



Fishery Data Collection and Research Committee

STRATEGIC PLAN
2022-2026



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Acronyms and Abbreviations

ACL – Annual Catch Limit
BSP – Guam Bureau of Statistics and Plans
CML – Commercial Marine License
CNMI – Commonwealth of the Northern Mariana Islands
CPUE – Catch Per Unit Effort
DAR – Hawaii Division of Aquatic Resources
DAWR – Guam Division of Aquatic and Wildlife Resources
DFW – CNMI Division of Fish and Wildlife
DMWR – American Samoa Department of Marine and Wildlife Resources
EBFM – Ecosystem-Based Fishery Management
EC – Ecosystem Component
ER – Electronic Reporting
ERDDAP – Environmental Research Division Data Access Program
FDCRC – Fishery Data Collection and Research Committee
FEP – Fishery Ecosystem Plan
FIN – Fisheries Information Network
FMP – Fishery Management Plan
FRS – Fishing Report System
HMRFS – Hawaii Marine Recreational Fishing Survey
MRIP – Marine Recreational Information Program
MSE – Management Strategy Evaluation
MUS – Management Unit Species
NOAA – National Oceanic and Atmospheric Administration
NMFS – National Marine Fisheries Service
ORMC – Guam Ocean Resources Management Council
PIFMAPS – Pacific Insular Fisheries Monitoring, Assessment and Planning Summit
PIFSC – NMFS Pacific Islands Fisheries Science Center
PIRO – NMFS Pacific Islands Regional Office
QAQC – Quality Assurance/Quality Control
RCS – HMRFS Roving Creel Survey
TC – FDCRC Technical Committee
SAFE Report – Stock Assessment and Fishery Evaluation Report
SFR – USFWS Sport Fish Restoration
USFWS – US Fish and Wildlife Service
WIDA – Western Pacific Fishery Information Network Island Data Assessment
WSFR – USFWS Wildlife and Sport Fish Restoration
WPRFMC – Western Pacific Regional Fishery Management Council

Preface

The strategic plan¹ 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. Stock assessments conducted for demersal federally managed species rely in large part on the fisheries-dependent data collected by the marine resources management agencies of these areas. This plan focuses on the demersal fish and crustacean fisheries and seeks to address the data quality standard both at the local jurisdictional and federal levels.

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 leverage funding support 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; the Council) Program Plan. 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.

The first Fishery Data Collection and Research Committee (FDCRC) strategic plan covered 2014-2019 and was developed through a workshop. The 2022-2026 strategic plan update was developed through a series of agency consultations held in April 2021. The results of the consultations were reported to the Technical Committee during their meeting on April 28-29, 2021.

¹ This regional strategic plan is not comprehensive. Other efforts specific to pelagic and international fisheries are not covered by this plan. This plan is meant to be a living document and should be updated as needs evolve.

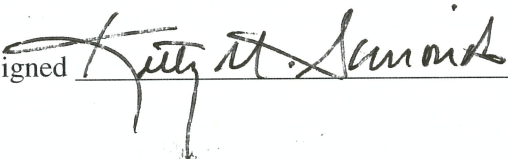
Statement of Commitment

I understand that my role as a member of the Fishery Data Collection and Research Committee (FDCRC; the 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:

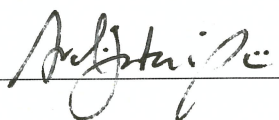
- Support the Mission, Vision, Goals of the *Plan*;
- Acknowledge that the strategies described in the *Plan* are aligned with my agency's priorities and internal plans;
- Will offer my agency's expertise to help ensure the success of this endeavor;
- Will contribute significantly to achieving the objectives 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.

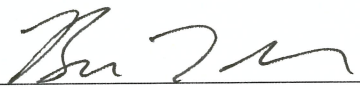
Ms. Kitty Simonds: Western Pacific Regional Fishery Management Council

Signed  Date 3/2/22

Mr. Taotasi Archie Soliai: American Samoa Department of Marine and Wildlife Resources

Signed  Date 6/20/22

Mr. Brian Nielson: Hawaii Department of Land and Natural Resources, Division of Aquatic Resources

Signed  Date 8/4/22

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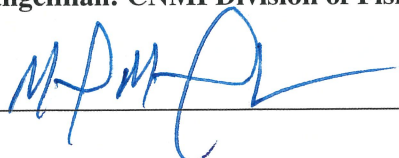
Ms. Chelsa Muña-Brecht: Guam Department of Agriculture, Division of Aquatic and Wildlife Resources

Signed  Date 03.09.2022

Ms. April Trinidad: Guam Bureau of Statistics and Plans

Signed  Date 3/8/22

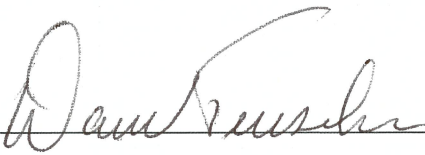
Mr. Manuel Pangelinan: CNMI Division of Fish and Wildlife

Signed  Date 4/8/22

Statement of Support – Wildlife and Sport Fish Restoration Program

The Sport Fish Restoration (SFR) program was established under the Sport Fish Restoration Act of 1950 (16 U.S.C § 777) to provide funding to aid state, territory, and commonwealth governments (State) in fish restoration and management. Within the eligibility guidelines of the SFR program (50 CFR 80), the Wildlife and Sport Fish Restoration Program is supportive of State priorities to improve recreational sport fish data collection and research. We hope that the collaborative partnership of the State resource agencies, federal partners, and the Western Pacific Regional Fishery Management Council will result in representative fishery data collection and research in the U.S. flag jurisdictions.

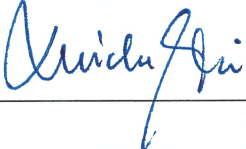
Mr. David M. Teuscher: Wildlife and Sport Fish Restoration Program, U.S. Fish and Wildlife Service

Signed  Date 3/16/22

Statement of Support – National Marine Fisheries Service

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 (PIFSC) 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) PIFSC's planning documents.

Dr. Michael Seki: NOAA-National Marine Fisheries Service – Pacific Island Fisheries Science Center

Signed  Date 3-2-2022

Acknowledgements

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 Aquatic and Wildlife Resources

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 Sport Fish Restoration Program

Agency Consultation Meeting Participants

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Domingo Ochavillo – Chief Fishery Biologist

Guam Department of Agriculture – Division of Aquatic and Wildlife Resources

Jay Gutierrez – Division Chief

Brent Tibbatts – Fishery Biologist

Tom Flores – Fishery Biologist

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

Frank Villagomez – Fishery Biologist

Maria Angela Dela Cruz – Creel Survey Program Manager

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

Jason Helyer – Commercial Fishery Database Manager

Tom Ogawa – Hawaii Marine Recreational Fisheries Survey Manager

NMFS – Pacific Islands Fisheries Science Center

T. Todd Jones – Fishery Research and Monitoring Division

Felipe Carvalho – Stock Assessment Program

Ashley Tomita – Fishery Reporting and Bycatch Program

Rob Ahrens – Management Strategy Evaluation Specialist

Western Pacific Regional Fishery Management Council

Marlowe Sabater – Marine Ecosystem Scientist

Overview

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), stock assessments. Although decades of data collection had generated substantial fishery information, the reliability of the catch estimates^{2,3,4,5} and identification of sources of sampling error and bias⁶ have only been evaluated sporadically throughout the programs' 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. The first strategic plan was developed in 2014 and covered the activities to 2019.

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.

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

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

⁴ 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.

⁵ Bak-Hospital, S. 2015. Western Pacific Regional Creel Survey Program Data Summary and Analysis Guam, the Commonwealth of the Northern Mariana Islands, and American Samoa. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96818-5007. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-15-06C, 194pp.

⁶ Bak-Hospital, 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, a grant manager for Pacific Island jurisdictions of the United States Fish and Wildlife Service (USFWS) Wildlife and Sport Fish Restoration (WSFR) Program and the chair of the Council. With the exception of the WSFR Program, the FDCRC is responsible for implementing specific tasks agreed upon by the Committee as recommended to the Council. The WSFR Program has no purview to implement measures in this plan, and their participation in the FDCRC is focused on coordination, information exchange and support of State partners. The FDCRC 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 TC with support from the FDCRC members.

