US Caribbean Commercial Data Improvement Project: Final Workshop

Ponce, PR – May 11-13, 2010

Summary Report

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2 List of Acronyms

ACL – Annual Catch Limit

AM – Accountability Measures (except when used in reference to time of day)

CCR – Commercial Catch Report

CFMC – Caribbean Fishery Management Council

CSFSP - Cooperative State Federal Statistics Program

DFW – Department of Fish and Wildlife

DNER – Department of Natural Resources and Environment

DPNR – Department of Planning and Natural Resources

FAD – Fish Aggregating Device

GPS – Global Positioning System

HMS – Highly Migratory Species

OLE – Office of Law Enforcement

PR – Puerto Rico

SEFSC – Southeast Fisheries Science Center

SERO – Southeast Regional Office

SSC – Scientific and Statistical Committee

STFA – St. Thomas Fishermen's Association

TIP – Trip Interview Program

VI – Virgin Islands

3 Introduction

The Puerto Rico Department of Natural Resources and Environment (DNER) and the US Virgin Islands Department of Fisheries and Wildlife (DFW) are undertaking the US Caribbean Commercial Data Improvement Project jointly with guidance and input from the NMFS, Southeast Fisheries Science Center (SEFSC), the NOAA Southeast Regional Office (SERO) and the Caribbean Fishery Management Council (CFMC). As part of the data collection improvement project which began in May 2009 and continued with technical workshops held in November 2009 and January 2010, this report summarizes the third and final workshop held May 11-13 2010 at the Hilton in Ponce, Puerto Rico. The workshop was hosted and supported by CFMC. It began at 8:30 am every day and ended at 5:30 pm on Tuesday and Wednesday and 1 pm on Thursday.

The purpose of the final workshop was to review and refine the optimal data collection program recommendations developed during the previous workshops, provide requirements for program related database and IT needs, solidify the oversight and monitoring component of the new program, and assign costs to all the individual program components. The majority of the workshop discussions focused on budget and costing. The results from this workshop will form the basis for a plan to recommend a 4-year program, consisting of 2-year data gathering and analysis phase and a 2-year transition to a long-term permanent program.

The information gathered during this workshop and the preceding planning and follow-up workshops will also be used to recommend a tiered strategy for selecting the final program. This tiered strategy will reflect the need to include different levels of funding which would be tied to varying degrees of accuracy associated with a range in sampling levels. However, because existing data are insufficient to provide recommend sampling sizes that will result with specific bias and precision, the participants considered that the first two years would serve as a pilot to obtain data with which to estimate sample sizes to obtain desired ranges of bias and precision for years 3 and subsequent.

4 Technical Workshop Terms of Reference

1 Provide Overview of Need for Improved Commercial Data Collection system in the US Caribbean for use in Stock assessment evaluations and in providing accurate management advice.

2 Provide Technical Input for Optimal Data Collection system in US Caribbean.

a) Proposed systems for estimating effort,
b) Proposed systems for estimating and validation of catch,
c) Proposed systems for sampling catches for size (length),
d) Biological sampling (age, maturity, trophic studies).

3 Collection system in US Caribbean.

e) Proposed systems for estimating effort,
f) Proposed systems for estimating and validation of catch,
g) Proposed systems for sampling catches for size (length),
h) Biological Sampling (age, maturity, trophic studies).

4 Provide Technical Input for Proposed Database and IT Needs and Associated Cost Requirements to Improve the Commercial Data Collection system Components.

5 Provide Recommendations relating to Oversight and Monitoring required for long-term support of an optimal data collection system- governance/control structure.

