samoa Department of Marine and Wildlife Resources**

Signed  Date 10/7/2014

**Mr. Manuel Pangelinan: CNMI Department of Land and Natural Resources, Division of Fish and Wildlife**

Signed  Date 10/20/2014

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- Will actively participate in all requests for my assistance and response.

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**Ms. Mariquita Taitague: Guam Department of Agriculture, Division of Aquatic and Wildlife Resources**

Signed  Date 10/20/14

**Mr. William Aila: Hawaii Department of Land and Natural Resources, Division of Aquatic Resources**

Signed  Date 10/20/14

**Ms. Lorilee Crisostomo: Guam Bureau of Statistics and Plans**

Signed  Date 11.13.14

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## STATEMENT OF SUPPORT – WILDLIFE AND SPORTFISH RESTORATION PROGRAM

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THE SPORT FISH RESTORATION (SFR) PROGRAM was established to fund the priorities and efforts by state, territory and commonwealth governments to improve recreational sport fishing. Within the eligibility guidelines of the SFR program (under 50 CFR 80), the Wildlife and Sport Fish Restoration Program is supportive of efforts to improve recreational sport fish data collection and research. We hope that the collaborative partnership of the territory and commonwealth resource agencies, federal partners, and the Western Pacific Regional Fisheries Management Council will result in improved fishery data collection and research in the U.S. flag jurisdictions.

**Mr. Edward Curren: Wildlife and Sportfish Restoration Program, US Fish and Wildlife Service**

Signed E. Hlin Curren Date 12/18/2014

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## STATEMENT OF SUPPORT – NATIONAL MARINE FISHERIES SERVICE

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In its mission to *provide timely, high-quality applied scientific information to support the conservation and management of fisheries, protected species, and marine habitats in the central and western Pacific Ocean*, THE NMFS-PACIFIC ISLAND FISHERIES SCIENCE CENTER acknowledges the efforts of the Fishery Data Collection and Research Committee to improve data collection and enhance research coordination in the Western Pacific region. PIFSC shall complement this coordinated effort through activities described in (but not limited to) the Science Center's strategic and implementation plan.

**Dr. Ned Cyr: NOAA-National Marine Fisheries Service – Pacific Island Fisheries Science Center**

Signed



Date

10/20/17



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## PREFACE

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THIS STRATEGIC PLAN<sup>1</sup> FOR FISHERY DATA COLLECTION IMPROVEMENTS AND RESEARCH COORDINATION in the Western Pacific region is an attempt to enhance fishery data collection programs in American Samoa, Guam, the Commonwealth of Northern Mariana Islands (CNMI), and Hawaii. Majority of the near-shore and coastal fisheries are currently data-limited. This plan focuses on the non-pelagic fisheries and seeks to address the data-poor situation and elevate the data quality standard both at the local jurisdictional level as well as the federal level.

Equally, this plan also aims to coordinate all fishery-related research in the region in order to improve fishery management decision-making through enhanced scientific information. The Plan intends to describe and define how each participating agency/institution will pursue each task element to effect efficient jurisdictional and Council-level management of fishery resources.

This coordinated and collaborative effort seeks to increase leverage in terms of funding support coming from multiple sources. The plan has a five-year horizon, which aligns with the planning timeframes of the Western Pacific Regional Fishery Management Council's (WPRFMC) Program Plan, NMFS-Pacific Island Fisheries Science Center's (PIFSC) Science Plan, and the Five-Year Plans generated by the local fishery management agencies required by the US Fish and Wildlife Service (USFWS) Wildlife and Sportfish Restoration Program (WSRP). This maximizes the coordination and leverage in terms of achieving the various goals described within the plan. We will update the plan at five year intervals, unless circumstances require intermittent modification.

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<sup>1</sup> This regional strategic plan should not be taken as comprehensive in any way. This acknowledges the existence of other efforts that may be specific to pelagic and international fisheries and are not covered by this plan. This plan is meant to be a living document and should be updated as needs evolve.



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## ACKNOWLEDGEMENTS

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THIS REGIONAL STRATEGIC PLAN is a product of the collaborative efforts and input by representatives from:

American Samoa: Department of Marine and Wildlife Resources

Guam: Department of Agriculture – Division of Fish and Wildlife

CNMI: Department of Land and Natural Resources – Division of Fish and Wildlife

Hawaii: Department of Land and Natural Resources – Division of Aquatic Resources

the Western Pacific Regional Fishery Management Council, the National Marine Fishery Service – Pacific Islands Fisheries Science Center, Pacific Island Regional Office, United States Fish and Wildlife Service – Wildlife and Sportfish Restoration Program, University of Hawaii – Hawaii Institute of Marine Biology, University of Guam Marine Laboratory, Hawaii Pacific University.

This Regional Strategic Plan came to fruition through the technical support by Ms. Ann Weaver, Ms. Stephanie Bennett, and Mr. Douglas Harper of NOAA Coastal Services Center that provided facilitation in the two-day planning session.

The FDCRC acknowledges the Pacific Island Fisheries Science Center for their thorough review of the strategic plan and for providing critical recommendations to enhance the collaborative relationship between the agencies signatory to the plan.

### **Workshop Participants**

*American Samoa Department of Marine and Wildlife Resources*

Domingo Ochavillo – Chief Fishery Biologist

Nonu TuiSamoa – Boat Based Creel Survey Program Manager

Yvonne Mika – Shore-based Creel Survey Program Manager

*Guam Department of Agriculture – Division of Aquatic and Wildlife Resources*

Celestino Aguon – Acting Division Chief

Brent Tibbats – Fishery Biologist

*CNMI Department of Land and Natural Resources – Division of Fish and Wildlife*

Manuel Pangelinan – Division of Fish and Wildlife Director

Todd Miller – Fisheries Supervisor

Sean MacDuff – Inshore Creel Survey Program Manager

*Hawaii Department of Land and Natural Resources – Division of Aquatic Resources*

Alton Miyasaka – Acting Fisheries Program Manager

Reginald Kokubun – Commercial Fishery Database Manager

Tom Ogawa – Hawaii Marine Recreational Fisheries Survey Manager

*NMFS – Pacific Islands Fisheries Science Center*

Hui Hua Lee – Stock Assessment Program

Robert Humphreys – Life History Program Manager

Hongguang Ma – Statistician, Marine Recreational Information Program

Ed Glazier – Human Dimension Research Program Manager

*NMFS – Pacific Island Regional Office*

Scott Bloom – Grant Program Manager

Jarad Makaiau – Natural Resource Management Specialist

*University of Hawaii – Hawaii Institute of Marine Biology*

Erik Franklin – Associate Professor

*University of Guam – Marine Laboratory*

Terry Donaldson – Marine Laboratory Director

*Hawaii Pacific University*

Samuel Kahng – Associate Professor

*US Fish and Wildlife Service:*

Edward Flinn Curren – Grant Program Manager, Wildlife and Sportfish Restoration Program

