Report on the Catchit Logit Application Suite Development and Pilot Implementation

Marlowe Sabater, Diana Kitiona, Felix Reyes, Floyd Masga

Western Pacific Regional Fishery Management Council
1164 Bishop St. Suite 1400, Honolulu, Hawaii, 96813

This report covers activities from August 2020 to December 31, 2021. The data analysis covers a six month period from January 1, 2021 to June 30, 2021.

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1. Introduction

In October 2014, the Fishery Data Collection and Research Committee approved the Regional Strategic Plan[1] to improve fishery data collection and coordinate fisheries research in the Western Pacific region. The agency director members of the FDCRC signed the plan as an expression of commitment and support for the tasks enumerated in the plan. Strategy 1.2.8 is to upgrade the fishery data collection by exploring options and implementing automated systems using current mobile, wireless and online technology. Task 1.2.8.2 is to explore the use of mobile technology in improving data collection.

In August 2019, the Council and Pacific Island Fisheries Science Center (PIFSC) convened a regional review workshop called Pacific Island Fisheries Monitoring and Assessment Planning Summit. The panel reviewers evaluated the fishery data collection programs in the territories and provided recommendations and direction for data collection improvements[2] . Regarding the commercial receipts and fisher reports, the panel recommended promoting electronic technologies. Regarding organization and execution, the panel recommended removing duplicity and developing a unified approach. Regarding electronic technologies, the panel recommended implementing use of an application to collect all commercial vendor receipts and collaborate with FIS and other FINs for resource sharing.

In order to address these tasks and recommendations, the Council, in collaboration and funding from PIFSC, developed the Catchit Logit Application Suite (CLAS). CLAS utilizes a Progressive Web Application, first in its class applying it for fisheries monitoring in the Western Pacific. CLAS is an electronic reporting system for commercial fishermen (Catchit Logit) and fish dealers (Sellit Logit) in the territories and an administration account to collate, summarize, and house the data submission. CLAS was developed to support the territories' mandatory license and reporting regulations.

CLAS was launched and implemented in American Samoa, Guam, and CNMI in October 2020 through the Territory Science Initiative funding. The summary of the status of the implementation is found below.

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[1] Fishery Data Collection and Research Committee. 2014. A Strategic Plan to Improve Fishery Data Collection and Coordinate Research: Western Pacific 2014-2019. Western Pacific Regional Fishery Management Council, Honolulu, Hawaii, 96813

[2] Turner S., Suter J., Ryznar B. 2019. Pacific Insular Fisheries Monitoring and Assessment Planning Summit Data Summit: Panel Report. Western Pacific Regional Fishery Management Council, Honolulu, Hawaii, 96813

2. Regional Multifaceted Approach

The Western Pacific region is taking a multifaceted approach to improving data collection. This approach covers the thematic areas shown in Figure 1. The main goals are: 1) establish an electronic reporting system supported by territorial regulations; 2) improve the creel surveys to capture management relevant fisheries; 3) enhance the local capacity to capture length information particularly from the non-commercial fisheries. The electronic self-reporting system is through CLAS. This is designed for mandatory commercial fisheries reporting. Non-commercial fishermen can also use this system provided that they are willing to provide detailed information. Experience tells us that non-commercial fishermen prefer minimal data entry as possible yet captures the necessary information for science and management. They can be supported by CLAS by developing an interface where upon selecting the type of fishing trip it goes to the non-commercial version where it captures species, length, and number of fish.