5 Overview of Systems

The workshop began with Bob Trumble giving a brief summary of the workshop terms of reference (above) and the consensuses from the May 2009, November 2009 and January 2009 workshops. He highlighted the key purpose for and the primary components of a reliable data collection program for the US Caribbean region. First and foremost, the data collection program must support the implementation of annual catch limits (ACLs). Additionally, the data collection program must incorporate sufficient and timely data collection, adequate outreach and improvements to basic landings data, biological sampling information, catch per unit effort (CPUE) statistics and fishing location information, allow for program monitoring and evaluation on a routine and timely basis. More specifically, the new data collection program must support a standardized catch reporting form, incorporate methods for validating catch data and ensuring the timely submission of data, and be capable of producing estimates of catch for each region of Puerto Rico (East, West, North, South) and each of the US Virgin Islands (St. Croix and St. Thomas/St. John). The agreed upon strata were: gear (fishery), region (coast in Puerto Rico and island in the VI), time period (month). The previously agreed upon gear strata included trap, line (shelf, offshore, FAD), hand harvest (SCUBA, free dive), net (seine, trammel), troll, and mixed.

He presented the pros and cons of using a classical survey design for catch estimation versus using a model based catch estimator. Independent estimators from sampling theories are typically easier to understand, but violations of the sampling design are serious. On the other hand, model estimators are much more difficult to understand, but it is easier to deal with violations of assumptions. Additionally, models typically afford better results with the same amount of effort.

After the data collection system overview, short discussions of gridded maps for reporting catch location data, vessel counts for quantifying fishing effort (trips), catch validation surveys for ground-truthing logbook reports and nighttime sampling safety occurred. Later on in the meeting there was also a specific discussion of the USVI commercial catch reports (Puerto Rico's trip ticket forms are already finalized for the most part). Following these discussions, a much more detailed discussion of island specific costs and other specifics related to effort information collected via ground counts of vessels and vessel overflights, catch validation surveys, length sampling, and biological sampling occupied most of the rest of the meeting. The point was made during these cost discussions that existing data are insufficient to provide good bias and precision estimates for the recommended sampling amounts, and that the first two years would serve as a pilot to obtain data with which to estimate sample sizes to obtain desired ranges of bias and precision. The meeting ended with a discussion of database and IT needs, program oversight, monitoring and enforcement, and the related costs for each.

6 Maps, Vessel Counts, Catch Validation, Nighttime Safety, and USVI catch forms

Maps

The first discussion centered on using gridded maps for reporting vessel location of trip specific catches. Based on fishermen input, a set of maps was developed for each island, each on a 2.5 minute x 2.5 minute scale, in an attempt to maintain some continuity among islands and across the Caribbean region. The catch report forms will include 11"x17" size version for the fishers, and the fishermen's cooperatives (Puerto Rico) will have available much larger (e.g., 3'x3') versions to hang on the wall. There was some concern that not all fishermen agreed to report on such a fine scale, but those at the meeting were assured that the fishermen will have the option of reporting up to 4 of the 2.5 minute x 2.5 minute grid squares. Additionally, some concern was raised that fishermen will not know their exact location to such a fine scale, but they were assured that after consultation with fishermen, well known locations and buoys will be included on the map to aid with determining location fished. As well, training will be carried out by the fishery samplers. For example Puerto Rico DNER have indicated they will be visiting fishery cooperatives and holding meetings with the fishers to educate them about completing the catch form and identifying their fishing locations accurately on the maps.

Fishing Effort Surveys

During the discussion on vessel counts, it was pointed out that the data elements being requested of the fishers are not unique requests of Puerto Rico or the US Virgin Islands fishers; the types of information being requested (e.g., species specific catch, catch location, and fishing effort data) are routine data that fisheries managers need, and are simple compared to many regions' systems. However, the group acknowledged that this is a step-wise progression and improvements may happen a little at a time.

Catch Validation Surveys

Related to catch validation, there were more questions on the kind of data being collected, and meeting organizers clarified that we would only be collecting total catch weight by species and gear. There are no individual fish measurements involved in the catch validation component. The catch validation data will allow cross-referencing of sampler data and the fishery self-reported commercial catch reports and trip tickets. The data collection/interview process for these data is anticipated to be very fast, with most of the data collected via interview and only periodic validations of these estimates needed.

Sample Timing

As for nighttime sampling, the issues related to this are both safety and inconvenience. In both Puerto Rico and the USVI, it was agreed that sampling at night was unsafe and in general it was felt that due to the safety issue, nighttime sampling should not be recommended. Fishers would also resist sampling at night because of a desire to get home after fishing late and for safety. In order to deal with some of the issues related to nighttime sampling, fishermen must be notified ahead of time and arrangements made in order that their catch will be sampled first thing in the morning, eliminating the element of randomness.