*Western Pacific Regional Fishery Management Council*

Marlowe Sabater – Marine Ecosystem Scientist

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## OVERVIEW

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FISHERY DATA COLLECTION HAS BEEN ONGOING in American Samoa, Guam, CNMI, and Hawaii for several decades. Implementation of fishery data collection programs differs by jurisdiction. These programs cannot be standardized due to differences in logistical capabilities and geographic scale of the survey areas. The data generated from these data collection programs are being used for fishery management and scientific studies. However in recent years, management requirements and information needs evolved and the demand for fishery information had increased significantly. Current data collection programs are no longer sufficient to meet modern management requirements, particularly for determining annual catch limits (ACLs) and stock status assessments. Although decades of data collection had generated substantial fishery information, the reliability of the catch estimates<sup>2,3,4,5</sup> and identification of sources of sampling error and bias<sup>6</sup> have only been evaluated sporadically throughout the program's existence. The data from these programs are important and generate the only data sets for the near-shore/coastal fisheries in existence, which were used to specify the crude initial sets of ACLs. The efforts of various data collection programs coupled with a series of data workshops aim to improve fishery information. However, the absence of a strategic plan makes a coordinated, collaborative, and objective-oriented effort to improve data collection more challenging.

Instituting a framework whereby all agencies are aware of planned and current research is an enormous task. Each of the fishery management agencies, federal science providers, and universities has been conducting or facilitating research related to fishery stocks and associated habitats. These different research projects and programs are valuable sources of information that have potential to inform the fishery decision making process and enhance management of stocks. The Council, as mandated by the Magnuson-Stevens Fishery Conservation and Management Act, works through its Scientific and Statistical Committee and other advisory bodies and staff, to develop Five Year Research Priorities documents. These are intended to guide the research that needs to be implemented to support quality fishery management decision-making.

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<sup>2</sup> Kikkawa, B. 1994. Western Pacific Fishery Information Network Island Data Assessment (WIDA) Project: Small Boat Fishery Survey in Guam 1980-1991. South West Fishery Science Center Administrative Report H-94-03, Honolulu, HI. 80pp.

<sup>3</sup> Kikkawa, B. 1996. WPacFIN Island Data Assessment (WIDA) of American Samoa Small Boat-based Fishery Survey, 1985-1993 and Shoreline Fishery Survey, 1990-1993. South West Fishery Science Center Administrative Report H-96-09, Honolulu, HI. 62pp

<sup>4</sup> Kikkawa, B. 1997. WPacFIN Island Data Assessment (WIDA) of Commonwealth of the Northern Mariana Islands Small Boat Fishery Survey, 1988-93 South West Fishery Science Center Administrative Report H-97-04, Honolulu, HI. 39pp.

<sup>5</sup> Bak-Hospital, S. (draft). Western Pacific Regional Creel Survey Data Historical Summary and Analyses: 1982-2012. Report to the Pacific Island Fishery Science Center.

<sup>6</sup> Bak, S. 2012. Evaluation of Creel Survey Program in the Western Pacific Region (Guam, CNMI, and American Samoa). Western Pacific Regional Fishery Management Council, Honolulu, HI. 59pp.



In order to achieve the goal of improving fishery information for management, the Council established the Fishery Data Collection and Research Committee (FDCRC). This committee is comprised of the heads of the different fishery management agencies, the PIFSC director, the manager of the USFWS Sportfish Restoration Program, and the chair of the Council. The FDCRC is responsible for implementing specific tasks agreed upon by the Committee as recommended to the Council. This committee is supported by a Technical Committee (TC) that is comprised of data collection managers, chief/senior scientists, and research scientists. Whereas the FDCRC members are high level participants, TC members are program and technical staff who collect, process, and/or report data. The TC members know the intricacies of the data programs and their needs, deficiencies, and ability to provide certain types of information. The on-the-ground implementation of the projects will be governed by the Technical Committee with support from the FDCRC members.

The success of this effort rests on the collaborative effort and agreement between the members of the FDCRC. Working relationship between agencies/programs already exist since the establishment of each entity. The Council, PIFSC, and WSRP have supported DMWR, DAWR, DFW and DAR through various programs and projects for decades by providing funding and/or technical support. This plan is meant to further enhance the collaboration through identification of specific tasks and monitoring the progress and accomplishment of all parties.

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## NEED

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THE NEED FOR BETTER FISHERY INFORMATION HAS BECOME MORE PRONOUNCED since the Magnuson-Stevens Fishery Management and Conservation Act was re-authorized in 2006. The re-authorization included mandates for the increased use of annual catch limits, allocation schemes, essential fish habitat and habitat of particular concern, and increased quality of information that goes into the Stock Assessment and Fishery Evaluation (SAFE) reports. Other statutes, such as the Endangered Species Act, Marine Mammal Protection Act, and the National Environmental Protection Act also demand for better information. In addition, pressures from non-government organizations on federal, state, territorial and commonwealth agencies to do a better job in conserving the marine resources.

The current near-shore and coastal data collection and research framework implemented by the local fishery management agencies were not designed to meet these emerging demands and must be upgraded to conform to current management information requirements. The need to support these local data collection efforts is critical because these are the only sources of near-shore-coastal data from which fishery management decisions are based. There is also a need to effectively coordinate and implement data improvement projects as well as monitor the progress

of the plan, as this has been a serious impediment to success. The lack of a governing body to oversee and regularly monitor the various initiatives resulted in revisiting the same issues and the matter not being resolved.

Near-shore and coastal fisheries research in the Western Pacific, on a regional level, is often disparate, lacks direction, and not designed to neatly inform fishery management decisions. In general, much of the research has been driven by the nature of the funding and the interests of the researchers, though research done in the Territories does tend to be designed to answer specific questions on a local scale. This locally generated scientific information can contribute to the broader scientific knowledge and can be used for broader fishery management decisions. However, the results are usually not readily available unless published in peer-reviewed scientific journals, which are often not available in a useful time frame. There is a need to consolidate these unpublished works and coordinate fishery research in order to address fishery information needs at multiple levels. This would increase the efficiency of the limited funding resources by addressing fishery information needs at various levels

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## PLANNING WORKSHOP

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THE COUNCIL ORGANIZED A REGIONAL STRATEGIC PLANNING WORKSHOP that was attended by members of the Technical Committee of the Fishery Data Collection and Research Committee on April 14-16, 2014 in Honolulu, Hawaii. The planning session was facilitated at the NOAA Coastal Services Center. The goal of the workshop was to develop a strategic plan that would lead to enhancements in the quality and quantity of fishery information. This plan is intended to serve as a roadmap to guide the region towards improved fishery information. This document will also be the basis for identifying funding sources and will be used by the agencies to seek funding support. The workshop was a participatory process that required participants to reflect on the strengths and weaknesses of each of their agencies they relate to fishery data collection and research. The process included identifying opportunities to collaborate and seek solutions to any issues thought to have the potential to inhibit operation of the plan. After identifying these elements, the participants defined the vision, mission and goals of this collaborative effort. This set the overall direction for the region towards which the agencies will progress. Each goal will be supplemented by specific strategies under which several projects will be identified. Each project that is identified will be augmented with a cost estimate, timeline, and agency lead.