The success of this effort rests on the collaboration and agreement between the members of the FDCRC. The Council, PIFSC and WSFR have supported the American Samoa Department of Marine and Wildlife Resources (DMWR), the Guam Division of Aquatic and Wildlife Resources (DAWR), the CNMI Division of Fish and Wildlife (DFW) and the Hawaii Division of Aquatic Resources (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 identifying specific tasks and monitoring the progress and accomplishment of all parties.

Accomplishments From The 2014-2019 Plan

The 2014-2019 FDCRC Strategic Plan identified a total of 74 tasks across five different goals (Table 1). A status matrix was developed and circulated amongst the FDCRC member agencies (see Appendix 2). The responses in the status lines were characterized based on level of completion of the tasks:

1. Not Started – no activities conducted to address the task
2. Ongoing – work was initiated addressing the task and still in progress or the work is part of a regular established process
3. Some Areas Completed – work was initiated in all island areas and able to be completed in some island areas while the tasks are in progress in others
4. Completed – work was completed addressing the task where no further work is required, and a product was developed

Goals	Not Started	Ongoing	Some Areas Completed	Completed
1. Establish a standardized/comparable and comprehensive data collection system that stores and disseminate quality controlled fisheries information	0	16	6	20
2. Create a list of priority species for each group/agency	0	0	0	3
3. Create and maintain an inventory of scientific literature (e.g., gray literature), unpublished/analyzed data sets and unprocessed specimen/samples that is publicly accessible	5	0	1	0
4. Proactive ecosystem-based fishery management is implemented at local and federal level through coordinated and targeted research to better understand fishery sustainability	4	11	1	3
5. Increase capacity of local fishery management agencies to collect improved fisheries data, monitor critical fisheries and conduct fisheries ecosystem research	2	1	0	1

Goal 1, “Establish a standardized/Comparable and comprehensive data collection system that stores and disseminate quality controlled fisheries information”, deals with improving the

fishery dependent data collection system. Forty-eight percent of the tasks were completed in the past five years. The highlights of accomplishments under this goal are:

1. Development and pilot implementation of the small boat electronic reporting system called Catchit Logit;
2. Development of the first machine learning software in the region for the purpose of collecting species composition in the island fisheries;
3. Development and completion of the mandatory license and reporting regulation for CNMI and efforts are underway in American Samoa and Guam;
4. Review of the creel surveys through Pacific Insular Fisheries Monitoring, Assessment and Planning Summit (PIFMAPS) and internally by PIFSC are underway, Center of Independent Experts review of the expansion was completed;
5. Development and launching of the fishery dependent data portal for the Annual Stock Assessment and Fishery Evaluation (SAFE) reports through wpcouncildata.org;
6. Ongoing improvements in the Fisheries Information Network (FIN) system through the MySQL migration from Visual FoxPro;
7. Development of a SHINY mirror database system to monitor progress in data collection including an improved query system through MySQL database service;
8. Continuous training of data collection staff on techniques, protocol and analysis;
9. Completion of revision of the Annual SAFE Reports as the standard reporting template;
10. Improvements in the online summaries of the FIN website;
11. Completion of the data sharing agreements between the Council and the territories; and
12. Enhanced education and outreach related to data collection.

All the tasks associated with Goal 2 “Create a list of priority species for each group/agency” were completed through the implementation of the Ecosystem Component (EC) Amendment as well as the revision of the Annual SAFE Reports to monitor prioritized EC species. In contrast, only one of the five tasks was initiated for Goal 3 “Create and maintain an inventory of scientific literature (e.g., gray literature), unpublished/analyzed data sets and unprocessed specimen/samples that is publicly accessible”. The Council posts project reports and gray literature on the Council website. PIFSC also creates Administrative or Internal Reports for activities that do not meet the Technical Memorandum standards.

The majority of the Goal 4 (“Proactive ecosystem-based fishery management is implemented at local and federal level through coordinated and targeted research to better understand fishery sustainability”), pertaining to research for Ecosystem-Based Fisheries Management (EBFM) and stock assessment improvements, showed that 58% of the tasks are classified as ongoing, while 21% are not initiated and 16% were completed. Some of the highlights of accomplishments under this goal include:

1. Stock assessment prioritization was completed that includes tier assignments of each management unit species (MUS);
2. Several project proposals were developed and received funding to address research gaps related to life history, population genetics, ecosystem indicators and thresholds;
3. Incorporation of ecosystem variables in the Annual SAFE Reports;
4. Ongoing work on development of ecosystem models to support EBFM.

Goal 5 is about enhancing capacity building of the FDCRC member agencies: “Increase capacity of local fishery management agencies to collect more accurate fisheries data, monitor critical fisheries and conduct fisheries ecosystem research”. Twenty five percent of the tasks were completed with the development of the SHINY application to support tracking of interviews and sampling frequency. A career service enrichment task is also accomplished through the Scholarship Program of the Council, funded by the Council, PIFSC and Pacific Islands Regional Office (PIRO), where students who graduate from the program work for the local territorial fishery department, enhancing FDCRC member agencies.

Needs

The need for better fishery information has become more pronounced since the Magnuson-Stevens Fishery Management and Conservation Act was reauthorized in 2006. The re-authorization included mandates for the increased use of ACLs, allocation schemes, essential fish habitat and habitat of particular concern and increased quality of information that goes into the Annual 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 marine resources.

The current near-shore and coastal data collection and research frameworks 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.

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.

Vision Statement

Communities benefit culturally, socially and economically from sustainable fisheries and healthy marine ecosystems managed using reliable, relevant and representative data.

Mission Statement

The Fishery Data Collection and Research Committee coordinates and supports the improvements in the collection, analysis and dissemination of relevant, reliable and unbiased information and enhances the trusted exchange between stakeholder groups enabling an effective fishery management at all levels.

Goals

Goal 1: Establish a standardized/comparable and comprehensive data collection system to store and disseminate quality controlled fisheries information

Goal 2: Create and maintain an inventory of scientific literature (e.g., gray literature), unpublished/analyzed data sets and unprocessed specimen/samples that is publicly accessible

Goal 3: Implement proactive ecosystem-based fishery management at local and federal levels through coordinated and targeted research to better understand fishery sustainability

Goal 4: Increase capacity of local fishery management agencies to collect representative fisheries data, monitor critical fisheries and conduct fisheries ecosystem research

Strategies

The FDCRC is a collaborative partnership between fishery management agencies and federal counterparts that may include academic institutions in the completion of some of its tasks. The mandates for all entities will vary, but each partner has a vital role in contributing to the overarching mission. Each organization has a certain level of expertise and capabilities that can augment the efforts of others. There are multiple viable strategies to achieve the overarching goals as presented, which is reflected through the wide range of tasks associated with each goal that are directed towards one or more of the various partner agencies. Through this collaborative effort and unified goals, the hope is that fishery data collection will be enhanced and fishery research will be better coordinated in the next five years, resulting in more comprehensive fishery information for management. The following goals and strategies are designed to

maximize efficiency in generating representative data and scientific information from the available funding sources.

NOTE: The text in red indicates the new tasks identified during the agency consultation meeting and reviewed by the TC at its April 2021 regular meeting.

Goal 1: Establish a standardized/comparable and comprehensive data collection system that stores and disseminate quality controlled fisheries information

Objective 1.1: Subject to appropriations, by 2026, the Committee will evaluate the delivery of the updated system with online, dynamic, text and spatial query capability that allows users to download reliable and relevant commercial and non-commercial fisheries dependent data in all US Western Pacific jurisdictions.

Strategy 1.1.1: Strengthen implementation of existing rules and regulations that support fishery data collection.

- Task 1.1.1.1: Implement requirements for collection of commercial fishery data in Guam and American Samoa;
- Task 1.1.1.2: DAWR to work with the Governor's Office to move the mandatory license and reporting regulation forward by developing a list of potential candidates for the Ocean Resources Management Council (ORMC) nominees, coordinate with the Governor's Office on the appointment for the ORMC seats; and support the nominees on securing the necessary documentations to finalize the appointment;
- Task 1.1.1.3: Develop and maintain up-to-date lists of commercial vendors and list of fishermen subject to mandatory license and reporting;
- Task 1.1.1.4: Host a sign up event and issuance of license. Include in the event the registration for CatchIt LogIt.