USVI Commercial Catch Report Forms

The Puerto Rico trip ticket forms had been finalized by the time of the workshop, and work on the VI catch form has occurred, with up to seven different versions of the new USVI commercial catch report form being discussed thus far. At the workshop, three new versions were discussed. In general, the consensus was that Form 7 was the best format to date. It is an 8.5" x 13" single page form, providing for the reporting of landings from multiple gears (VI_FORM7_June03Ver.xlsx). A pilot study using the form was suggested, but the consensus was that everyone would rather see a final version of the catch form, as the booklets were due at the printers by June 1, 2010 to be ready for annual registration. The potential does exist for small adjustments annually. There is a critical implementation deadline of January 1, 2011 for the new forms, to allow for the collected data to match the ACL calendar year. The biggest concern with implementation by January (as opposed to June) is getting the forms out to the fishermen, since that is usually only done in June once a year at re-registration.

Some comments on the form included a request to color code the form by gear type and to add territorial boundaries to the fishing location maps. A clarification was also made that each trip requires its own form, but multiple gears fished during the same trip will be reported on the same form. In response to fishermen queries, management staff explained that they could expect the data collected via the new forms to effect change in ACLs within 3-5 years. Development of a data form for USVI continued following the workshop under the coordination of the SEFSC.

7 Catch Estimation Procedures

MRAG subcontracted with Dr. Mark Kaiser, a statistician at Iowa State University, who has worked with MRAG to conduct statistical analyses of observer data with the AFSC and NEFSC, to develop some analytical concepts for the data improvement program and to apply these concepts to help determine sample sizes for various aspects of the program. Dr. Kaiser produced a series of reports that provide options and examples of estimators for number of trips and for catch per trip and sample size estimates for the estimators (Appendix 1).

For estimating number of trips and estimating catch per trip, Dr. Kaiser provided advantages and disadvantages for a standard Horvitz-Thompson (sample-based) estimator and for a stochastic model-based estimator (Appendix 1.1). For planning purposes, the workshop participants agreed to set up the sampling program such that both estimators (stochastic model based, classical sample based) could be applied and compared.

Dr. Kaiser provided a simulation study conducted to gain some understanding of sample sizes that might be needed in estimation of the total number of fishing trips conducted off of the four coasts of Puerto Rico (Appendix 1.2). He also provided a discussion of the observation errors associated with the estimator (Appendix 1.3). The results of the simulation do not give exact answers, but provide a reasonable guide for determination of the sampling effort that would be necessary to estimate the number of trips with given levels of precision. This simulation focused on estimating number of trips by fishing center or group of centers, which required a higher number of samples than would be required to estimate trips by coastal area.

Dr. Kaiser provided an example of a Bayesian model-based catch estimator using USVI CCR records and snapper as an example (Appendix 1.4). He recommended the model-based estimator as a means of dealing with the large number of records with zero catch for a species (e.g., for catch-by-gear records, snapper occurred on a relatively small number of records) and a three-stage sampling thereof. The estimator would be used in conjunction with an estimated number of total trips (from the trips estimator component), a sample of trips on which gear types are observed and a sample of trips on which catch is observed. These samples may be the same, one may be a subset of the other, or they may be disjoint. The objective is to estimate total catch of a given species for the four regions of Puerto Rico and the regions of St. Thomas/St. John and St. Croix.