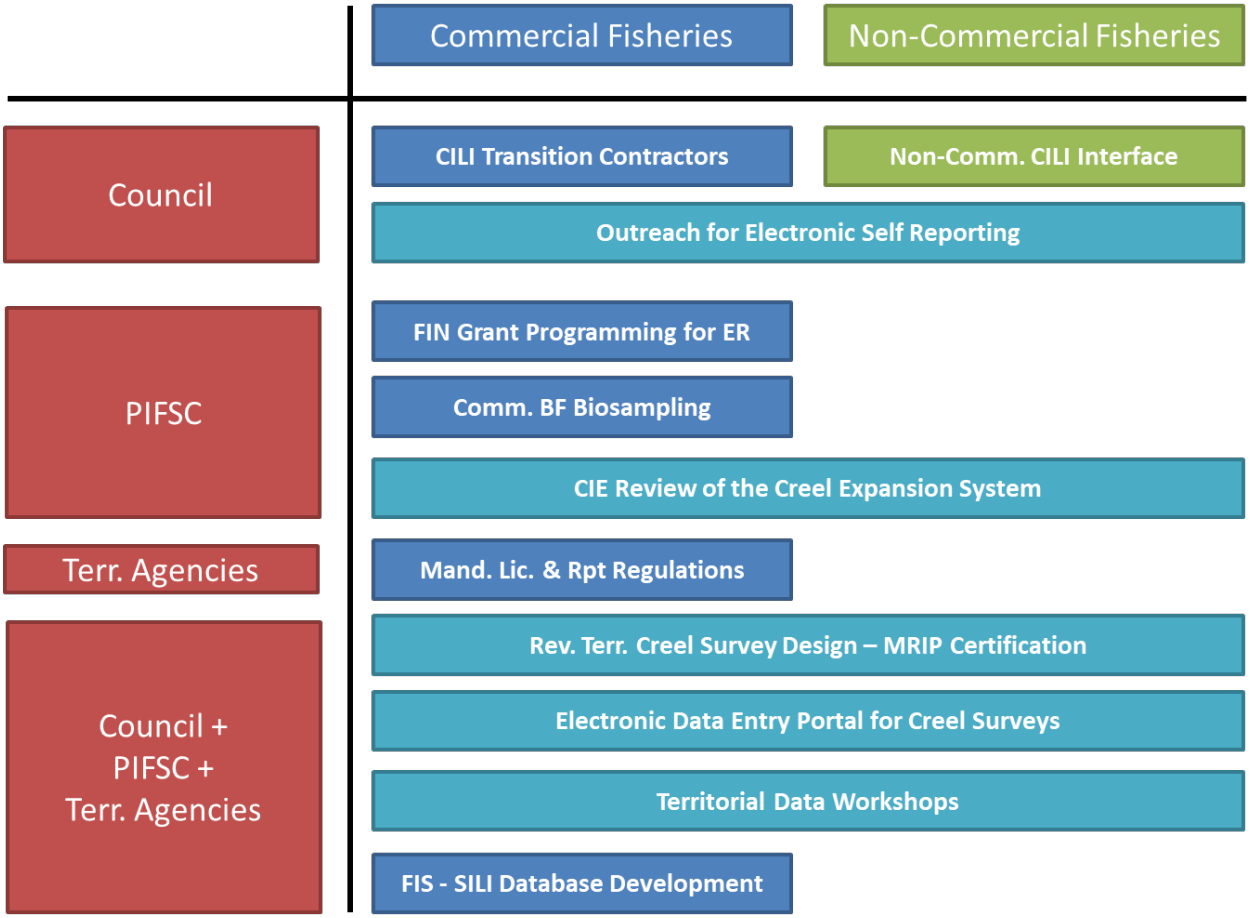

Figure 1. Diagram describing the multifaceted approach to improving the data collection systems in the Territories.

The creel survey is the basic data collection system in the territories and the multifaceted approach requires the survey designed to be reviewed and subject to MRIP certification. The review of the creel design will allow for operational corrections to improve the catch and effort estimation. This can also be supported by the development of the electronic data entry system to allow for more near-real time data submission.

3. Software Development

The CatchIt Logit App Suite is comprised of three relational systems, which are the fisher reporting (CatchIt Logit), vendor reporting (SellIt LogIt), an admin system (LogIt ReportIt). The initial suite in early 2020 is the prototype for the Marianas. The TSI project expanded the system to American Samoa. Additional modifications were made to the system in mid-2020 to separate the reporting in Guam and CNMI. The Forest App was developed to support the CatchIt LogIt suite by allowing the system administrator to modify the port, species, and fishing location maps. The data summary dashboard was completed and gone live in October 2020. The SudoKrew Solutions LLC contract to conduct system monitoring, maintenance, and debugging ended in August 2021.

The project is entering the transition phase where the technology and the implementation will be transferred to the territorial fishery agencies and the data warehousing to PIFSC-Fishery Monitoring Program.

4. Pilot Implementation

A. Registration and Training

The Council organized a series of training events in American Samoa, Guam, and CNMI that catered to the varying levels of COVID restrictions in each area. The training started in August 2020 for the Advisory Panel Members and the local fishery management agencies' staff. The AP members and the agency staff served as the trainers for the general fisherman training in October and November. Guam conducted training in smaller groups due to restrictions from the COVID upsurge in the last quarter of 2020. All areas other areas conducted a small group training session after the general training sessions. Individual training and signups are continuing at the ports, marinas, and boat ramps.