Strategy 1.1.2: Enhance the local fishery agencies capabilities to carry out the data collection at a statistically-adequate yet logistically-optimal level.

- Task 1.1.2.1: FDCRC to convey the urgent need to fill in the two to three vacant positions at the Data Section of the CNMI DFW;
- Task 1.1.2.2: Conduct an agency status inventory to determine current capabilities within the agencies in terms of hardware, staffing levels, software, etc., to carry out the data collection;
- Task 1.1.2.3: Conduct an institutional analysis to determine capacity of local fishery agencies and whether there is a need for technology transfer and capacity building and training;
- Task 1.1.2.4: Work with the Marine Recreational Information Program (MRIP) on the development of the database infrastructure and the quality assurance/quality control (QAQC) protocols for the tablet-based data entry system;
- Task 1.1.2.5: Explore the use of the Hawaii DAR servers to house the Hawaii Marine Recreational Fishing Survey (HMRFS) Roving Creel Survey (RCS) data –
1) Work with the data programs at the National Oceanic and Atmospheric

- Administration (NOAA) to get their opinion on the translation of the database format and evaluating which ones are more efficient; 2) Coordinate with PIFSC on plans for a local database development; 3) Develop a data scrubbing program to QAQC the data from the tablet-based data entry;
- Task 1.1.2.6: Form a regional MRIP Transition Team for the HMRFS RCS and develop the RCS Transition Plan.
- Strategy 1.1.3: Improve the accuracy of the data from the existing data collection programs in collecting fishery dependent data.*
- Task 1.1.3.1: Improve the DAR QAQC process for the fishing report system (FRS) data by enhancing the follow-up process with the fishermen on inaccurate data submission;
- Task 1.1.3.2: Conduct outreach on how to fill in the fisher report. Develop an effective outreach tool for the Hawaii fishermen. Consider conducting the outreach when the fishermen apply for the annual commercial license, and conduct research as to whether this type of outreach would be effective;
- Task 1.1.3.3: Conduct a workshop to explore the QAQC improvement process;
- Task 1.1.3.4: Conduct workshop with DMWR and DFW to demonstrate the importance of each element of the data collection protocol to enhance awareness of the impacts of deviating from the design;
- Task 1.1.3.5: Develop safeguards to ensure that the survey protocol is strictly followed, and develop a strategy to document when protocols differ to allow for data interpretation;
- Task 1.1.3.6: Conduct a workshop on the data expansion algorithm to enhance understanding how the estimates are calculated.
- Strategy 1.1.4: Design, test and implement new data collection programs that are not adequately covered by the existing survey program.*
- Task 1.1.4.1: Local fishery management agencies to implement the new data collection system with adequate monitoring of performance;
- Task 1.1.4.2: Establish a data validation procedure for the uku and Kona crab fisheries in the FRS-Dealer Report System.
- Strategy 1.1.5: Upgrade fishery data collection by exploring options and implementing automated systems using current mobile, wireless and online technology.*
- Task 1.1.5.1: Develop a mobile electronic data entry for the territorial creel surveys and the HMRFS;
- Task 1.1.5.2: Support the database migration and data consistency of the territorial electronic reporting system to the territorial agencies and PIFSC;
- Task 1.1.5.3: Conduct electronic reporting (ER) training for fishermen in Manua and conduct a WiFi capacity assessment in remote island areas;
- Task 1.1.5.4: Continued support for the implementation and improvement of existing mandatory reporting by integrating the electronic reporting system;

- Task 1.1.5.5: Council and PIFSC to work with the DFW Director on the importance of integrating the CatchIt LogIt with the local data collection efforts to avoid duplication;
- Task 1.1.5.6: Develop a reliable remote access system to troubleshoot programming issues in the Guam database system, such as exploring the use of screen sharing to guide the Guam database staff through troubleshooting the system. Explore the utility of the system and apply to other island areas as requested.
- Strategy 1.1.6: Enhance local fishery management agencies' capacity to process collected fishery data in near real-time.*
- Task 1.1.6.1: Conduct periodic training and technical assistance on the data collection and transcription process;
- Task 1.1.6.2: Enhance/develop a communication framework between the agencies and the PIFSC Fisheries Research and Monitoring Division to facilitate easier follow ups and technical questions.
- Strategy 1.1.7: Enhance the local fishery management agencies' capacity to summarize and analyze collected fishery data.*
- Task 1.1.7.1: Integrate the information from various data streams (BioSampling, creel surveys, commercial purchase reporting system, etc.) to generate reliable fishery data;
- Task 1.1.7.2: Develop a database system for in-water surveys in Guam;
- Task 1.1.7.3: Develop analytical capacity at DAR in expanding HMRFS data in-house for species not covered by MRIP.
- Strategy 1.1.8: 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 1.1.8.1: Conduct a five year review and renewal of the data sharing agreements;
- Task 1.1.8.2: Developing a public request system; mandatory requirement for a data sharing plan (two years).
- Strategy 1.1.9: Enhance fishermen and vendor participation in the fishery data collection programs⁷.*
- Task 1.1.9.1: Conduct public outreach to clarify and explain the rules, regulations/purpose and need of data collection to increase compliance and participation;
- Task 1.1.9.2: Design an engagement framework to determine the effectiveness of conducting outreach on the purpose and need of data collection programs.

⁷ 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.

Strategy 1.1.10: Evaluate the Roving Creel Survey Programs and provide recommendations to improve the data generated by the data collection system.

- Task 1.1.10.1: Conduct and review the creel survey programs in Fiscal Year 2022. This includes the statistical analysis of the existing creel data to look at bias and errors;
- Task 1.1.10.2: Conduct a series of workshops to review the changes in the fisheries and review the design and implementation of the creel surveys. The workshop will include the evaluation of the access points and whether they are still a viable sampling port. The workshop report will include the documentation of the historical changes in implementation;
- Task 1.1.10.3: Provide recommendations to enhance the survey design that meets the needs of the data users;
- Task 1.1.10.4: Work with MRIP on certifying the updated creel survey design;
- Task 1.1.10.5: DAR to coordinate with the Council and PIFSC through the MRIP Regional Implementation Team on the review of the territorial creel surveys to determine elements in the development of the roving creel design for Hawaii.

Strategy 1.1.11: Review and evaluate the data fields in the DAR FRS to determine which fields are useful and fields that are no longer valid.

- Task 1.1.11.1: Conduct a review of the data streams that are used for stock assessments;
- Task 1.1.11.2: Conduct a review of the data streams that are used for state and federal fisheries management;
- Task 1.1.11.3: Conduct a review of the data stream with the fishing community to understand perspectives, challenges, reporting strategies, and suggested areas for improvement.

Goal 2: 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 2.1: 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 2.1.1: Develop an inventory of biological and fishery-related information focused on all managed exploited biological resources.

- Task 2.1.1.1: Compile all information regarding managed exploited biological resources.
[NOTE: Ensure that point of contacts are identified for each information archive]

Strategy 2.1.2: 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 2.1.2.1: Conduct a literature search on various information databases, such as but not limited to: online scientific literatures, gray literatures, library holdings of each agency. The contractor will also develop a compendium of scientific literature, agency based data holdings and unprocessed specimen libraries;
- Task 2.1.2.2: Conduct an agency-based interview of staff with long-standing affiliation with the agency to document institutional knowledge on what research had been conducted and track viable sources of historic information about the fisheries and stocks being managed;
- Task 2.1.2.3: Develop a searchable library [EndNote or other online application] compiling all the information generated by the information mining contracts;
- Task 2.1.2.4: Establish partnership with FishBase, ScholarSpace and the Environmental Research Division Data Access Program (ERDDAP) to establish the database of mined information (*Optional*)
-

Goal 3: Proactive ecosystem-based fishery management is implemented at local and federal level through coordinated and targeted research to better understand fishery sustainability

Objective 3.1: The Council, PIFSC, local fishery management agencies and academic institutions have determined the stock status of MUS in the priority list within the next five years.

Strategy 3.1.1: Amend the Fishery Ecosystem Plans (FEPs) on the stock status determination criteria for each priority species.

- Task 3.1.1.1: Council staff shall amend the FEPs to reflect the methodology to which stock status are to be determined.

Strategy 3.1.2: Improve the information used by stock assessment by analyzing existing data and conducting studies that address the information gaps⁸.