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## VISION STATEMENT

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COMMUNITIES BENEFIT CULTURALLY, SOCIALLY AND ECONOMICALLY FROM SUSTAINABLE FISHERIES AND HEALTHY MARINE ECOSYSTEMS MANAGED USING RELIABLE, RELEVANT AND REPRESENTATIVE DATA.

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## MISSION STATEMENT

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THE FISHERY DATA COLLECTION AND RESEARCH COMMITTEE COORDINATE AND SUPPORT THE IMPROVEMENTS IN THE COLLECTION, ANALYSIS AND DISSEMINATION OF RELEVANT, RELIABLE AND UNBIASED INFORMATION AND ENHANCE THE TRUSTED EXCHANGE BETWEEN STAKEHOLDER GROUPS ENABLING AN EFFECTIVE FISHERY MANAGEMENT AT ALL LEVELS.

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## GOALS

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GOAL 1: ESTABLISH A STANDARDIZED/COMPARABLE AND COMPREHENSIVE DATA COLLECTION SYSTEM THAT STORES AND DISSEMINATE QUALITY CONTROLLED FISHERIES INFORMATION

GOAL 2: CREATE A LIST OF PRIORITY SPECIES FOR EACH GROUP/AGENCY

GOAL 3: CREATE AND MAINTAIN AN INVENTORY OF SCIENTIFIC LITERATURE (E.G. GRAY LITERATURE), UNPUBLISHED/ANALYZED DATA SET, AND UNPROCESSED SPECIMEN/SAMPLES THAT IS PUBLICLY ACCESSIBLE

GOAL 4: PROACTIVE ECOSYSTEM-BASED FISHERY MANAGEMENT IS IMPLEMENTED AT LOCAL AND FEDERAL LEVEL THROUGH COORDINATED AND TARGETED RESEARCH TO BETTER UNDERSTAND FISHERY SUSTAINABILITY

GOAL 5: INCREASE CAPACITY OF LOCAL FISHERY MANAGEMENT AGENCIES TO COLLECT IMPROVED FISHERIES DATA, MONITOR CRITICAL FISHERIES AND CONDUCT FISHERIES ECOSYSTEM RESEARCH



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## STRATEGIES

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The FDCRC is a collaborative partnership between fishery management agencies, federal counterparts, and academic institutions. The mandates for all entities vary but each has a vital role in contributing to the overarching mission. Each has certain level of expertise and capabilities that can augment the short-fall of others. Through this collaborative effort and unified goals, it is hoped that in the next 5 years fishery data collection has been enhanced and fishery research have been coordinated resulting in a more comprehensive fishery information for management. The following goals and strategies are designed to maximize efficiency in generating improved data and scientific information from limited funding sources. Appendix 1 describes the agencies that will participate, identify priority level, and funding requirements for each task described below.

### GOAL 1: ESTABLISH A STANDARDIZED/COMPARABLE AND COMPREHENSIVE DATA COLLECTION SYSTEM THAT STORES AND DISSEMINATE QUALITY CONTROLLED FISHERIES INFORMATION

**Objective 1.1:** Within 5 years the committee will evaluate and assess the technical assistance, guidance and training being provided by WPacFIN to determine if they are meeting the user needs for developing reliable, relevant, accurate, and accessible fisheries data

*Strategy 1.1.1: Develop evaluation criteria on local fishery management agencies' data collection capabilities and monitor program performance over 5 years;*

Task 1.1.1.1: Work with agencies in developing criteria;

Task 1.1.1.2: Conduct institutional assessment on technical capacity for data collection, analysis and reporting;

*Strategy 1.1.2: Develop an evaluation process through the annual meeting of the FDCRC and its Technical Committee;*

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**Objective 1.2:** Subject to appropriations, by October 2019, this committee will evaluate the delivery of the updated system with online, dynamic, text, and spatial query capability that allows users to download 80% of reliable and relevant commercial and non-commercial fisheries dependent data in all US Western Pacific jurisdictions.

*Strategy 1.2.1: Strengthen implementation of existing rules and regulations that supports fishery data collection;*

- Task 1.2.1.1: Develop legislation that would support collection of fishery data via mandatory reporting and compliance to data collection;
- Strategy 1.2.2: Diversify funding opportunities to support the basic fishery data collection and the improvements thereafter;*
- Task 1.2.2.1: Identify additional funding sources (short and long-term) for the fishery data collection to improve the data collection program;
- Task 1.2.2.2: Create a list of funding sources that the territories can apply for (make sure the eligibility requirements are explicit);
- Strategy 1.2.3: Identify the status of the local fishery agencies capabilities to carry out the data collection at a statistically adequate yet logistically optimal level;*
- Task 1.2.3.1: Conduct an agency status inventory to determine current capabilities within the agencies in terms of hardware, man-power, software etc. to carry out the data collection;
- Task 1.2.3.2: Institutional analysis to determine capacity and whether there is a need for technology transfer and capacity building and training;
- Strategy 1.2.4: Prioritize fisheries that require enhanced or new data collection*
- Task 1.2.4.1: Conduct a prioritization session to determine which fisheries are in need of consistent monitoring through the Joint Archipelagic Plan Team [and set other fisheries as low priorities that can be addressed if funding is adequate]
- Strategy 1.2.5: Design, test, and implement new data collection programs that are not adequately covered by the existing survey program;*
- Task 1.2.5.1: Based on the results of the PIFSC contract with S. Bak, coordinate with local fishery agencies to determine important fisheries not addressed by the current program
- Task 1.2.5.2: Execute a contract to design a data collection system and determine the requirements for the new data collection system (i.e. logistics and regulations)
- Task 1.2.5.3: Local fishery management agencies conduct pilot testing of the commercial and non-commercial data collection system (funding may originate from MRIP or NMFS FIN); determine a viable long-term funding source and database structure;



Task 1.2.5.4: Local fishery management agencies implement the new data collection system with adequate monitoring of performance

*Strategy 1.2.6: Improve the data query functionality of the database to allow flexibility in creating data summaries, and to simplify access to the database [new task for creating online querying and/or data downloading]*

Task 1.2.6.1: Conduct workshop to determine data summaries needed for various reports and management needs.