Subsequently, Dr. Kaiser brought together key aspects of the first four papers into advice for sample sizes for estimating number of trips and catch by trip (Appendix 1.5). The advice recognizes four conditions described by workshop participants for the estimates:

1. Stratification or sub-populations for Puerto Rico are to be considered at most the four coasts. In the Virgin Islands there is a desire to consider the fisheries of St. Thomas/St. John and St. Croix separately. This results in three "populations", one (Puerto Rico) with potentially four sub-populations.
2. Sampling for number of trips is to be conducted by air flights and a program for ground verification. All coasts of Puerto Rico are to be sampled on the same day, as are the entire fisheries of St. Thomas/St. John and St. Croix.
3. Catch composition will be conducted by port samplers in all three populations. A potential difficulty in both Puerto Rico and the Virgin Islands is sampling catch landed during the night due to safety concerns. Catch from trips landing during the night will be sampled the next morning using notification of fishers to be included as they leave in the early evening.
4. Gear type is a major factor in catch composition and must be taken into account in estimation of catch.

Given this background, Dr. Kaiser recommended minimum sampling levels of 50-75 overflights per year and 50-75 ground counts per year per coastal region of PR or island of USVI, or 200-300 ground counts for PR and 100-150 for USVI. For catch validation surveys, Dr. Kaiser recommended a minimum of 500-750 surveys per year per region, or 2000-3000 for PR and 1000-1500 for USVI. Dr. Kaiser's results also provided some information on the expected level of uncertainty around the associated parameter of interest. This level (or range) in uncertainty can be used and evaluated by managers in setting the required number of samples for the various components of the sample design (e.g, trip estimate survey, ground counts, overflights, catch validation survey). These ranges of uncertainty are further discussed in relation to sample sizes, amount of expected bias, and costs to sample in the following sections.

8 Puerto Rico Costing Discussions

8.1 Aerial Surveys for estimation of fishing effort (trips) by coast, month

Puerto Rico (DNER) has available a department plane than can be reserved for flights over the shelf, but a private plane would need to be chartered to capture offshore effort. The Department plane may not be available to meet the schedules required for the overflights. For inshore shelf effort, it is expected that a complete survey can be accomplished in 8 hours of flight time, whereas the offshore effort will

require an additional 20 hours. Because of the extra costs of the offshore survey, workshop participants agreed to remove the offshore overflights from the calculations at this time.

Overall, the PR shelf flights were estimated to cost a minimum of $4,000 per survey, with a minimum of 50 surveys needed per year. A sample size of 50 surveys per year (stratified over month, coast) would generally result in an expected bias in the estimate of total fishing trips (i.e., effort) of plus or minus 20%-30% (but up to +-40-50% in some cases). In addition, a $4,500 quality control and analysis cost would produce a minimum total cost of $204,500 for aerial surveys in Puerto Rico (Table 1). Increasing the number of overflights to 75 would increase the cost to $306,750. In order to offset these costs, a randomized transect design could be used instead of complete coverage.

8.2 Ground Surveys for estimation of fishing effort (trips) by coast

The workshop participants next discussed the cost of ground surveys in Puerto Rico, and the summary of the costs are reported here. In each of the four separate areas (west, north, east, and south), a minimum of 50 trips are required annually, costing $20 per hour per person plus $20 per trip for travel and expenses.

On the west coast, four single person "teams" would each spend 4 hours per ground count sample trip for an annual total of $20,000. On the north coast, six single person "teams" would each spend 4 hours per sample trip for an annual total of $30,000. On the eastern islands (Vieques and Culebra), two single person "teams" would each spend 2 hours per sample trip for an annual total of $6,000. On the east coast mainland, three single person "teams" would each spend 4 hours per sample trip for an annual total of $15,000. On the south coast, six single person "teams" would each spend 4 hours per sample trip for an annual total of $30,000. In each region, there is also an addition $6,250 quality control and analysis, to make the overall annual PR ground survey total of $126,000 (Table 1). Increasing the number of surveys to 75 per region would increase the cost to $189,000.

8.3 Catch Validation

For catch validation in Puerto Rico, participants determined that a minimum of 500 randomly taken catch samples (total weight by species) were needed annually in each region (west, east, south, north), distributed over varying days and time. Estimator performance was similar for both the survey model and Bayes' model; both were able to estimate catch within 10% of true catch. In addition, the need to ensure that the samples be taken randomly was discussed and it was noted that departures from random sampling could introduce substantial biases in the estimate of catch for both the classical and the stochastic catch estimators.