- Task 3.1.2.1: Develop proposals and secure funding to conduct targeted research focusing on but not limited to:
- Life history traits (k , L_{inf} , longevity etc.);
 - $L50$ to support the Guam coral reef FMP
 - Spatially explicit catch per unit effort (CPUE);
 - Independent measure of population size;
 - Estimate total harvest;

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

- Tagging studies to determine spatial distribution, mortality, etc.;
- Task 3.1.2.2: Analyze the spatial distribution of effort from existing creel survey, CML, HMRFS and aerial survey data.

Objective 3.2: 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 five years that can be used as a tool for making fishery management decisions.

Strategy 3.2.1: Identify critical ecosystem management drivers, specific pressures on ecosystems, investigate stakeholders' interests and agendas, and identify patterns of interaction among stakeholders.

Task 3.2.1.1: Conduct scoping session with stakeholders (fishery management agencies, fishing communities and ocean users) at the different island areas in each jurisdiction;

Task 3.2.1.2: Draft summary of the scoping session and generate white paper on scoping results.

Strategy 3.2.2: Conduct targeted research to complete the elements needed to run ecosystem models for fishery management.

Task 3.2.2.1: Convene a meeting with PIFSC-Ecosystem Science Division to determine elements to build an ecosystem model and identify priority research to fill information gaps;

Task 3.2.2.2: 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 3.2.3: Develop ecosystem indicators that will be monitored over time, which describe the general status of the population, and conduct a risk analysis on what perturbation influences the indicators.

Task 3.2.3.1: 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 3.2.3.2: Identify and collate data sets that will be used in the ecosystem model;

Task 3.2.3.3: Conduct a full assessment to determine the state of all indicators that can be feasibly quantified. Identify data and other limitations.

Strategy 3.2.4: Develop ecosystem models for various fisheries and ground truth reliability of model results that can be used for fishery management.

Task 3.2.4.1: Execute a contract/grant to potential contractors to develop ecosystem models and conduct ground-truthing/result validation;

Task 3.2.4.2: Conduct a Management Strategy Evaluation (MSE) to simulate the effect of various existing and upcoming management tools on the ecosystem indicators and how the effects change based on the different combination and extent of implementation and enforcement.

Objective 3.3: The FDCRC shall utilize and apply the assessment and fishery research information to formulate scientifically-sound management strategies within their own jurisdiction that is coordinated at all levels.

Strategy 3.3.1: Apply Management Strategy Evaluation to current fisheries regulations and other related management strategies to determine efficacy and impact on the ecosystem indicators

Task 3.3.1.1: 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 3.3.1.2: Conduct a comprehensive fisheries regulatory review focusing on the effectiveness of the different fishery regulations and revise regulations based on the MSE.

Goal 4: Increase capacity of local fishery management agencies to collect representative fisheries data, monitor critical fisheries and conduct fisheries ecosystem research⁹

Objective 4.1: In the next five years, fishery management agencies have adequate staffing capacity, analytical skill-sets, legislative framework and hardware to conduct representative

⁹ The BioSampling Program provides local technical expertise to conduct life history research and will provide local staff with training of life history sampling.

fishery data collection and research through collaboration within the membership of the FDCRC and other institutions the FDCRC identifies as partners.

Strategy 4.1.1: Implement a regular training session on fishery data collection and fishery data analysis.

- Task 4.1.1.1: Continue the Training-Work session cycle at the Annual Joint Archipelagic Plan Team Meeting;
- Task 4.1.1.2: Explore options for online lecture series from researchers with relevant fisheries research information;
- Task 4.1.1.3: Conduct Fisheries 101 training.

Strategy 4.1.2: Explore options for a career service enrichment program.

- Task 4.1.2.1: Work with the Education Committee to establish career service enrichment program;
- Task 4.1.2.2: Work with the University of Hawaii in exploring the establishment of a Fisheries School to enhance the fisheries science capabilities in the region.

Performance Evaluation

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 during the Island Reports of each Council meeting. The Coordinator will follow up with the TC members on the status of the tasks. The Coordinator will also be responsible for monitoring potential funding availability and coordinating the submission of the proposals. A complementary implementation plan may be developed to detail the metrics used to evaluate the completion of the tasks listed under this strategic plan.

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/comparable and comprehensive data collection system that stores and disseminates quality controlled fisheries information									
Objective 1.1: Subject to appropriations, by 2026, this committee will evaluate the delivery of the updated system with online, dynamic, text, and spatial query capability that allows users to download reliable and relevant commercial and non-commercial fisheries dependent data in all US Western Pacific jurisdictions.									
Strategy 1.1.1: Strengthen implementation of existing rules and regulations that supports fishery data collection;									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.1.1.	Implement requirements for collection of commercial fishery data in Guam and American Samoa	X	X						
1.1.1.2.	DAWR to work with the Governor's Office and the Guam Legislature to move the mandatory license and reporting regulation forward by developing a list of potential candidates for the ORMC nominees, coordinate with the Governor's Office on the appointment for the ORMC seats; and support the nominees on securing the necessary documentations to finalize the appointment		X						
1.1.1.3.	Develop and maintain up-to-date lists of commercial vendors and list of fishermen subject to mandatory license and reporting	X	X						
1.1.1.4.	Host a sign up event and issuance of license. Include in the event the registration for CatchIt LogIt		X				X		
Strategy 1.1.2: Enhance the local fishery agencies capabilities to carry out the data collection at a statistically adequate yet logistically optimal level;									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.2.1.	FDCRC to convey the urgent need to fill in the two to three vacant positions at the Data Section of CNMI DFW			X			X		
1.1.2.2.	Conduct an agency status inventory to determine current capabilities within the agencies in terms of hardware, staffing levels, software etc. to carry out the data collection		X						
1.1.2.3.	Conduct an institutional analysis to determine capacity of local fishery agencies and whether there is a need for technology transfer and capacity building and training				X		X		
1.1.2.4.	Work with MRIP on the development of the database infrastructure and the QAQC protocols for the tablet-based data entry system				X				
1.1.2.5.	Explore the use of the HDAR servers to house the roving creel survey data – 1) Work with the data people at NOAA to get their opinion on the translation of				X				

	the database format and evaluating which ones are more efficient; 2) Coordinate with PIFSC on plans for a local database development; 3) Develop a data scrubbing program to QAQC the data from the tablet-based data entry								
1.1.2.6.	Form a regional MRIP Transition Team for the HMRFS Roving Creel Survey (RCS) and develop the RCS Transition Plan				X		X		
<i>Strategy 1.1.3: Improve the accuracy of the data from the existing data collection programs in collecting fishery dependent data;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.3.1.	Improve the DAR QA/QC process for the FRS data by enhancing the follow-up process with the fishermen on inaccurate data submission				X				
1.1.3.2.	Conduct outreach on how to fill in the fisher report. Develop an effective outreach tool for the Hawaii fishermen. Consider conducting the outreach when the fishermen apply for the annual commercial license, and conduct research as to whether this type of outreach would be effective				X		X		
1.1.3.3.	Conduct a workshop to explore the QA/QC improvement process				X		X		
1.1.3.4.	Conduct a workshop with DMWR and DFW to demonstrate the importance of each element of the data collection protocol to enhance awareness of the impacts of deviating from the design	X		X			X		
1.1.3.5.	Develop safeguards to ensure that the survey protocols are strictly followed, and develop a strategy to document when protocols differ to allow for data interpretation	X	X	X					
1.1.3.6.	Conduct a workshop on the data expansion algorithm to enhance understanding how the estimates are calculated	X	X	X			X		
<i>Strategy 1.1.4: Design, test, and implement new data collection programs that are not adequately covered by the existing survey program;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.4.1.	Local fishery management agencies implement the new data collection system with adequate monitoring of performance	X	X	X					
1.1.4.2.	Establish a data validation procedure for the uku and Kona crab fisheries in the FRS-Dealer Report System				X				
<i>Strategy 1.1.5: Upgrade fishery data collection by exploring options and implementing automated systems using current mobile, wireless, and online technology;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.5.1.	Develop a mobile electronic data entry system for the territorial creel surveys and HMRFS				X		X		
1.1.5.2.	Support the database migration and data consistency of the territorial electronic reporting system to the territorial agency and PIFSC						X		
1.1.5.3.	Conduct ER training for fishermen in Manua and conduct a WiFi capacity assessment in remote island areas	X					X		
1.1.5.4.	Continued support for the implementation and improvement of existing mandatory reporting by integrating the electronic reporting system	X	X	X			X		