Task 1.2.6.2: WPacFIN or programming contractor develops software that provides flexibility in the query of the fishery data; technical support for the agency staff to query the database;

*Strategy 1.2.7: Improve the collection and analysis of socio-economic data*

Task 1.2.7.1: Work with the Social Science Research Committee in developing priorities in the socio-economic (related to communities) data collection and integrate this in the data collection system;

*Strategy 1.2.8: Upgrade fishery data collection by exploring options and implementing automated systems using current mobile, wireless, and online technology*

Task 1.2.8.1: Upgrade the electronic data entry

Task 1.2.8.2: Explore the use of mobile technology in improving fishery data collection;

Task 1.2.8.3: Support the development of legislation for mandatory reporting in Guam;

Task 1.2.8.4: Support the implementation and improvement of existing mandatory reporting;

Task 1.2.8.5: Support the development of the online dealer reporting for Hawaii

*Strategy 1.2.9: Enhance local fishery management agencies' capacity to process collected fishery data in near real-time*

Task 1.2.9.1: Provide funding support to upgrade the Hawaii commercial database

Task 1.2.9.2: Conduct periodic training and technical assistance on the data collection and transcription process

Task 1.2.9.3: Develop a manual for data collectors that documents the whole process of collecting fisheries data

Task 1.2.9.4: Enhance/develop communication framework between agencies and WPacFIN to facilitate easier follow ups and technical questions

*Strategy 1.2.10: Enhance the local fishery management agencies' capacity to summarize and analyze collected fishery data*

- Task 1.2.10.1: Conduct a “reporting need session” during the Archipelagic Plan Team to generate a list of data summaries needed for fishery management at all levels; submit the list and product format to the WPacFIN to generate the product;
- Task 1.2.10.2: Conduct a historical inventory on changes in the fishery and data collection to better interpret the fishery information in the database;
- Task 1.2.10.3: WPRFMC and PIFSC provide technical training on data analysis of fishery data through the Archipelagic Plan Team;
- Task 1.2.10.4: Integrate the information from various data streams (BioSampling, creel, PRS etc.) to generate reliable fishery data;

*Strategy 1.2.11: Enhance dissemination of fishery information utilizing various media*

- Task 1.2.11.1: Create a standard reporting template that would satisfy the reporting requirements at all levels (local, federal, national); this should satisfy the requirements of National Standard 2 which includes sections (but not limited to) biological, socio-economic, and impact to communities;
- Task 1.2.11.2: Create an online version of the annual report;
- Task 1.2.11.3: Conduct public outreach to clarify and explain the rules and regulations/purpose and need of data collection to increase compliance and participation
- Task 1.2.11.4: Enhance collaboration/communication with other agencies to avoid duplication in fishery data collection to avoid interviewee “stress”
- Task 1.2.11.5: Develop a user-friendly online tool to query non confidential data
- Task 1.2.11.6: Improve the online summaries in the WPacFIN website; integrate all the information needs of FDCRC members and upgrade the website based on the needs

*Strategy 1.2.12: Revisit and enhance the data sharing agreement with the members of the FDCRC and the public to facilitate more efficient generation of data products and scientific information for local and federal fisheries management*

- Task 1.2.12.1: Develop an MOU for FDCRC members to access and query the data not requiring data request
- Task 1.2.12.2: Developing a public request system; mandatory requirement for a data sharing plan (2 years)
- Task 1.2.12.3: Establish a database station or online accessible via encrypted password.at the offices of the FDCRC members and provide data summarization and query training to authorized users



*Strategy 1.2.13: Enhance fishermen and vendor participation in the fishery data collection programs<sup>7</sup>*

- Task 1.2.13.1: Develop an incentive system built-into the data collection programs for vendors and fishermen;
  - Task 1.2.13.2: Develop outreach materials and strategies to feed the data back to the fishermen in a useful format;
  - Task 1.2.13.3: Conduct regular forum and dialogue with fishing organization to gather fishery issues and identify avenues of collaboration;
  - Task 1.2.13.4: Run public ads through various media promoting the fishery data collection and emphasize on the importance in participating in the program;
- 

## GOAL 2: CREATE A LIST OF PRIORITY SPECIES FOR EACH GROUP/AGENCY

**Objective 2.1:** By the next meeting each committee representative from the jurisdiction will send a list of their priority species and associated meta-data [collection methods/standards/best practices] to the council to add to the consolidated list for prioritizing research.

*Strategy 2.1.1: Generate a consolidate list of priority species that represents various aspects of the fisheries which would in-turn be the priority species for monitoring, stock assessment and research*

- Task 2.1.1.1: Each agency that is a member of the FDCRC will speak to its respective constituents and consolidate a list of priority species within their jurisdiction. This list shall include all available data associated with the species and rationale for the inclusion. Agencies must send the compiled list to the council.
- Task 2.1.1.2: Conduct a Productivity-Susceptibility Analysis on all exploited species based on available and inferred information and compare the PSA results with the list each agency had developed;
- Task 2.1.1.3: Council staff develops a species – metadata matrix per jurisdiction/agency. Staff will then develop a white paper that will provide options for using these species as indicator species that represents the families of fishes in the FEPs. Vet these species list to the advisers for review.

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<sup>7</sup> CNMI BioSampling Program initiated by PIFSC and supported by the Council is a standard to which this strategy can learn from. The Territory Science Initiative by PIFSC in collaboration with the Council seeks to further expand this success.

- Task 2.1.1.4: Develop an amendment to the FEP that would utilize the indicator species as species for fisheries management;
- 

**GOAL 3: CREATE AND MAINTAIN AN INVENTORY OF SCIENTIFIC LITERATURE (E.G. GRAY LITERATURE), UNPUBLISHED/ANALYZED DATA SET, AND UNPROCESSED SPECIMEN/SAMPLES THAT IS PUBLICLY ACCESSIBLE**

**Objective 3.1:** By October 2024, dynamic databases will exist with bibliography of fishery research, fishery dependent/independent datasets, and catalogue of specimens for stocks under local and federal fisheries management

*Strategy 3.1.1: Develop an inventory of biological and fishery-related information focused on all managed exploited biological resources*

- Task 3.1.1.1: Execute a contract with a third party entity or graduate student that would compile all information regarding managed exploited biological resources. [NOTE: Ensure that point of contacts are identified for each information archived]

*Strategy 3.1.2: Create a compendium of each priority species for each group/agency and make sure the research meets certain criteria focusing on all managed/exploited biological resources*

- Task 3.1.2.1: Execute a contract with a third party entity that will conduct literature search on various information databases, such as but not limited to: online scientific literatures, gray literatures, library holdings of each agencies. The contractor will also develop a compendium of scientific literature, agency based data holdings, and unprocessed specimen libraries.
- Task 3.1.2.2: Conduct an agency-based interview of staff with long-standing affiliation with the agency to document institutional knowledge on what research had been conducted track viable sources of historic information about the fisheries and stocks being managed.
- Task 3.1.2.3: Develop a searchable library [EndNote or other online application] compiling all the information generated by the information mining contracts;
- Task 3.1.2.4: Establish partnership with FishBase, ScholarSpace, and ERDDAP to establish the database of mined information (*Optional*)



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**GOAL 4:** PROACTIVE ECOSYSTEM-BASED FISHERY MANAGEMENT IS IMPLEMENTED AT LOCAL AND FEDERAL LEVEL THROUGH COORDINATED AND TARGETED RESEARCH TO BETTER UNDERSTAND FISHERY SUSTAINABILITY

**Objective 4.1:** The Council, PIFSC, local fishery management agencies, and academic institutions have determined the stock status of x% of the species in the priority list within the next 5 years

*Strategy 4.1.1: Conduct assessment of the priority species applying the appropriate assessment methods based on the quantity and quality of information available for each species*

Task 4.1.1.1: Assign stock assessment tiers (with corresponding stock assessment methodology) to each of the species in the priority list based on the amount of information available and which could be feasibly gathered.

