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MEMORANDUM FOR: Roy E. Crabtree, Ph.D.
Regional Administrator

FROM: Bonnie J. Ponwith, Ph.D.
Director, Southeast Fisheries Science Center

SUBJECT: SEFC Determination of the Reasons for ACL Overages for Caribbean Fisheries - Impacts of Enhanced Reporting on 2012-2014 Commercial Landings in the US Virgin Islands and Puerto Rico

As requested in your memo dated November 20, 2015, the Southeast Fisheries Science Center investigated the causes that may have contributed to ACL overages in the US Virgin Islands and Puerto Rico commercial fisheries as calculated on November 4, 2015, using mean landings for the period 2012-2014. The investigation included the possibility of increases in landings or enhanced reporting as a result of new requirements for species-specific reporting on the commercial fishing report forms. SEFSC staff also attended the December 8-10 SSC meeting in San Juan, PR where this issue was discussed. The results of our analysis are as follows:

Virgin Island ACLs

In the US Virgin Islands the angelfish, squirrelfish, and wrasse FMUs exceeded the established ACLs. Following examination of commercial reporting forms each overage was attributed to improved data collection (Table 1). None of the angelfish, squirrelfish, or wrasse species were present on the St. Croix or St. Thomas/St. John commercial logbook reporting forms during the benchmark years for ACL calculation. Angelfish and squirrelfish species reporting requirements were added to the St. Croix and St. Thomas/St. John commercial logbook forms in July, 2011. Those additions represent improvement in the collection of angelfish and squirrelfish data. Wrasses, however, have not been added to commercial logbook forms in the US Virgin Islands. The increase in wrasse landings is likely due to a minor improvement in data collection through more frequent write-in reporting of this species group by fishers.

Table 1. Average annual commercial landings relative to ACLs for St. Croix and St. Thomas/St. John species groups with ACL overages and the reason for overage.

Species or Species Group	Average Annual Landings (pounds)	Years Used	ACL (pounds)	ACL Overage (pounds)	Reason for Overage
St. Croix Angelfish	9,515	2012-2014	305	9,210	Improved reporting
St. Croix Squirrelfish	458	2012-2014	121	337	Improved reporting
St. Croix Wrasses	9	2012-2014	7	2	Improved reporting
St. Thomas/St. John Angelfish	17,563	2012-2014	7,897	9,666	Improved reporting
St. Thomas/St. John Squirrelfish	9,401	2012-2014	4,241	5,160	Improved reporting
St. Thomas/St. John Wrasses	2,117	2012-2014	585	1,532	Improved reporting