1.1.5.5.	Council and PIFSC to work with the DFW Director on the importance of integrating the CatchIt LogIt with the local data collection efforts to avoid duplication			X			X	X	
1.1.5.6.	Develop a reliable remote access system to troubleshoot programming issues in the Guam database system like exploring the use of screen sharing to walk the Guam database staff on trouble shooting the system. Explore the utility of the system and apply to other island areas as requested		X						
<i>Strategy 1.1.6: Enhance local fishery management agencies' capacity to process collected fishery data in near real-time;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.6.1.	Conduct periodic training and technical assistance on the data collection and transcription process	X	X						
1.1.6.2.	Enhance/develop communication framework between agencies and FMP to facilitate easier follow ups and technical questions						X		
<i>Strategy 1.1.7: Enhance the local fishery management agencies' capacity to summarize and analyze collected fishery data;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.7.1.	Integrate the information from various data streams (BioSampling, creel surveys, commercial purchase reporting system, etc.) to generate reliable fishery data		X						
1.1.7.2.	Develop a database system for in-water surveys in Guam		X						
1.1.7.3.	Develop analytical capacity at Hawaii DAR in expanding HMRFS data in-house for species not covered by MRIP				X				
<i>Strategy 1.1.8: 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;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.8.1.	Conduct a five year review and renewal of the data sharing agreements	X	X	X			X		
1.1.8.2.	Developing a public request system; mandatory requirement for a data sharing plan (two years)		X	X					
<i>Strategy 1.1.9: Enhance fishermen and vendor participation in the fishery data collection programs;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.9.1.	Conduct public outreach to clarify and explain the rules and regulations/purpose and need of data collection to increase compliance and participation	X	X				X	X	
1.1.9.2.	Design an engagement framework to determine the effectiveness of conducting outreach on the purpose and need of data collection programs						X	X	
<i>Strategy 1.1.10: Evaluate the Roving Creel Survey Programs and provide recommendations to improve the data generated by the data collection system;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.10.1.	Conduct and review the Creel Survey Programs in FY 2022. This includes the statistical analysis of the existing creel data to look at bias and errors	X	X	X			X		

1.1.10.2.	Conduct a series of workshop to review the changes in the fisheries, review the design and implementation of the creel surveys. The workshop will include the evaluation of the access points whether it is still viable sampling port. The workshop report will include the documentation of the historical changes in implementation		X				X		
1.1.10.3.	Provide recommendations to enhance the survey design that meets the needs of the data users						X		
1.1.10.4.	Work with MRIP on certifying the updated creel survey design		X				X		
1.1.10.5.	HDAR to coordinate with the Council and PIFSC through the MRIP Regional Implementation Team on the review of the territorial creel surveys to determine elements in the development of the roving creel design for Hawaii						X		
<i>Strategy 1.1.11: Review and evaluate the data fields in the DAR FRS to determine which fields are useful and fields that are no longer valid;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
1.1.11.1.	Conduct a review of the data stream which are used for stock assessments						X	X	
1.1.11.2.	Conduct a review of the data stream which are used for state and federal fisheries management		X				X	X	
1.1.11.3.	Conduct a review of the data stream with the fishing community to understand perspectives, challenges, reporting strategies, and suggested areas for improvement						X	X	
Goal 2: Create and maintain an inventory of scientific literature (e.g., gray literature), unpublished/analyzed data sets, and unprocessed specimen/samples that is publicly accessible									
Objective 2.1: 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.									
<i>Strategy 2.1.1: Develop an inventory of biological and fishery-related information focused on all managed exploited biological resources;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
2.1.1.1.	Compile all information regarding managed exploited biological resources. [NOTE: Ensure that point of contacts are identified for each information archived]						X		
<i>Strategy 2.1.2: 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</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
2.1.2.1.	Conduct a literature search on various information databases, such as but not limited to: online scientific literatures, gray literatures, library holdings of each agency. The contractor will also develop a compendium of scientific literature, agency based data holdings, and unprocessed specimen libraries						X		
2.1.2.2.	Conduct an agency-based interview of staff with long-standing affiliation with an agency to document institutional knowledge on what research had been						X		

	conducted track viable sources of historic information about the fisheries and stocks being managed								
2.1.2.3.	Develop a searchable library [EndNote or other online application] compiling all the information generated by the information mining contracts						X		
2.1.2.4.	Establish partnership with FishBase, ScholarSpace, and ERDDAP to establish the database of mined information (<i>Optional</i>)								
Goal 3: Proactive ecosystem-based fishery management is implemented at local and federal levels through coordinated and targeted research to better understand fishery sustainability									
Objective 3.1: The Council, PIFSC, local fishery management agencies, and academic institutions have determined the stock status of MUS in the priority list within the next 5 years.									
Strategy 3.1.1: Amend the Fishery Ecosystem Plans on the stock status determination criteria for each priority species;									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
3.1.1.1.	Council staff shall amend the FEPs to reflect the methodology to which stock status are to be determined						X		
Strategy 3.1.2: Improve the information used by stock assessment by analyzing existing data and conducting studies that address the information gaps;									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
3.1.2.1	Develop proposals and secure funding to conduct targeted research focusing on but not limited to: <ul style="list-style-type: none"> Life history traits (k, L_{inf}, longevity etc.); L50 to support the Guam coral reef FMP Spatially explicit CPUE; Independent measure of population size; Estimate total harvest; Tagging studies to determine spatial distribution, mortality etc. 		X				X		
3.1.2.2.	Analyze the spatial distribution of effort from existing creel, CML, HMRFS and aerial survey data	X	X	X	X		X		
Objective 3.2: 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 3.2.1: Identify critical ecosystem management drivers, specific pressures on ecosystems, investigate stakeholders' interests and agendas, and identify patterns of interaction among stakeholders;									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
3.2.1.1.	Conduct scoping session with stakeholders (fishery management agencies, fishing communities and ocean users) at the different island areas in each jurisdiction						X		
3.2.1.2.	Draft summary of the scoping session and generate white paper on scoping results						X		
Strategy 3.2.2: Conduct targeted research to complete the elements needed to run ecosystem models for fishery management;									

Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
3.2.2.1.	Convene a meeting with PIFSC-Ecosystem Science Division to determine elements to build an ecosystem model and identify priority research to fill information gaps						X	X	
3.2.2.2.	Develop proposals and secure funding to conduct targeted research focusing on but not limited to: <ul style="list-style-type: none"> • 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; <i>NOTE: Elements will have to be prioritized based on critical information that will complete a working ecosystem model</i>						X	X	
<i>Strategy 3.2.3: 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;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
3.2.3.1.	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	
3.2.3.2.	Identify and collate data sets that will be used in the ecosystem model						X	X	
3.2.3.3.	Conduct a full assessment to determine the state of all indicators that can be feasibly quantified. Identify data and other limitations						X	X	
<i>Strategy 3.2.4: Develop ecosystem models for various fisheries and ground truth reliability of model results that can be used for fishery management;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
3.2.4.1.	Execute a contract/grant to potential contractors to develop ecosystem models						X		

	and conduct ground-truthing/result validation								
3.2.4.2.	Conduct a Management Strategy Evaluation (MSE) to simulate the effect of various existing and upcoming management tools on the ecosystem indicators and how those change based on the different combination and extent of implementation and enforcement						X	X	
Objective 3.3: 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.									
<i>Strategy 3.3.1: Apply Management Strategy Evaluations to current fisheries regulation and other related management strategies to determine efficacy and impact on the ecosystem indicators;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
3.3.1.1.	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		
3.3.1.2	Conduct a comprehensive fisheries regulatory review focusing on the effectiveness of the different fishery regulations and revise regulations based on the MSE						X		
Goal 4: Increase capacity of local fishery management agencies to collect representative fisheries data, monitor critical fisheries and conduct fisheries ecosystem research									
Objective 4.1: In the next five years, fishery management agencies have adequate staffing capacity, analytical skill-sets, legislative framework and hardware to conduct representative fishery data collection and research through collaboration within the membership of the FDCRC and other institution the FDCRC identifies as partners.									
<i>Strategy 4.1.1: Determine the optimal number of data collection staff that could deliver the adequate quantity and quality fishery data for monitoring purpose;</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC	PIFSC	
4.1.1.1.	Continue the Training-Work session cycle at the Annual Joint Archipelagic Plan Team Meeting						X		
4.1.1.2.	Explore options for online lecture series from researchers with relevant fisheries research information						X		
4.1.1.3	Conduct Fisheries 101 training						X		
<i>Strategy 4.1.2: Explore options for a career service enrichment program.</i>									
Task	Description	DMWR	DAWR	DFW	DAR	BSP	WPRFMC		
4.1.2.1.	Work with the Education Committee to establish career service enrichment program		X				X		
4.1.2.2.	Work with University of Hawaii in exploring the establishment of a Fisheries School to enhance the fisheries science capabilities in the region						X		

Appendix 2: Status Matrix for the 2014-2019 FDCRC Strategic Plan

Appendix 2 presents the status of tasks identified by the previous FDCRC Strategic Plan for 2014-2019, effectively summarizing and evaluating the completion of these tasks from the previous iteration of the plan.