Task 4.1.1.2: Convene a meeting with PIFSC-Stock Assessment Program, HPU, UH identify and assign species in the priority list for stock assessment; agree on protocol, timeline and budget requirements

Task 4.1.1.3: Conduct a Western Pacific Stock Assessment Review of the assessment generated

*Strategy 4.1.2: Amend the Fishery Ecosystem Plans on the stock status determination criteria for each priority species*

Task 4.1.2.1: Council staff shall amend the FEPs to reflect the methodology to which stock status are to be determined;

*Strategy 4.1.3: Improve the information used by stock assessment by analyzing existing data and conducting studies that address the information gaps<sup>8</sup>*

Task 4.1.3.1: Convene a meeting with PIFSC-Stock Assessment Program to determine priority research to fill information gaps;

Task 4.1.3.2: Develop proposals and secure funding to conduct targeted research focusing on but not limited to:

- Life history traits (k,  $L_{inf}$ , longevity etc.);
- Spatially explicit CPUE;

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<sup>8</sup> The BioSampling Program provides additional information on life history and length-weight relationship that can support stock assessment.

- Independent measure of population size;
  - Estimate total harvest;
  - Tagging studies to determine spatial distribution, mortality etc.
- Task 4.1.3.3: Compile research results in the online database (Task 3.1.2.3)
- Task 4.1.3.4: Analyze the spatial distribution of effort from existing creel, CML, HMRFS and aerial survey data

*Strategy 4.1.4: Improve understanding of the human dimensions in the different fisheries in the Western Pacific Region and how these factors contribute to the sustainability of the stocks;*

- Task 4.1.4.1: Coordinate with the Social Science Research Committee to determine priority research and secure funding for the priority topics;

*Strategy 4.1.5: Improve on the stock assessment model used to determine stock status of moderate to data-poor stocks;*

- Task 4.1.5.1: Convene a meeting with PIFSC-Stock Assessment Program and other assessment practitioners and partners to determine priority research to improve stock assessment methods;

**Objective 4.2:** The Council, PIFSC, local fishery management agencies, and academic institutions have jointly developed working ecosystem models for the nearshore ecosystems [scale of which will have to be determined] within the next 5 years that can be used as a tool for making fishery management decisions

*Strategy 4.2.1: Identify critical ecosystem management drivers, specific pressures on ecosystems, investigate stakeholders interests and agendas, and identify patterns of interaction among stakeholders*

- Task 4.2.1.1: Conduct scoping session with stakeholders (fishery management agencies, fishing communities and ocean users) at the different island areas in each jurisdiction;
- Task 4.2.1.2: Draft summary of the scoping session and generate white paper on scoping results

*Strategy 4.2.2: Conduct targeted research to complete the elements needed run ecosystem models for fishery management*

- Task 4.2.2.1: Convene a meeting with PIFSC-Ecosystem and Oceanography Division and Coral Reef Ecosystem Division to determine elements to build an ecosystem model and identify priority research to fill information gaps;

Task 4.2.2.2: Develop proposals and secure funding to conduct targeted research focusing on but not limited to:

- Estimate area specific biomass information over time;
- Enhance habitat mapping product prioritizing increased bathymetric and relief resolution;
- Determining high resolution species-habitat relationship;
- Estimating fishery productivity;
- Determining trophic interactions and associated grazing/predation rates;
- Estimating recruitment and survival rates;
- Determining system carrying capacity;
- Genetic and ecological connectivity;
- Vital rate responses to various perturbations (or lack thereof) like, but not limited to, pollution, large and small scale habitat degradation, fishing, climate change impacts;
- Life history determination;
- Species shift-effects from con-specific removals;
- Human dimension influence on the fisheries and the compounding effects on fish stocks;
- Estimating ecosystem resilience from phase-shifts;

*NOTE: Elements will have to be prioritized based on critical information that will complete a working ecosystem model*

*Strategy 4.2.3: Develop ecosystem indicators that will be monitored over time which describes the general status of the population and conduct a risk analysis on what perturbation influences the indicators*

Task 4.2.3.1: Convene an ecosystem indicator and risk analysis workshop with PIFSC and local agencies to determine which indicators and threats will be used for model simulation

Task 4.2.3.2: Identify and collate data sets that will be used in the ecosystem model

Task 4.2.3.3: Conduct a full assessment to determine the state of all indicators that can be feasibly be quantifies. Identify data and other limitations;

*Strategy 4.2.4: Develop ecosystem models for various fisheries and ground truth reliability of model results that can be used for fishery management*

Task 4.2.4.1: Execute contract/grant to potential contractors to develop ecosystem models and conduct ground-truthing/result validation;



Task 4.2.4.2: Conduct Management Strategy Evaluation (MSE) to simulate the effect of various existing and upcoming management tools on the ecosystem indicators and how that changes based on the different combination and extent of implementation and enforcement

**Objective 4.3:** The Fishery Data Collection and Research Committee shall utilize and apply the assessment and the fishery research information to formulate scientifically-sound management strategies within their own jurisdiction that is coordinated at all levels

*Strategy 4.3.1: Apply Management Strategy Evaluation to current fisheries regulation and other related management strategies to determine efficacy and impact on the ecosystem indicators*

Task 4.3.1.1: Conduct an MSE workshop with the local fishery management agencies and other agencies that manages ancillary factors impacting the stocks. The goal of the workshop is to evaluate current regulations and run simulations on its effect on the ecosystem indicators;

Task 4.3.1.2: Conduct a comprehensive fisheries regulatory review focusing on the effectiveness of the different fishery regulations and revise regulations based on the MSE;

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**GOAL 5: INCREASE CAPACITY OF LOCAL FISHERY MANAGEMENT AGENCIES TO COLLECT IMPROVED FISHERIES DATA, MONITOR CRITICAL FISHERIES AND CONDUCT FISHERIES ECOSYSTEM RESEARCH<sup>9</sup>**

**Objective 5.1:** In the next 5 year, fishery management agencies have adequate man-power, analytical skill-sets, legislative framework and hardware to conduct improved fishery data collection and research through collaboration within the membership of the FDCRC and other institution the FDCRC identifies as partners.