As of January 14, 2022, 138, 112, and 132 fishermen are trained and registered on the app suite in American Samoa, Guam, and CNMI, respectively. For the vendors, there are 20, 10, and 10 in the same order. Some of the issues encountered in the registration and training of fishermen are:

- Reluctance of using the application due to unfamiliarity with smart devices;
- Lukewarm support due to absence of regulatory framework to require self-reporting
- Areas with mandatory reporting (CNMI and American Samoa for dealers), fishers and vendor are confused on which platform to report
- Some fishermen do not have smart devices

B. Data Collection Contractors and Fishermen Reporting

The Council hired island contractors from September 15, 2020 to September 14, 2021 to support the pilot implementation of CLAS. These contractors were tasked to work with the fishing community to register and train fishermen and fisher vendors on the use of CLAS. They were also tasked in promoting the reporting application in tournaments and various outreach efforts via social media, on-air and printed ads.

The island contractors' performance was evaluated by the contract monitor. For the Guam contractor, he went above and beyond by developing the training video on how to use the app. He conducted weekly visits with fishermen in the marina and fishing areas and picks up one or two fishermen for follow up to conduct training.

Figure 2 shows the number of fishermen reporting in the troll and bottomfish fisheries in 2021. There were, on average, four and five fishermen reporting in the bottomfish and troll fisheries per month, respectively. The bottomfish fishery appeared to have a stable number of fishermen reporting whereas the troll fishery decreased slightly over time. Of the 24 fishermen that reported in 2021, three fishermen reported consistently in eight to eleven out of twelve months in the bottomfish and troll fisheries

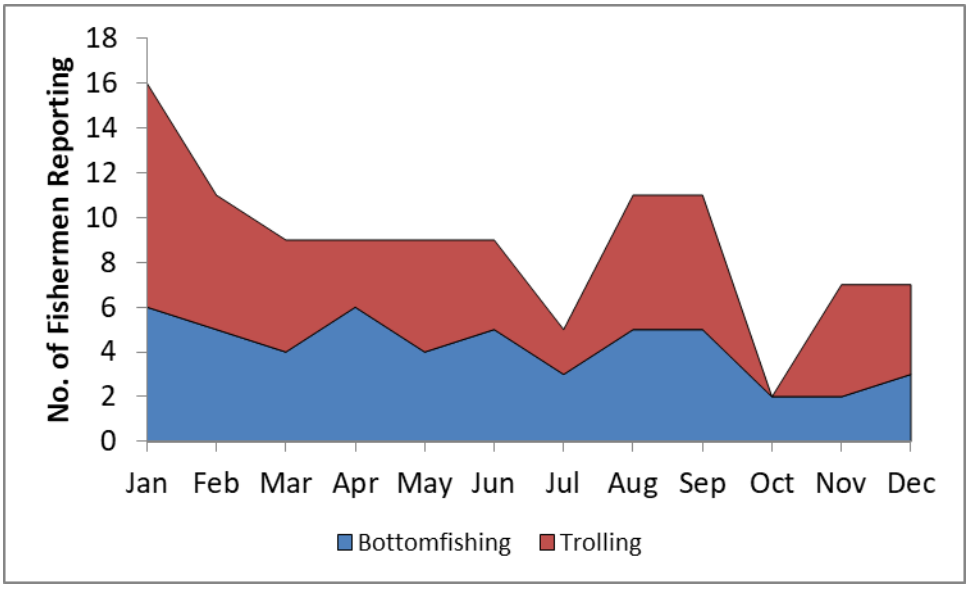

Figure 2. Number of fishermen reporting in the Guam bottomfish and troll fisheries in 2021

The Guam contractor encountered several issues with the initial implementation of CLAS. First, despite support from the Division of Aquatic and Wildlife Resources, it was challenging to convince the fishermen to report regularly since there is no regulatory framework to back it up. DAWR is currently working on a regulation to require commercial fishing license and reporting. Despite numerous outreach and training, Council advisers who were supposed to promote and be examples in the fishing community did not have the motivation to report as well. Of the six registered advisers they only reported between one to two months in 2021.