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	Status
1.1.1.1.	Work with agencies in developing criteria	WPacFIN - Status unknown, but recommend revisiting the objective. WPacFIN plans to revisit user requirements for the territorial data systems as part of the project to transition the database management system from Visual FoxPro to MySQL.
1.1.1.2.	Conduct institutional assessment on technical capacity for data collection, analysis and reporting	DMWR - informally done between supervisors and Chief of Fisheries; and within programs.
Strategy 1.1.2: Develop an evaluation process through the annual meeting of the FDCRC and its Technical Committee		
Task	Description	Status
1.1.2.1.	Report out on the status of the data collection improvement efforts	The FDCRC Technical Committee members report on their data collection improvement efforts during the annual meeting in April. The FDCRC members provide a report during the June Annual Meetings based on the reports provided by the TC members.
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	Status
1.2.1.1.	Develop legislation that would support collection of fishery data via mandatory reporting and compliance to data collection;	DFW - The mandatory license and reporting regulations was approved for implementation in 02/28/2019. – COMPLETE Guam is impeded by the non-formation of the Guam Ocean Fishery Management Council. The legal opinion issued by the Guam AG indicated that DAWR legally cannot move forward with the AAA process without going through the GOFMC.

		DMWR – AS has legislation but working with DMWR Enforcement division for effective enforcement.
Strategy 1.2.2: Diversify funding opportunities to support the basic fishery data collection and the improvements thereafter		
Task	Description	Status
1.2.2.1.	Identify additional funding sources (short and long-term) for the fishery data collection to improve the data collection program;	The Council worked with a contractor to conduct web-based research on potential funding sources that can support the local agencies in the data collection improvement efforts. See below for the product. – COMPLETE
1.2.2.2.	Create a list of funding sources that the territories can apply for (make sure the eligibility requirements are explicit);	The Council developed a summary matrix of available local, regional, national and international grant and funding opportunities that can support the Territories in applying for funds to support data collection improvements. Information included Program name, description of the program, eligibility, dates of RFP, funding availability. – COMPLETE
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	Description	Status
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;	DFW - assist with review of data program conducted by PIFSC. DMWR - informal between supervisor and Chief of Fisheries and within programs.
1.2.3.2.	Institutional analysis to determine capacity and whether there is a need for technology transfer and capacity building and training;	DFW - assist with review of data program conducted by PIFSC. DMWR - informal between supervisor and Chief of Fisheries and within programs.
Strategy 1.2.4: Prioritize fisheries that require enhanced or new data collection		
Task	Description	Status
1.2.4.1.	Conduct a prioritization session to determine which fisheries are in need of consistent monitoring through the Joint Archipelagic Plan Team	Council developed the Ecosystem Component Amendment that reduced the number of species that are in need of conservation and management that will be monitored against the MSA and FEP requirements. However, Ecosystem Component species will still be monitored. This was implemented on February 8, 2019. The Archipelagic Plan Team conducted a session in May 2019 identifying the top species that will be monitored using ecological survey data and fishery dependent data. The priority species and top 10 species are monitored regularly in the Annual SAFE reports. – COMPLETE
Strategy 1.2.5: Design, test, and implement new data collection programs that are not adequately covered by the existing survey program		
Task	Description	Status
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	The contract was complete. However, the final report has not been released by PIFSC.
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)	DFW - no progress DMWR - not applicable.

		The Council supported the development of the mandatory license and reporting regulation in CNMI (and a draft in Guam). The Council and PIFSC are funding the implementation of the e-reporting app for the bottomfish fishery and the commercial vendor to support the regulations. – ONGOING; Software development – COMPLETE
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;	<p>The Council applied and received Territory Science Initiative funding from PIFSC to support the improvements in the Commercial Dealer Reporting in American Samoa and the Marianas. The Council also secured funding to pilot test surveys to address spatio-temporal gaps in coverage and under-sampled fishing methods through MRIP (Guam naval base project, seasonal run fishery project, and Marianas non-commercial spearfishing project. - COMPLETE</p> <p>DAWR in Guam conducted a 24 hour survey to determine the distribution of fishing effort and evaluate whether the existing survey design is capturing the general fishing activities in Guam. – COMPLETE</p>
1.2.5.4.	Local fishery management agencies implement the new data collection system with adequate monitoring of performance	<p>DFW - no progress.</p> <p>DMWR - not applicable.</p> <p>Guam BSP - implemented the new Guam Import Database systems monitoring the quantity of fishery-based products entering Guam in the different commercial ports; DAWR is currently conducting the monitoring at the ports – COMPLETE</p>
Strategy 1.2.6: Improve the data query function of the database to allow flexibility in creating data summaries		
Task	Description	Status
1.2.6.1.	Conduct workshop to determine data summaries needed for various reports and management needs;	This was conducted with the Plan Team in the development of the Annual SAFE reports. – COMPLETE
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;	<p>The Council developed the SHINY Application in the CNMI creel database that analyzes the data in near-real time and has the ability to download raw data in Excel format. The SHINY App also performs a power analysis to provide the agency with number of interview samples to meet the statistical target level. – COMPLETE</p> <p>The Council also developed the online Annual SAFE reports that have all the charts and data tables that can be downloaded for further analysis. – COMPLETE</p> <p>WPacFIN’s web portal provides the public with access to non-confidential WPacFIN datasets. WPacFIN will consider the agency staff’s needs in developing tools to query the new MySQL database as necessary as part of the new database</p>

		and application development project for the territorial data systems.
Strategy 1.2.7: Improve the collection and analysis of socio-economic data		
Task	Description	Status
1.2.7.1.	Work with the Social Science Planning Committee in developing priorities in the socio-economic (related to communities) data collection and integrate this in the data collection system;	The SSPC met and set new research priorities. – COMPLETE
Strategy 1.2.8: Upgrade fishery data collection by exploring options and implementing automated systems using current mobile, wireless, and online technology		
Task	Description	Status
1.2.8.1.	Upgrade the electronic data entry;	<p>The Council developed an online voluntary reporting platform (www.ispearfish.org) to collect non-commercial spear fishing catch and effort information. This was implemented with the spearfishing clubs in Guam and CNMI. The Council also developed the Catchit Logit e-reporting app for the small boat fisheries and the commercial fish vendors to support the mandatory license and reporting regulation. The Council is also developed a prototype of an image recognition software to support the automated data collection on the vendor side. – COMPLETE</p> <p>WPacFIN received FIS funding to support electronic reporting in the U.S. Pacific Islands bottomfish fisheries. This project will support integration of the Catch-it Log-it app into the data collection structure and implementation in the territorial bottomfish fisheries. Success of the Catch-it Log-it application in improving federal fisheries monitoring and management is dependent upon, among other things, the implementation and enforcement of territorial licensing and reporting requirements. WPacFIN plans to transition to electronic reporting of creel survey (and commercial purchase if not covered by Catch-it Log-it) information, instead of paper-based data sheets, after completing the transition from Visual FoxPro to MySQL.</p>
1.2.8.2.	Explore the use of mobile technology in improving fishery data collection;	<p>The Council developed a tablet based data entry system (same as the ispearfish data entry portal) that is synchronized with the web interface that allows for near real-time data entry. This was supposed to be used to do structured creel surveys in Guam for the non-commercial spear fishery. However, the creel survey phase of the project did not occur due to challenges in properly capturing the non-commercial spear fishery.</p> <p>The Council also developed the Catchit Logit e-reporting app for the bottomfish fishery and the commercial fish vendors to support the mandatory license and reporting regulation. – COMPLETE</p>
1.2.8.3.	Support the development of legislation for mandatory reporting in Guam;	The Council supported the drafting of the mandatory license and reporting