*Strategy 5.1.1: Determine the optimal number of data collection staff that could deliver the adequate quantity and quality fishery data for monitoring purpose*

Task 5.1.1.1: Conduct statistical analysis of the existing fishery data to determine optimum number of sampling runs that would generate a statistically

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<sup>9</sup> The BioSamplig Program provides local technical expertise to conduct life history research and will provide local staff with training of life history sampling.

robust expansion estimate; determine the level of precision and scale as dictated by a management strategy;

*Strategy 5.1.2: Implement a regular training session on fishery data collection and fishery data analysis*

Task 5.1.2.1: Continue the Training-Work session cycle at the Annual Joint Archipelagic Plan Team Meeting;

Task 5.1.2.2: Explore options for online lecture series from researchers with relevant fisheries research information;

*Strategy 5.1.3: Explore options for a career service enrichment program*

Task 5.1.3.1: Work with the Education Committee to establish career service enrichment program;

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## PERFORMANCE EVALUATION

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TRACKING THE ACCOMPLISHMENT AND FOLLOW UP ON THE TASKS listed in this regional strategic plan will be carried out by the Coordinator of the FDCRC. The FDCRC members will be asked to report on the accomplishments at the Annual Meeting of the Committee and at the Island Reports of each Council meeting. The Coordinator will be following up with the Technical Sub-Committee members on the status of the tasks. The Coordinator will also be responsible for monitoring potential funding availability and coordinate the submission of the proposals.

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## LINKAGES TO OTHER STRATEGIC PLAN AND PRIORITIES

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THE PRIORITIES DESCRIBED IN THIS PLAN REFLECT ELEMENTS FROM DIFFERENT STRATEGIC PLANS such as: 1) WPRFMC Five-Year Research Priorities<sup>10</sup>; 2) NMFS Strategic Plan for Fisheries Research<sup>11</sup>; 3) Coral Reef Conservation Program Goals and Objectives (2010-2015)<sup>12</sup>; 4) Hawaii Coral Reef Strategy<sup>13</sup>; 5) American Samoa and Guam Fisheries Local Action Strategies; and 6) Commonwealth of Northern Mariana Islands Coral Reef Management Priorities<sup>14</sup>; 7) Territory Marine Conservation Plans. Appendix 2 describes the linkages of the strategies in this plan with some of the objectives of the Council's research priorities, NMFS research plan, CRCP goals and objectives, and the State and Territories' Fishery Local Action Strategies.

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<sup>10</sup> WPRFMC. 2014. *Western Pacific Regional Fishery Management Council Five-Year Research Priorities 2014-2018*. Western Pacific Regional Fishery Management Council, Honolulu, HI

<sup>11</sup> NMFS. 2007. *NMFS strategic plan for fisheries research*. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/SPO-80, 170 p.

<sup>12</sup> NOAA Coral Reef Conservation Program. 2009. *NOAA Coral Reef Conservation Program Goals and Objectives 2010-2015*. Silver Spring, MD

<sup>13</sup> The State of Hawaii. 2010. *Hawai'i Coral Reef Strategy: Priorities for Management in the Main Hawaiian Islands 2010-2020*. Honolulu, HI: NOAA

<sup>14</sup> The Commonwealth of Northern Mariana Islands and NOAA Coral Reef Conservation Program. 2010. *Commonwealth of the Northern Mariana Islands' Coral Reef Management Priorities*. Silver Springs, MD: NOAA



## APPENDIX 1: TASK-AGENCY MATRIX

*Appendix 1 identifies the agencies that will be implementing the tasks identified by this plan. By marking [X], the agency will (but not limited to) implement the task described and will attempt to seek funding to achieve the task. The agency could also support the task in-kind through complementary efforts that would generate a similar product via other means or process.*

GOAL 1: ESTABLISH A STANDARDIZED AND COMPREHENSIVE DATA COLLECTION SYSTEM THAT STORES AND DISSEMINATE QUALITY CONTROLLED FISHERIES INFORMATION									
Objective 1.1: Within 5 years the committee will evaluate and assess the technical assistance, guidance and training being provided by WPacFIN to determine if they are meeting the user needs for developing reliable, relevant, accurate, and accessible fisheries data									
Strategy 1.1.1: Develop evaluation criteria on local fishery management agencies' data collection capabilities and monitor program performance over 5 years;									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC		
1.1.1.1.	Work with agencies in developing criteria	X	X						
1.1.1.2.	Conduct institutional assessment on technical capacity for data collection, analysis and reporting		X						
Strategy 1.1.2: Develop an evaluation process through the annual meeting of the FDCRC and its Technical Committee;									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC		
1.1.2.1.		X		X	X	X	X		
1.1.2.2.									
Objective 1.2: Subject to appropriations, by October 2019, this committee will evaluate the delivery of the updated system with online, dynamic, text, and spatial query capability that allows users to download 80% of reliable and relevant commercial and non-commercial fisheries dependent data in all US Western Pacific jurisdictions.									
Strategy 1.2.1: Strengthen implementation of existing rules and regulations that supports fishery data collection									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC		
1.2.1.1.	Develop legislation that would support collection of fishery data via mandatory reporting and compliance to data collection;	X (enf)	X						
Strategy 1.2.2: Diversify funding opportunities to support the basic fishery data collection and the improvements thereafter									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC		
1.2.2.1.	Identify additional funding sources (short and long-term) for the fishery data collection to improve the data collection program;						X		
1.2.2.2.	Create a list of funding sources that the territories can apply for (make sure the eligibility requirements are explicit);						X		



<i>Strategy 1.2.3: Identify the status of the local fishery agencies capabilities to carry out the data collection at a statistically adequate yet logistically optimal level</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>			
1.2.3.1.	Conduct an agency status inventory to determine current capabilities within the agencies in terms of hardware, man-power, software etc. to carry out the data collection;	X	X					WPRFMC	
1.2.3.2.	Institutional analysis to determine capacity and whether there is a need for technology transfer and capacity building and training;	X	X						
<i>Strategy 1.2.4: Prioritize fisheries that require enhanced or new data collection</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>			
1.2.4.1.	Conduct a prioritization session to determine which fisheries are in need of consistent monitoring through the Joint Archipelagic Plan Team		X-participate					WPRFMC	
<i>Strategy 1.2.5: Design, test, and implement new data collection programs that are not adequately covered by the existing survey program</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>			
1.2.5.1.	Based on the results of the PIFSC contract with S. Bak, coordinate with local fishery agencies to determine important fisheries not addressed by the current program	X	X					WPRFMC	
1.2.5.2.	Execute a contract to design a data collection system and determine the requirements for the new data collection system (i.e. logistics and regulations)							X	
1.2.5.3.	Local fishery management agencies conduct pilot testing of the commercial and non-commercial data collection system (funding may originate from MRIP or NMFS FIN); determine a viable long-term funding source and database structure;	X	X						
1.2.5.4.	Local fishery management agencies implement the new data collection system with adequate monitoring of performance	X	X						
<i>Strategy 1.2.6: Improve the data query function of the database to allow flexibility in creating data summaries</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>			
1.2.6.1.	Conduct workshop to determine data summaries needed for various reports and management needs;		X-participate					WPRFMC	
1.2.6.2.	WPacFIN or programming contractor develops software that provides flexibility in the query of the fishery data; technical support for the agency staff to query the database;							X	
<i>Strategy 1.2.7: Improve the collection and analysis of socio-economic data</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>			
1.2.7.1.	Work with the Social Science Research Committee in developing priorities in		X					WPRFMC	