In CNMI, the contractor is a known and respected member of the fishing community. CNMI also has the backing of a mandatory license and reporting regulation. The contractor used his influence to gain support in the fishing community. The contractor held several community trainings and individual fishermen and vendor training.

Figure 3 shows the number of fishermen reporting per month in the troll and bottomfish fisheries in 2021. On average, there are three and four fishermen reporting per month in the bottomfish and troll fisheries, respectively. The number of reports was highest in the February-

March and August-September months. Of the 22 fishermen that reported in 2021, two fishermen reported consistently in nine to ten out of twelve months in the bottomfish and troll fisheries.

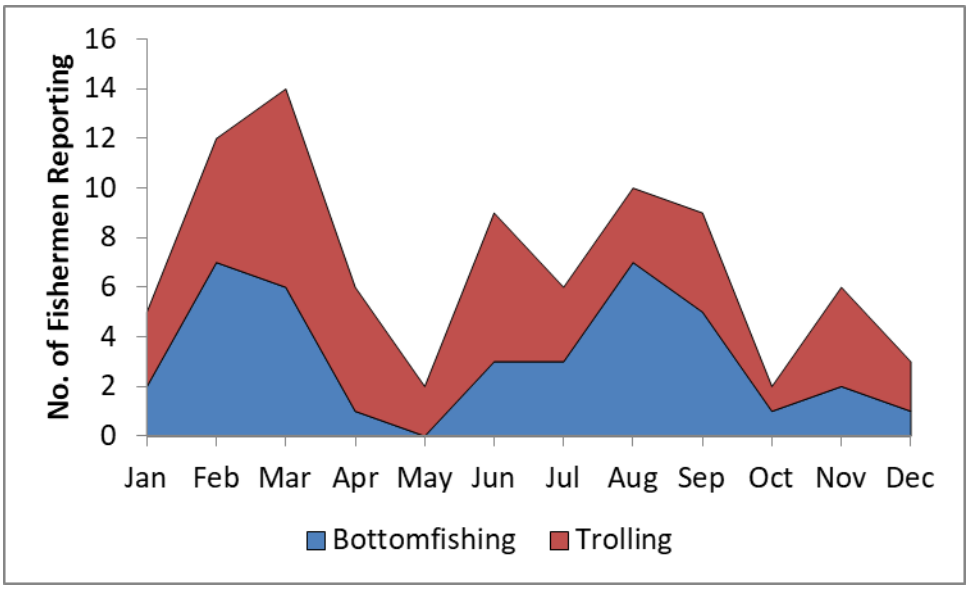

Figure 3. Number of fishermen reporting in the CNMI bottomfish and troll fisheries in 2021.

The contractor faced some implementation challenges in the electronic reporting. This includes the non-implementation of the mandatory license and reporting. The non-enforcement of the regulations creates confusion in the fishing community and resistance in the reporting. The contractor does not have the authority to enforce the regulations. There is also duplication between the electronic and paper logbook reporting. Commercial fish vendors complain about reporting in the two platforms.

For the American Samoa contractor, of the 138 logged into the system, only 40 were trained. The contractor utilized a different approach where he registered fishermen based on the commercial permit from DMWR and people he interacted in the fishing access point. From that list he invited them for training either as a group or individually. Some in the CILI registry were not trained due to resistance or could not find a common schedule. Majority of the registered fishermen reporting are non-commercial fishermen.

On average, there were one and three fishermen reporting each month in the bottomfish and troll fisheries, respectively. The peak of the reporting happened in April 2021 due to the tournament (Figure 4). The reporting was consistently low. Of the 13 fishermen that reported in 2021, only one fisherman reported for eight out of the 12 months, who is also a Council member.