It was noted that obtaining 500 samples may be unattainable on the North coast as fishing effort is much lower. The cost per sample on the south, east and west coasts is $120, and the unit cost per sample in the north is $160. Fewer people are needed for sampling in the north, but due to the large area that they have to cover, the time input per sample is far greater. In each region, there is also an additional$6,250 quality control and analysis to make the overall annual catch validation survey total of $285,000 (Table 1). Increasing the number of samples to 750 would increase the cost to $427,500.

8.4 Enhanced Length Sampling Surveys

For length sampling in Puerto Rico, Todd Gedamke presented the results of the Hudy-Berkson-Gedamke simulations that showed an estimated 30,000 lengths are needed annually if the samples are appropriately distributed in time and space: 1,000-1,800 per species for 15-20 primary species. However, for most species, even just 100 lengths per year will give reasonable results to start. The consensus of the workshop participants was that we would try to sample 1,200 trips in Puerto Rico each year. To do this, we would need 8 full time contract personnel making four teams; each team could intercept 2 vessel trips per day for a total of $344,000. There will also be some equipment (electronic measuring boards) and quality control and analysis needs to bring the overall sampling total to $394,000 per year (Table 1). In the future the number of lengths could go down, but for the first 2-3 years the number of lengths needs to be high to ensure accurate data collection.

8.5 Biological Surveys: Maturity Samples, Aging (including conch), Stomach contents

In order to gather maturity data in Puerto Rico, a monthly goal of 5 fish per species per 5 cm length interval (total of eight intervals) was set, for a total of 480 maturity samples per species per year, distributed around the entire island. Initially, samplers would rely on samples that they are already taking from landed catch, but some special projects may need to be added to access the populations below minimum size. A starting goal of 4 species and a cost of $16 per fish (processing) makes the total processing cost Puerto Rico maturity total $30,720 and extraction add another $4,320.

Participants recommended collecting 100 otoliths from each of four species as a feasibility study, at an estimated cost of $37,306 for purchasing and processing the otoliths. The ageing of conch was also discussed, as there is no accepted method available. In Puerto Rico, 1,000 samples of whole conch per year are desired for this purpose. The total cost for Puerto Rico will be $34,500 (Table 1), including the purchase and processing of the animals, and cost of distributing coolers, picking up the animals.

9 USVI Costing Discussions

9.1 Aerial Surveys for estimation of fishing effort (trips) by coast, month

For inshore shelf effort, a full survey can be accomplished in 4 hours of flight time, whereas the offshore effort will require 10 hours. Because of the extra costs of the offshore survey, workshop participants agreed to remove the offshore overflights from the calculations at this time.

Overall, the USVI shelf flights were estimated to cost $2,000 per survey, with a minimum of 50 surveys needed per year, plus an annual $4,500 quality control and analysis cost, for a total of $104,500 (Table 1). A sample size of 50 surveys per year (stratified over month, coast) would generally result in an expected bias in the estimate of total fishing trip (*i.e.*, effort) of plus or minus 20%-30% (but up to plus or minus 40-50% in some cases). Increasing the number of overflights to 75 would increase the cost to $156,750. In order to offset these costs, a randomized transect design could be used instead of full coverage.

9.2 Ground Surveys for estimation of fishing effort (trips) by island and month

The workshop participants next discussed the cost of ground surveys in the USVI, and the summary of the costs are reported here. On each of the two regions (St. Thomas-St. John and St. Croix), a minimum of 50 trips are required annually, costing $50 per hour plus 50% overhead per trip for travel and expenses.

On each region, two single person "teams" would each spend 3 hours per sample trip for an annual total of $22,500. On each region, there is also an addition $6,250 quality control and analysts, to make the overall annual USVI ground survey total of $57,500 (Table 1). Increasing the number of trips to 75 per region would increase the cost to $86,250.

9.3 Catch Validation Surveys

For catch validation in the USVI, participants determined that 500 catch samples randomly taken catch (weight by species) were needed annually for each region, distributed over varying days and time. The cost per sample is $225. For each region, there is also an addition $6,250 quality control and analysis, to make the overall annual catch validation survey total of $237,500 (Table 1). Increasing the number of catch samples to 750 would increase the cost to $356,250. A critical element in achieving accuracy in estimation of total catch hinges on the ability to achieve random catch sampling in time, space, and across all gears.