stock status of x% of the species in the priority list within the next 5 years									
<i>Strategy 4.1.1: Conduct assessment of the priority species applying the appropriate assessment methods based on the quantity and quality of information available for each species</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>		
4.1.1.1.	Assign stock assessment tiers (with corresponding stock assessment methodology) to each of the species in the priority list based on the amount of information available						X		
4.1.1.2.	Convene a meeting with PIFSC-Stock Assessment Program, HPU, UH identify and assign species in the priority list for stock assessment; agree on protocol, timeline and budget requirements						X		
4.1.1.3.	Conduct a Western Pacific Stock Assessment Review of the assessment generated						X		
<i>Strategy 4.1.2: Amend the Fishery Ecosystem Plans on the stock status determination criteria for each priority species</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>		
4.1.2.1	Council staff shall amend the FEPs to reflect the methodology to which stock status are to be determined;						X		
<i>Strategy 4.1.3: Improve the information used by stock assessment by analyzing existing data and conducting studies that address the information gaps</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>		
4.1.3.1.	Convene a meeting with PIFSC-Stock Assessment Program to determine priority research to fill information gaps  Develop proposals and secure funding to conduct targeted research focusing on but not limited to: <ul style="list-style-type: none"> <li>Life history traits (k, Linf, longevity etc.);</li> <li>Spatially explicit CPUE;</li> <li>Independent measure of abundance;</li> <li>Estimate of total harvest;</li> <li>Tagging studies to determine spatial distribution, mortality etc.</li> </ul>	X	X				X		
4.1.3.2.	Compile research results in the online database (Task 3.1.2.3)						X		
4.1.3.3.	Analyze the spatial distribution of effort from existing creel survey, CML, HMRFS and aerial survey data		X				X		
<i>Strategy 4.1.4: Improve understanding of the human dimensions in the different fisheries in the Western Pacific Region and how these factors contribute to the sustainability of the stocks</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>		
4.1.4.1.	Coordinate with the Social Science Research Committee to determine priority research and secure funding for the priority topics		X						
<i>Strategy 4.1.5: Improve on the stock assessment model used to determine stock status of moderate to data-poor stocks</i>									
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>		







<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>
4.2.3.1.	Convene an ecosystem indicator and risk analysis workshop with PIFSC and local agencies to determine which indicators and threats will be used for model simulation		X				X
4.2.3.2.	Identify and collate data sets that will be used in the ecosystem model						X
4.2.3.3.	Conduct a full assessment to determine the state of all indicators;						X
<i>Strategy 4.2.4: Develop ecosystem models for various fisheries and ground truth reliability of model results that can be used for fishery management</i>							
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>
4.2.4.1.	Execute contract/grant to potential contractors to develop ecosystem models and conduct ground-truthing/result validation;						X
4.2.4.2	Conduct Management Strategy Evaluation (MSE) to simulate the effect of various existing and upcoming management tools on the ecosystem indicators and how that changes based on the different combination and extent of implementation and enforcement						X
<b>Objective 4.3: The Fishery Data Collection and Research Committee shall utilize and apply the assessment and the fishery research information to formulate scientifically-sound management strategies within their own jurisdiction that is coordinated at all levels</b>							
<i>Strategy 4.3.1: Apply Management Strategy Evaluation current fisheries regulation and other related management strategies to determine efficacy and impact on the ecosystem indicators</i>							
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>
4.3.1.1.	Conduct an MSE workshop with the local fishery management agencies and other agencies that manages ancillary factors impacting the stocks. The goal of the workshop is to evaluate current regulations and run simulations on its effect on the ecosystem indicators		X-participate				X
4.3.1.2.	Conduct a comprehensive fisheries regulatory review and revise regulations based on the MSE	X					X
<b>GOAL 5: INCREASE CAPACITY OF LOCAL FISHERY MANAGEMENT AGENCIES TO COLLECT IMPROVED FISHERIES DATA, MONITOR CRITICAL FISHERIES AND CONDUCT FISHERIES ECOSYSTEM RESEARCH</b>							
<b>Objective 5.1: In the next 5 years, fishery management agencies have adequate man-power, analytical skill-sets, legislative framework and hardware to conduct improved fishery data collection and research through collaboration within the membership of the FDCRC and other institution the FDCRC identifies as partners</b>							
<i>Strategy 5.1.1: Determine the optimal number of data collection staff that could deliver the adequate quantity and quality fishery data for monitoring purpose</i>							
<b>Task</b>	<b>Description</b>	<b>DMWR</b>	<b>DAWR</b>	<b>DFW</b>	<b>DAR</b>	<b>BSP</b>	<b>WPRFMC</b>
5.1.1.1.	Conduct statistical analysis of the existing fishery data to determine optimum number of sampling runs that would generate a statistically robust expansion						X





## APPENDIX 2: LINKAGES WITH OTHER PRIORITIES

### Legends:

**Direct** – Strategy has a direct linkage to other Strategic Plan and Action Strategies

**Indirect** – Strategy is a precursor or a product of actions/priorities in other Strategic Plan and Action Strategies

**Blank** – Not applicable

Appendix 2.1: Strategy linkages between the CRSP and the MSA mandated Five Year Research Priorities on stocks and ecosystems

	MSA Mandated Five-Year Research Priorities: Stocks and Ecosystems										
Regional Strategic Plan Strategies	Stock assessment and MSY estimates for major species	Fishery data via improved fishery monitoring logbooks, observers & port sampling	Life history and population parameters in risk order ranking	Species interactions and ecosystem functions	Trophic interactions and food webs, effects of predator removals.	Impacts of forcings, humans, and natural biological cycles on nearshore habitat:	Status and factors of marine ecosystem resiliency	Impacts of societies on ecosystems	Connectivity within and between island / archipelago ecosystems	Estimating carrying capacity and productivity of near shore ecosystems	Develop and support decision tools for ecosystem management (e.g. CAMEO)
Strategy 1.1.1.	Indirect	Direct									
Strategy 1.1.2.	Indirect	Direct									
Strategy 1.2.1.	Indirect	Direct									
Strategy 1.2.2.	Indirect	Direct									
Strategy 1.2.3.	Indirect	Direct									
Strategy 1.2.4.	Indirect	Direct									
Strategy 1.2.5.	Indirect	Direct									
Strategy 1.2.6.	Direct	Direct									
Strategy 1.2.7.	Indirect	Direct									
Strategy 1.2.8.	Indirect	Direct									
Strategy 1.2.9.	Direct	Direct									
Strategy 1.2.10.	Direct	Direct									
Strategy 1.2.11.	Indirect	Direct									
Strategy 1.2.12.	Direct	Direct									
Strategy 1.2.13.	Direct	Direct									
Strategy 2.1.1.	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Strategy 3.1.1.	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Strategy 3.1.2.	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Strategy 4.1.1.	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Strategy 4.1.2.	Direct	Direct									