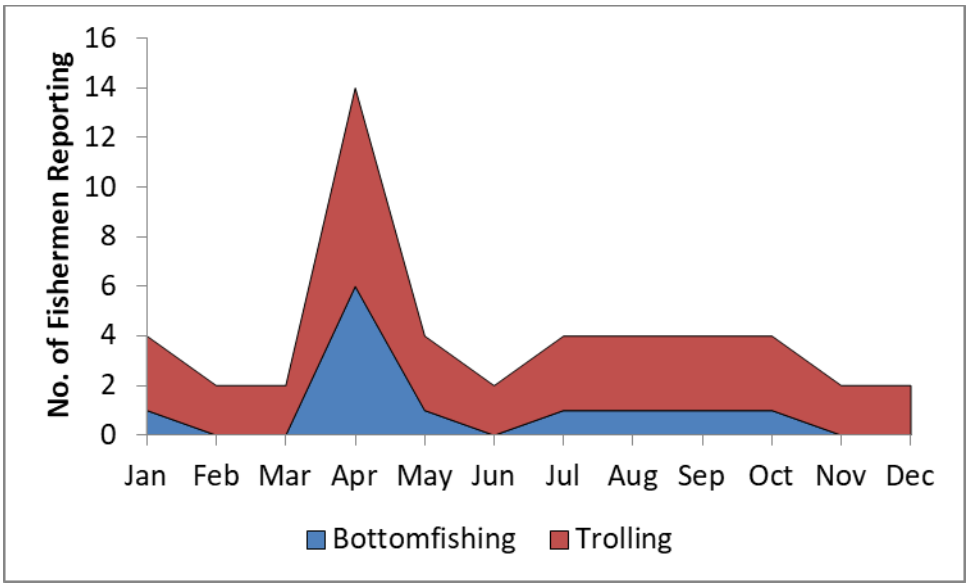

Figure 4. Number of fishermen reporting in the American Samoa bottomfish and troll fisheries in 2021.

The contractor faced significant challenges regarding implementation of the electronic reporting. This includes the classic run-around where it was difficult to get the fishermen to get trained due to unavailability. Most of the alia fishermen are not too tech savvy as well. They also point to no regulations requiring them to self-report their catch. There was also minimal support from the DMWR fishery data collection program. The contractor also had a full time job as the Department of Commerce IT Division. Despite being familiar with the fishery and able to do troubleshooting of the app, he had challenges in developing relationship with the fishermen.

C. Education and Outreach

The Council developed printed media to support the data collection system. Posters and brochures were sent to the territories. The printed media were disseminated at the training as well as known spots where fishermen visit. The Council sponsored a three-month radio ad in each territory to support the data collection effort. The ads were in English and local dialect. A digital PSA was developed on the importance of submitting accurate data through the electronic reporting system. These are disseminated through the Council website and social media. The Council created a webpage specific for CatchIt LogIt. The Guam CatchIt LogIt team also developed a training video on how to install and use the CatchIt LogIt app on an iOS. CatchIt LogIt has its own Facebook page. CatchIt LogIt was promoted in several tournaments in American Samoa, Guam, and CNMI. A CatchIt LogIt tournament was held in American Samoa. Special categories were added to the tournament for those who report in the ER system. Social media campaign was launched through Instagram, Facebook and LinkedIn.

5. Analysis of the Catchit Logit Data Versus Creel Expansion

The pilot implementation ran for 15 months. Council staff requested for a six-month catch and trip expansion for the troll, bottomfish, and spear fisheries. The expanded data came

from the creel surveys. The creel survey catch and trip data was compared with CILI. The self-reported trip and catch from CILI was divided by the trip and catch from creel surveys to get the proportion of CILI data relative to creel surveys (expressed in percentages).

There are some caveats in this comparison: 1) the creel expanded catch and trip include commercial and non-commercial fisheries; 2) there is high variability in the creel data because the design is for an annual expansion; 3) the universe of the CILI self-reported catch and trip is only from those registered in the program; 4) the universe of the participants in CILI is incomplete since the mandatory license and reporting regulations in CNMI has not been fully executed and other territories have none or have gaps.

Table 1. Comparison of catch and trip between the creel survey and Catchit Logit for the troll, bottomfish and spear fisheries. The catch and trip from creel surveys data were expanded covering six months (January 1 to June 30, 2021). The Catchit Logit data was truncated to the same time period. All fishing trips and catch that reported the three fishing methods were added. Catchit Logit catch were divided by the creel expanded catch and multiplied by 100 to evaluate what proportion of the CILI catch relative to the creel total. The same approach was used for CILI trips.