		regulation in the Marianas. Guam is pending due to the non-formation of the GOFMC. DAWR is taking the lead on getting the legislation changed and establish the mandatory license and reporting regulation.
1.2.8.4.	Support the implementation and improvement of existing mandatory reporting;	<p>DFW – working currently with DLNR/AG/WPRFMC to implement mandatory reporting regulations.</p> <p>DMWR is working with its Enforcement Division for effective implementation.</p> <p>The Council provided DMWR, DAWR and DFW with the ID machine that prints out the fishing permit for the commercial fishermen in American Samoa, Guam, and CNMI.</p>
1.2.8.5.	Support the development of the online dealer reporting for Hawaii;	WPacFIN - The Online Dealer Report application went live in 2019. WPacFIN provided support during its development.
Strategy 1.2.9: Enhance local fishery management agencies' capacity to process collected fishery data in near real-time		
Task	Description	Status
1.2.9.1.	Provide funding support to upgrade the Hawaii commercial database;	<p>SFF4 funding was dedicated for the online reporting upgrade to the Fisher Reporting System. The funding got reprogrammed because HDAR still have to finish the funds allotted from WPacFIN.</p> <p>WPacFIN - The Hawaii commercial database was delivered to HDAR in the summer of 2020. WPacFIN plans to deliver the complete application by the summer of 2021, and a temporary, transitional application was delivered for testing on January 8, 2021.</p>
1.2.9.2.	Conduct periodic training and technical assistance on the data collection and transcription process;	<p>DFW - training takes place with new staff and periodically thereafter with assistance from WPacFIN.</p> <p>DMWR - WPacFIN conducts technical assistance every field visit.</p>
1.2.9.3.	Develop a manual for data collectors that documents the whole process of collecting fisheries data;	<p>DFW - There is a methodology and protocol manual. – COMPLETE</p> <p>DMWR - There is a methodology and protocol manual written in English and Samoan. – COMPLETE</p> <p>DAWR – There is a methodology and protocol manual. - COMPLETE</p> <p>The Council's e-reporting project has full technical documentation on how to fill up the data entries – COMPLETE</p> <p>WPacFIN has the survey manuals on file for CNMI DFW, Guam DAWR, and American Samoa DMWR.</p>

1.2.9.4.	Enhance/develop communication framework between agencies and WPacFIN to facilitate easier follow ups and technical questions;	WPacFIN - HDAR and FIN have regular check-in meetings on the progress of replacing their Visual FoxPro system. WPACFIN is open to developing a communication plan.
Strategy 1.2.10: Enhance the local fishery management agencies' capacity to summarize and analyze collected fishery data		
Task	Description	Status
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;	<p>DFW - Data needs are fairly well understood and have been summarized many times over the years.</p> <p>DMWR - This is done informally with DMWR staff and WPacFIN staff, outside of the Plan Team Meeting.</p> <p>WPacFIN will revisit user requirements for territorial agencies, to include reporting needs, as part of the project to replace Visual FoxPro with a new MySQL database management system. WPacFIN is in the process of updating reporting requirements with HDAR as part of their project</p>
1.2.10.2.	Create a list of all the data needs for each agency and consolidate the list and submit to WPacFIN; CNMI list of report that the database can generate;	<p>DFW - Data needs are fairly well understood and have been summarized many times over the years.</p> <p>WPacFIN - The Council, State of Hawaii, and NMFS are in the process of re-visiting the data needs for federal and state fisheries management</p>
1.2.10.3	WPRFMC and PIFSC provide technical training on data analysis of fishery data through the Archipelagic Plan Team;	Several training sessions were conducted through the Plan Team. First is the implementation of length-based mortality estimation. Another one is being planned on using DLM tool and the detection probability estimation. – COMPLETE
1.2.10.4.	Integrate the various data streams (BioSampling, creel, PRS etc.) to generate reliable fishery data;	<p>DFW - needs clarification</p> <p>DMWR conducts its own analysis of datasets coming from the creel data and biosampling information.</p> <p>WPacFIN is happy to support integration of data streams at such time that this task is feasible.</p>
Strategy 1.2.11: Enhance dissemination of fishery information utilizing various media		
Task	Description	Status
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;	The Annual SAFE Report is the standardized reporting platform for fishery performance and ecosystem considerations. – COMPLETE
1.2.11.2.	Create an online version of the annual report;	The Council contracted Mirae InfoDesign LLC to develop an online version of the Annual SAFE report. This online platform summarizes the data tables found in the book form of the report. The site is www.wpcouncildata.org – COMPLETE

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;	<p>DFW – SFR funded Aquatic Outreach Coordinator can talk about data collection but not rules and regulations specifically. DFW enforcement does limited outreach.</p> <p>DMWR – conducts regular outreach to fishermen, commercial vendors and communities in Tutuila, Aunuu and Manua.</p> <p>The Council contracted radio stations to air advertisements on the importance of fishery data for fishery management. This is through MRIP and TSI. – COMPLETE</p>
1.2.11.4.	Enhance collaboration/communication with other agencies to avoid duplication in fishery data collection to avoid interviewee “stress”;	<p>DFW - attempt to communicate with other government agencies, NGOs, etc. Not always successful.</p> <p>DMWR supplies fishery statistics to the American Samoa Government.</p>
1.2.11.5.	Develop a user-friendly online tool to query non confidential data;	<p>The SHINY App developed for DFW contains a user-friendly online tool to download non confidential data and summaries. The Council funded the development of the online Annual SAFE report. – COMPLETE</p> <p>The WPacFIN data portal is available to query non-confidential data online</p>
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;	<p>The Annual SAFE report was launched late 2018 for American Samoa, Guam, CNMI, Hawaii, and Pacific Pelagics. – COMPLETE</p> <p>WPacFIN launched their new website to summarize and download data sets in early 2019 – COMPLETE</p>
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	Description	Status
1.2.12.1.	Develop an MOU for FDCRC users to access and query the data not requiring data request;	<p>MOU of Data Sharing was completed for the Council-DMWR, Council-DAWR and Council-CNMI DLNR. – COMPLETE</p> <p>The Hawaii agreements are yet to be developed. The problem is the statute, and this process will require a Chapter 91 amendment.</p>
1.2.12.2.	Developing a public request system; mandatory requirement for a data sharing plan (two years);	DFW - currently only through written request to Director.
1.2.12.3.	Establish a database station at the offices of the FDCRC members and provide data summarization and query training to authorized users	The SHINY app has a near-real time update on data uploaded to the WPacFIN system. The Council has a link to the CNMI-DLNR system that can download the data once the computer system is powered up.
Strategy 1.2.13: Enhance fishermen and vendor participation in the fishery data collection programs		
Task	Description	Status
1.2.13.	Develop an incentive system built-into the data collection programs for vendors	Incentive system is available for the Territory Science Initiative Program as well as

1.	and fishermen;	<p>the MRIP spearfishing project. The Council has been providing DAWR with incentives for their data collection program. – COMPLETE</p> <p>WPacFIN - The PIFMAPS Panel Report includes the following regarding incentives: “Some of the territories stated that fishers and/or vendors received incentives for reporting. The panel is generally not in favor of providing incentives for reporting on / providing access to public marine resources. However, if this practice is to continue a committee made up of territorial representatives and the funding agencies should be formed to review and discuss a transparent program across the territories.”</p>
1.2.13.2.	Develop outreach materials and strategies to feed the data back to the fishermen in a useful format	<p>DFW - occasional poster or pamphlet developed to provide information to fishermen, but more timely feedback should be developed.</p> <p>DMWR - developed outreach materials for fishermen, commercial vendors and communities and feedbacks during fishermen meetings.</p> <p>The Council’s e-reporting app includes a dashboard that summarizes the information submitted by the fisherman and the vendors. The Council conducted several fishers forum events to present the results of the project to the fishing communities. – COMPLETE</p>
1.2.13.3	Conduct regular forum and dialogue with fishing organization to gather fishery issues and identify avenues of collaboration	The Seafood Vendors Forum in American Samoa and Guam serve as a forum for fish retailers to bring up issues and discuss solutions.
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;	Regular ads were running for the MRIP and TSI projects in Guam, CNMI, and American Samoa. – COMPLETE
Goal 2: Create a list of priority species for each group/agency and make sure the research meets certain criteria (size, unbiased, etc.)		
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		
<i>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</i>		
Task	Description	Status
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;	<p>DFW - no direct progress but priority species have been discussed for other purposes.</p> <p>DMWR - is in the process of developing a prioritized list.</p> <p>For the purposes of monitoring ECS, the prioritized list is reflected in the 2020 version of the Annual SAFE reports. - COMPLETE</p>