Regional Strategic Plan Strategies	Stock assessment and MSY estimates for major species	Fishery data via improved fishery monitoring logbooks, observers & port sampling	Life history and population parameters in risk order ranking	Species interactions and ecosystem functions	Trophic interactions and food webs, effects of predator removals.	Impacts of forcings, humans, and natural biological cycles on nearshore habitat.	Status and factors of marine ecosystem resiliency	Impacts of societies on ecosystems	Connectivity within and between island / archipelago ecosystems	Estimating carrying capacity and productivity of near shore ecosystems	Develop and support decision tools for ecosystem management (e.g. CAMEO)
Strategy 4.1.3.	Direct	Direct	Direct							Direct	Direct
Strategy 4.1.4.	Direct	Direct						Direct			Direct
Strategy 4.1.5.	Direct	Direct	Direct								
Strategy 4.2.1.	Indirect			Direct	Direct	Direct	Direct	Direct	Direct	Direct	Indirect
Strategy 4.2.2.	Indirect		Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Strategy 4.2.3	Indirect		Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Strategy 4.2.4.	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Strategy 4.3.1.											Direct
Strategy 5.1.1.		Direct									
Strategy 5.1.2.		Direct									
Strategy 5.1.3.		Direct									



Appendix 2.2: Strategy linkages between the CRSP and the NMFS Strategic Plan for Fisheries Research

NMFS Strategic Plan for Fisheries Research											
Regional Strategic Plan Strategies	1.1: Periodically assess stocks	1.2: Assessments with forecasting capabilities	1.3: Improve data collection and analytical techniques	1.8: Assessing and specifying MSY	1.9: Developing criteria to determine if stock is overfished	1.11: Additional research to refine EFH	3.2: Collect economic and socio cultural data	5.2: Utilize FIS web-enabled system	5.3: Establish regional and national standards for information collection, management and dissemination	5.5: Determine minimum fisheries information needs	5.7: Develop electronic systems for the collection, reporting, processing and sharing of data
Strategy 1.1.1.			Direct								
Strategy 1.1.2.			Direct								
Strategy 1.2.1.			Direct								
Strategy 1.2.2.	Indirect	Indirect	Direct								
Strategy 1.2.3.	Indirect	Indirect	Direct								
Strategy 1.2.4.			Direct						Direct	Direct	
Strategy 1.2.5.			Direct						Direct	Direct	
Strategy 1.2.6.			Direct					Direct			
Strategy 1.2.7.			Direct				Direct				
Strategy 1.2.8.			Direct					Direct			Direct
Strategy 1.2.9.			Direct								
Strategy 1.2.10.			Direct								
Strategy 1.2.11.			Direct								
Strategy 1.2.12.			Direct					Direct			Direct
Strategy 1.2.13.			Direct					Direct			Direct
Strategy 2.1.1.	Direct	Direct	Direct	Direct	Direct					Direct	
Strategy 3.1.1.	Direct	Direct		Direct	Direct	Direct	Direct		Direct		
Strategy 3.1.2.	Direct	Direct		Direct	Direct	Direct	Direct		Direct		
Strategy 4.1.1.	Direct	Direct		Direct	Direct						
Strategy 4.1.2.				Direct	Direct						
Strategy 4.1.3.											
Strategy 4.1.4.							Direct		Direct	Direct	
Strategy 4.1.5.	Direct	Direct									
Strategy 4.2.1.	Indirect	Indirect									
Strategy 4.2.2.	Indirect	Indirect									
Strategy 4.2.3.	Indirect	Indirect									
Strategy 4.2.4.	Indirect	Indirect									



Regional Strategic Plan Strategies	1.1: Periodically assess stocks	1.2: Assessments with forecasting capabilities	1.3: Improve data collection and analytical techniques	1.8: Assessing and specifying MSY	1.9: Developing criteria to determine if stock is overfished	1.11: Additional research to refine EFH	3.2: Collect economic and socio cultural data	5.2: Utilize FIS web-enabled system	5.3: Establish regional and national standards for information collection, management and dissemination	5.5: Determine minimum fisheries information needs	5.7: Develop electronic systems for the collection, reporting, processing and sharing of data
Strategy 4.3.1.											
Strategy 5.1.1.			Direct							Indirect	
Strategy 5.1.2.			Direct								
Strategy 5.1.3.			Direct								

Appendix 2.3: Strategy linkages between the CRSP and the Coral Reef Conservation Program Goals and Objectives

Regional Strategic Plan Strategies	CRCP Goals and Objectives						
	F1.1: Support the creation or improvement of coral reef fisheries management plans	F1.2: Prioritize key coral reef associated species or functional group	F1.3: Obtain essential life history and ecological information on key species	F1.4: Obtain necessary information on fishing effort in US coral reef ecosystem	F1.5: Predict appropriate levels of extraction for key species by developing ecosystem models	F1.6: Conduct applied research and monitoring to evaluate management actions	F3.4: Conduct biological and socioeconomic research and monitoring to assess the effectiveness of compliance
Strategy 1.1.1.						Direct	
Strategy 1.1.2.						Direct	
Strategy 1.2.1.							Direct
Strategy 1.2.2.							
Strategy 1.2.3.							
Strategy 1.2.4.	Direct	Direct					
Strategy 1.2.5.				Direct			
Strategy 1.2.6.							
Strategy 1.2.7.	Indirect			Direct		Direct	Direct
Strategy 1.2.8.	Indirect			Direct		Indirect	Direct
Strategy 1.2.9.	Indirect			Direct		Indirect	Direct
Strategy 1.2.10.	Indirect			Direct		Indirect	Direct
Strategy 1.2.11.	Indirect			Direct		Indirect	Direct
Strategy 1.2.12.							
Strategy 1.2.13.							
Strategy 2.1.1.	Direct	Direct	Direct		Direct	Direct	
Strategy 3.1.1.	Direct	Direct	Direct		Direct	Direct	
Strategy 3.1.2.	Direct	Direct	Direct		Direct	Direct	
Strategy 4.1.1.	Direct	Direct	Direct		Direct	Direct	
Strategy 4.1.2.	Direct	Direct	Direct		Direct	Direct	
Strategy 4.1.3.	Direct	Direct	Direct		Direct	Direct	
Strategy 4.1.4.	Direct	Direct	Direct		Direct	Direct	
Strategy 4.1.5.	Direct	Direct	Direct		Direct	Direct	
Strategy 4.2.1.					Direct	Direct	
Strategy 4.2.2.					Direct	Direct	
Strategy 4.2.3.					Direct	Direct	
Strategy 4.2.4.					Direct	Direct	



Regional Strategic Plan Strategies	F1.1: Support the creation or improvement of coral reef fisheries management plans	F1.2: Prioritize key coral reef associated species or functional group	F1.3: Obtain essential life history and ecological information on key species	F1.4: Obtain necessary information on fishing effort in US coral reef ecosystem	F1.5: Predict appropriate levels of extraction for key species by developing ecosystem models	F1.6: Conduct applied research and monitoring to evaluate management actions	F3.4: Conduct biological and socioeconomic research and monitoring to assess the effectiveness of compliance
Strategy 4.3.1.	Direct				Direct	Direct	Direct
Strategy 5.1.1.							
Strategy 5.1.2.							
Strategy 5.1.3.							