CREEL				CATCHIT LOGIT			
Island	Method	Trips	Lbs_Caught	CILI catch	CILI%lb	CILI Trips	CILI%trip
Am. Samoa	TROLL	54	9,384	7,997	85	44	81
	BOTTOMFISHING	11	476	1,458	306	18	164
	SPEAR	69	2,286	40	2	1	1
CNMI	TROLL	1,330	81,997	24,409	30	165	12
	BOTTOMFISHING	1,021	11,986	6,729	50	80	8
	SPEAR	254	1,814	1,021	56	14	6
Guam	TROLL	5,788	260,047	7,435	3	89	2
	BOTTOMFISHING	1,638	22,345	3,462	15	67	4
	SPEAR	682	7,915	661	8	39	6

Overall, catches and trips are typically lower in CILI except for some unusual circumstances (Figures 5-7). The degree of difference between the CILI self-reported data and the creel expanded data may depend on the representativeness of the fishermen reporting and/or captured in the surveys. At this point there is no easy way of comparing the universe of both systems.

A. Commonwealth of Northern Mariana Islands

CNMI CILI pilot implementation may have captured the catches better compared to the other territories (Table 1). This could be attributed to the contractor who is well known in the fishing community thus establishing trust. Second, despite DFW not fully implementing the regulations in this reporting period, having the regulation is in itself advantageous for the pilot implementation. People are aware that the regulation exists and it's a matter of time when the regulations are implemented. As noted above, it is a double edged sword because non-

implementation meant no full compliance. The CILI catch is about 30-56 percent of the creel expanded catch. Knowing that the creel expanded catch includes non-commercial trips, the CILI catch is perhaps within the ball park of the commercial portion of the creel expanded catch based on what we know about the CNMI small boat fisheries. This needs to be investigated further. The CNMI CILI trips are about 6-12 percent of the creel expanded trips. It is difficult to determine if the captured CILI trips are representative of the commercial portion of the creel expanded trips without additional analyses.

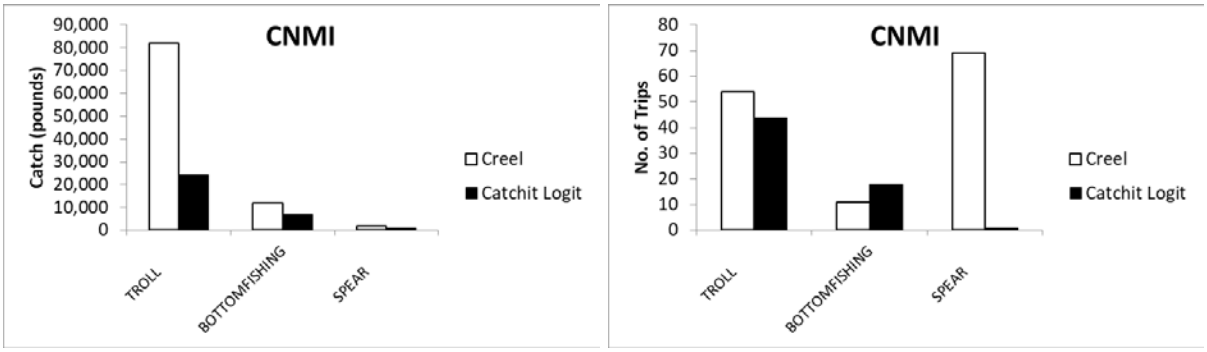

Figure 5. Comparison of catch (left) and trip (right) between creel derived data and Catchit Logit in the troll, bottomfish, and spear fisheries in CNMI.

B. American Samoa

American Samoa implementation is a bit unusual with the bottomfishing catch is roughly three times higher than the creel expanded catch. This could be due to under estimation in the expansion (due to few interviews) or CILI was able to capture a more accurate picture of the commercial bottomfish fishery. The bottomfishing trips reported in CILI was higher compared to the 11 trips in the creel survey during this time period. The contractor did not work much on the spear fishery and was focusing mostly on the bottomfish and troll fisheries hence the low reporting. CILI reported catch and trip is about 85 and 81 percent of the total catch and trip from the creel surveys, respectively. The numbers here seemed promising since majority of the reports are coming from members of the Pago Pago Game Fishing Association.