Estimator performance was similar for both survey model and Bayes' catch estimator models, both were able to estimate catch within 10% of true catch. In addition, the need to ensure that the samples be taken randomly was discussed and it was noted that departures fromrandom sampling could introduce substantial biases in the estimate of catch for both the classical and the stochastic catch estimators.

Some additional comments from the workshop highlighted the fact that it remains to be determined whether survey teams will be full time or contract employees, and who will do the hiring. Additionally, the USVI has to abide by union regulations, so costs may be higher if there is a lot of overtime pay. A commitment on the part of the USVI was requested, in the form of quickly filling current open positions.

9.4 Enhanced Length Sampling Surveys

The number of length samples needed in the USVI was not determined during the workshop, and is a task that is being finalized during summer and fall2010. There was some question whether the territory fisheries agency could handle the type of sampling intensity suggested for Puerto Rico, as fishing effort is quite a bit lower. The USVI has not provided an estimate of the number of samples or cost for length sampling. As such, costing for length sampling was not finalized, but $200,000 was used as a placeholder estimate (Table 1). Additionally, the islands will each need to purchase 6 electronic measuring boards (12 total), for a total of $60,000.

Workshop participants attempted to identify the best sample design for obtaining fish lengths. It was acknowledged that the best way would be to sample a small number of fish from each boat, but to randomly intercept a large number of trips. As an exercise, participants attempted to list the number of each species caught in a typical trip by each gear type for each of the islands, but this proved difficult,

especially with confusion from different local species names. Additionally, randomly sub-sampling from a catch is very difficult (if not impossible), so instead of randomly sampling 100-200 fish, samplers will have to census sample 100-200 trips, though the actual number of trips necessary will actually be less because the information obtained on a per trip basis is superior than what would be obtained if many samples of a single or only a few individuals (<than 3) were sampled, even if there is a cluster effect. It is important to remember that sampled trips will have to be spread out spatially and temporally.

9.5 Biological Sampling for Maturity Samples (including conch)

In order to gather maturity data in the USVI, a monthly goal of 5 fish per species per 5 cm length interval (total of eight intervals) was set, for a total of 480 maturity samples per species per year, distributed around each island. Initially, samplers would rely on samples that they are already taking from landed catch, but some special projects may need to be added to access the populations below minimum size. A starting goal of 4 species and a cost of $24 per fish makes the USVI maturity total $92,160 ($46,080 per region). Shipping, processing and extraction add another $37,560. Otolith samples may also be taken, but just for a feasibility study, the cost of purchasing and processing the otoliths is estimated at $40,506 (Table 1).

The ageing of conch was also discussed, as there is not yet an accurate method. In the USVI, 1,000 samples of whole conch per year are desired for this purpose. These samples will only be taken in St. Croix, as St. Thomas has no conch fishery. The total cost for St. Croix will be $34,500 (Table 1), including the purchase and processing of the animals, and cost of distributing coolers, picking up the animals and reporting.

10 Recommendations for Database and IT Needs

The discussion of database and IT needs was very specific, so an overall summary and list of the types of needs is given here, along with the overall cost for various components. For more specific costs by line item, please see the accompanying Excel workbook entitled “Total Costs”.

The Southeast Fisheries Science Center will provide the overall software system and the data entry programs for the catch validation, ground and aerial surveys. SEFSC will house the systems in Miami, and the systems will be accessible by PR and USVI personnel remotely via the internet. Both the PR trip ticket and USVI CCR database and entry systems will need to be designed and implemented by the end of 2010 because the redesigned catch forms are scheduled to go into effect January 1, 2011. For hardware and infrastructure needs, T1 lines will need to be installed or hooked up in all locations with the exception of Mayaguez and San Juan PR. Additional computers are necessary around the islands for data entry, and personnel for performing data entry are necessary. Scanning equipment will be required to make electronic records of all the catch forms. The PR FRL, the USVI DFW, and the SEFSC will need permanent staff to monitor quota and coordinate IT reporting, and to perform training, management and analysis, at 3 FTE, 2 FTE, and 1.5 FTE, respectively.