		The prioritized list of species for stock assessment is currently being worked on by PIFSC through the Stock Assessment Prioritization.
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;	The Council's Coral Reef Conservation Program funds were used to conduct PSAs for American Samoa, Guam, CNMI, and Hawaii. The reports are available at the Council Office. This was based on whatever available data for the analysis and not based on a pre-existing list generated by the agencies. – COMPLETE
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;	This is included in the Ecosystem Component exploratory data analysis. The amendment was finalized and implemented on February 8, 2019. – COMPLETE
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	Description	Status
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.	
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	Description	Status
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 agency. The contractor will also develop a compendium of scientific literature, agency based data holdings, and unprocessed specimen libraries	The Council's project reports are compiled and consolidated as gray literature in the Council servers and will be made available through the new Council website.
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.	DFW - currently ongoing
3.1.2.3.	Develop a searchable online library compiling all the information generated by the information mining contracts;	
3.1.2.4.	Establish partnership with FishBase, ScholarSpace, and ERDDAP to establish the database of mined information (Optional)	
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	Description	Status
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	The WPSAR Steering Committee assigned the level of assessment for each MUS remaining after the Ecosystem Component Amendment. – COMPLETE
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	This will no longer be done because the PIFSC-SAP already covers all of the MUS for stock assessment. Methods have already been developed for each MUS. – COMPLETE
4.1.1.3.	Conduct a Western Pacific Stock Assessment Review of the assessment generated	The WPSAR Steering Committee already set the five year review schedule for all MUS that will be assessed. – COMPLETE
Strategy 4.1.2: Amend the Fishery Ecosystem Plans on the stock status determination criteria for each priority species		
Task	Description	Status
4.1.2.1	Council staff shall amend the FEPs to reflect the methodology to which stock status are to be determined;	Included in the Council’s five year program plan 2020-2024.
Strategy 4.1.3: Improve the information used by stock assessment by analyzing existing data and conducting studies that address the information gaps		
Task	Description	Status
	Convene a meeting with PIFSC-Stock Assessment Program to determine priority research to fill information gaps	SAP is happy to provide information on planned activities to improve stock assessments.
4.1.3.1.	Develop proposals and secure funding to conduct targeted research focusing on but not limited to: <ul style="list-style-type: none"> • Life history traits (k, Linf, longevity etc.); • Spatially explicit CPUE; • Independent measure of abundance; • Estimate of total harvest; • Tagging studies to determine spatial distribution, mortality etc. 	DFW- Life History and Tagging programs ongoing. DMWR collaborated with TNC on life history and WSFR for population genetics. The Council is currently funding the Hawaii BioSampling Program.
4.1.3.2.	Compile research results in the online database (Task 3.1.2.3)	DFW - no progress. The Council’s project reports are compiled and consolidated as gray literature in the Council servers and will be made available through the new Council website.
4.1.3.3.	Analyze the spatial distribution of effort from existing creel survey, CML, HMRFS and aerial survey data	DFW - no progress. Hawaii DAR has been preliminarily exploring the spatial distribution of non-commercial shoreline fishing effort in Hawaii based mainly upon HMRFS and DAR roving effort survey data (SAFE 2017 & 2018). Pending MRIP certification of a roving survey design, DAR plans to expand the mapping efforts both spatially and temporally.
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		

<i>the sustainability of the stocks</i>		
Task	Description	Status
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	Description	Status
4.1.5.1.	Convene a meeting with PIFSC-Stock Assessment Program to determine priority research to improve stock assessment methods	<p>This will be incorporated in the Data Workshop series that will be conducted prior to the assessment development.</p> <p>The PIFSC SAP is happy to provide information on planned activities to improve stock assessments.</p>
Objective 4.2: The Council, PIFSC, local fishery management agencies, and academic institutions have jointly developed working ecosystem models for the nearshore ecosystems 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	Description	Status
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;	DFW - conducted meetings with Saipan, Tinian, Rota public for mandatory reporting comments.
4.2.1.2.	Draft summary of the scoping session and generate white paper on scoping results	DFW - not done yet.
Strategy 4.2.2: Conduct targeted research to complete the elements needed run ecosystem models for fishery management		
Task	Description	Status
4.2.2.1.	Convene a meeting with PIFSC-Ecosystem and Oceanography Division to determine elements to build an ecosystem model and identify priority research to fill information gaps	This is part of the Annual Climate Change Collaborative Workshop.
4.2.2.2.	<p>Develop proposals and secure funding to conduct targeted research focusing on but not limited to:</p> <ul style="list-style-type: none"> • 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 & 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 	<p>DFW-pilot project upcoming for nearshore bathymetry/habitat assessment. Life history project ongoing.</p> <p>DMWR collaborated with TNC on life history and WSFR for population genetics.</p> <p>The Council funded genetic projects for CNMI and American Samoa through the CRCP grant. The Council is also funding the Hawaii BioSampling Program.</p>

	<p>not limited to, pollution, large and small scale habitat degradation, fishing, climate change impacts;</p> <ul style="list-style-type: none"> • 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; 	
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	Description	Status
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	<p>The Council has a contract to develop habitat indicators. The Council and its Plan Team developed the ecosystem indicators and are being monitored through the Annual SAFE Report. – COMPLETE</p> <p>The Council currently has a project with Arizona State University that looks into the ecosystem indicators for Hawaii and will develop ecosystem thresholds upon which ecosystem management decisions will be based on.</p>
4.2.3.2.	Identify and collate data sets that will be used in the ecosystem model	PIFSC is taking the lead on the development of the ATLANTIS Ecosystem model for the Main Hawaiian Islands.
4.2.3.3.	Conduct a full assessment to determine the state of all indicators	
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	Description	Status
4.2.4.1.	Execute contract/grant to potential contractors to develop ecosystem models and conduct ground-truthing/result validation;	The Council currently has a project with Arizona State University that looks into the ecosystem indicators for Hawaii and will develop ecosystem thresholds upon which ecosystem management decisions will be based on.
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	The ATLANTIS model has MSE as part of the modeling framework.
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 current fisheries regulation and other related management strategies to determine efficacy and impact on the ecosystem indicators		
Task	Description	Status
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	The workshops are part of the process for developing the ATLANTIS model for the main Hawaiian Islands in which PIFSC is taking the lead.

	on the ecosystem indicators	
4.3.1.2.	Conduct a comprehensive fisheries regulatory review and revise regulations based on the MSE	DFW – needed.
Goal 5: Increase capacity of local fishery management agencies to collect improved fisheries data, monitor critical fisheries and conduct fisheries ecosystem research		
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	Description	Status
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 estimate;	DFW - attempts made in the past, but more work needed. WPacFIN created shiny applications for each creel survey to determine 1) number of interviews required to meet desired level or certainty and 2) number of sample days per quarter or month to meet desired level or certainty. The creel survey scheduling applications can be accessed using the links below: https://tobymatthews.shinyapps.io/American_Samoa_BB_Creel_Scheduler/ https://tobymatthews.shinyapps.io/American_Samoa_SB_Creel_Scheduler/ https://tobymatthews.shinyapps.io/CNMI_Creel_Scheduler/ https://tobymatthews.shinyapps.io/Guam_Creel_Scheduler/
Strategy 5.1.2: Implement a regular training session on fishery data collection and fishery data analysis		
Task	Description	Status
5.1.2.1.	Continue the Training-Work session cycle at the Annual Joint Archipelagic Plan Team Meeting	
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	Description	Status
5.1.3.1.	Work with the Education Committee to establish career service enrichment program	