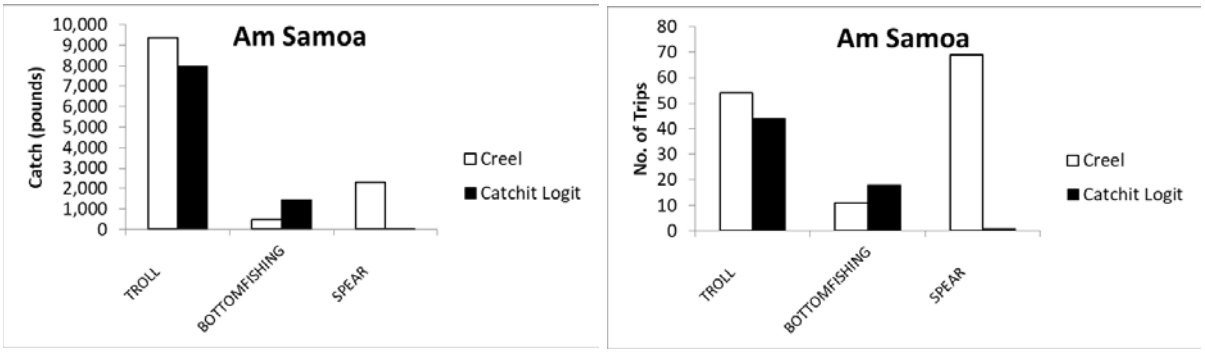

Figure 6. Comparison of catch (left) and trip (right) between creel derived data and Catchit Logit in the troll, bottomfish, and spear fisheries in American Samoa.

C. Guam

The results in Guam is a bit concerning. The CILI reported catch is between 3-15 percent of the creel expanded catch (depending on the method). The CILI reported trip is between 2-6 percent of the creel expanded trip. Despite the efforts of the island contractor to reach out to the fishermen to register and participate and follow ups to report, the reporting level remains low. This could be due to absence of the mandatory license and reporting regulations. There is no impetus for fishermen to report if it is voluntary. Aside from a few fishermen who consistently report, the vast majority (10 out of 18 for bottomfish; 13 out of 19 for troll) of the registered fishermen only reported once. Another explanation could be the over-expansion of the creel survey catch but this can be evaluated with additional analysis. In the process of requesting the 6-month expansion, FRMD made technical corrections to the expansion outputs that actually reduced the expansion estimates but without sensitivity analysis, the over-expansion of the 6-month data cannot be determined.

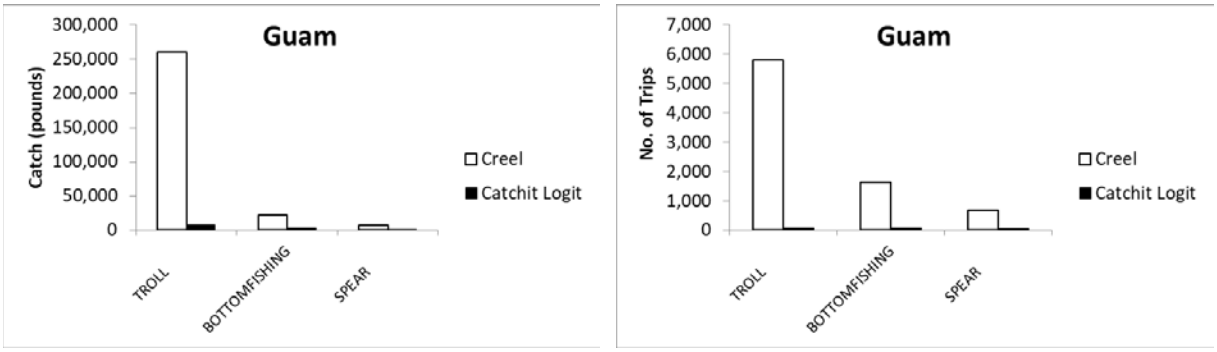

Figure 7. Comparison of catch (left) and trip (right) between creel derived data and Catchit Logit in the troll, bottomfish, and spear fisheries in Guam.

6. Transition Activities

The CLAS Transition Plan was approved by the Fishery Data Collection and Research Committee at its 2021 Regular Meeting on September 2021. Included in the transition plan is the transfer of the AWS database system to PIFSC. Through the Council's Fishery Information System funding, the Council contracted SudoKrew Solutions LLC to provide team augmentation in the development of the backend database system. The territorial commercial receipt book data has been transitioned to the cloud system on a PWA platform consistent with the Sellit Logit. Additional database migration work will be conducted from March to July 2022.

The Council is working with DFW on the synchronizing the implementation of the Mandatory License and Reporting regulation with the data collection activities. The Council is also working with DAWR and DMWR in the finalizing their license and reporting regulations.