When all the individual cost components were compiled, the total for IT support and local staff was $515,500; the total for SEFSC staff was $162,000; the training, management and analysis total was $371,000 for a Database and IT total of $1,048,500 (Table 1).

11 Recommendations for Management and Analysis, Program Oversight, Monitoring and Enforcement

Puerto Rico and the USVI would need fulltime coordination of the overall sampling programs: one person for each of the four coasts of Puerto Rico and one each for St. Thomas-St. John and St. Croix. Together, these coordinators would cost $350,000.

To provide program oversight and monitoring, workshop participants have suggested two major groups: a regional steering committee and two sub-regional steering committees (one in PR and one in the USVI). The regional committee will meet once per year to provide high level oversight, plan overall projects and review overall program performance. The workshop participants suggested that the regional steering committee meet in a half-day format in conjunction with and just prior to a Caribbean Council meeting. We recommend sub regional committees for each or Puerto Rico and the USVI. The sub-committees will each meet once per year on their respective islands, and come together once per year for a joint meeting to review specific science and management tasks. The sub-regional committee members reviewing the science tasks will provide oversight in the form of working groups on catch validation, effort and biological sampling while the management-focused committee members will monitor the ACLs. The regional committee will report directly to the Council, while the results of the sub-committee meetings will go to the Scientific and Statistical Committee (SSC) who in turn will report to the Council. For the first couple of years, more meetings might be necessary to make sure that everything is working properly. We budgeted the regional steering committee as 20% of the cost of a Caribbean Council meeting, the joint sub-committees as the cost of an SSC meeting, and the individual sub-committee meetings at half the cost of an SSC meeting. A full-time coordinator will be required to keep track of the working groups and budgets and schedule meetings and travel. In total the oversight and monitoring would cost $132,500.

Enforcement was discussed along with program oversight, and it was determined that in order to be effective, it must be island specific and involve both local and federal agents. The USVI has requested three agents per region for a total of six agents. Puerto Rico has estimated that they need four additional agents. The NMFS Office of Law Enforcement (OLE) will also need to add two full time federal agents, one each in PR and the USVI. With costs of officers, gear, maintenance, and fuel, the enforcement costs total $870,000 (Table 1).

12 Summary

As a whole, the total cost for the ideal program amounts to approximately 4 million dollars for the lower level (base) and 4.5 million dollars for the higher level (expanded) of vessel count and catch validation surveys (Table 1).

Table 1: Total summary costs for the first year of the overall US Caribbean commercial data improvement project; Federal costs apportioned to either PR or USVI.

Component Model	Cost Item	Puerto Rico (base)	US Virgin Islands (base)	Puerto Rico (expanded)	US Virgin Islands (expanded)
Biological	Aerial Survey (shelf only)	$204,500	$104,500	$306,750	$156,750
	Ground Survey	$126,000	$57,500	$189,000	$86,250
	Catch Validation Survey	$285,000	$237,500	$427,500	$356,250
	Length Survey	$424,000	$260,000	$424,000	$260,000
	Maturity Sampling	$111,846	$204,726	$111,846	$204,726
	Subtotal I: Biological	**$1,151,346**	**$864,226**	**$1,459,096**	**$1,063,976**
Data	Database and IT Support, Database Training	$1,151,346	$341,500	$357,000	$341,500
	Subtotal II: Data and IT	**$1,151,346**	**$341,500**	**$357,000**	**$341,500**
Management and Enforcement	Management and Analysis Program Oversight, Monitoring and Enforcement	$661,250	$691,250	$661,250	$691,250
	Subtotal III: Management & Enforcement	**$661,250**	**$691,250**	**$661,250**	**$691,250**
Totals	**Subtotals I, II, II**	**$2,963,942**	**$1,896,976**	**$2,477,346**	**$2,096,726**
	Program Total	**$4,066,572**		**$4,574,072**	