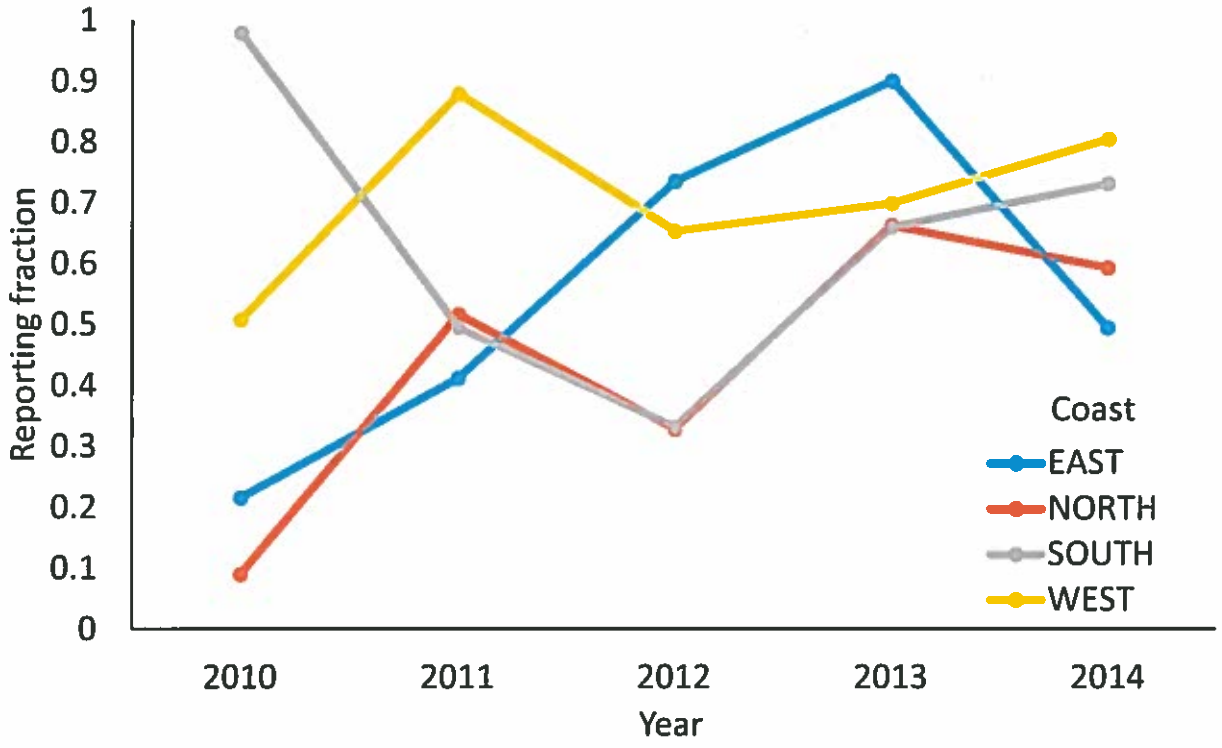
Puerto Rican ACL Overages

The possible reasons for ACL overages in the Puerto Rico parrotfish unit, snapper unit 2, spiny lobster, triggerfish and filefish, and wrasses FMUs were examined by investigating changes in reporting fractions (also called correction factors or expansion factors), the effects on mean landings due to recent edits and corrections of the Puerto Rico commercial landings data set, and the effect of those same data edits on ACL calculations. Commercial landings in Puerto Rico are known to be incompletely reported and so, reporting fractions or the fraction of landings reported, are used to estimate total landings from reported landings.

Impacts from Reporting Fractions

Reporting fractions by coasts for the years 2010-2014 are provided by Puerto Rico DNER as shown in Figure 1. The graph shows a lot of variability in reporting fractions but indicates a general increase since 2010. The use of reporting fractions is designed to provide more accurate landings data by correcting for non-reporting fishers. The methods for calculating the year and coast specific reporting fractions, as well as the calculation of total landings, have not changed since 2007. The SEFSC is not aware of any change in 2014 that would result in landings calculations that are not consistent with the methods in use since 2007. Calculation of reporting fractions and the implementation of surveys necessary collect data for estimating reporting fractions are conducted by Puerto Rico DNER.

Figure 1. *Puerto Rico reporting fractions by year and coast.*



Effect of Data Editing on Mean Landings

During 2015, the Puerto Rico commercial landings data set was edited to: eliminate duplicate records, correct data processing errors in fishing center assignments to coast, and properly associate gear with fishing trips. Removal of duplicate records and correct assignment of fishing center to coast could result in differences in landings totals compared to summaries of the unedited data. The SEFSC found only a few duplicate records. Since reporting fractions are calculated from and are applied to specific coasts, re-assignment of records to the correct fishing centers is expected to heavily affect the landings in those places. The recent data edits, however, resulted in very minor changes in mean landings calculated for the period 2012-2014 (Table 2) and do not explain the reported ACL overages found in the 2012-2014 mean landings.

Effect of Data Editing on ACLs

As noted above, the effects of data corrections and edits on ACL calculation was examined by recalculating all ACLs that had been established using Puerto Rico commercial landings data (Table 3) and the difference between each recalculated ACL and the corresponding existing ACL was determined. Mean landings for the period 2012-2014 were also calculated and compared with the recalculated ACLs. Grouper and snapper ACLs were higher when recalculated using the edited landings data, however, the differences were less than 3.5% in all cases. Snapper unit 2 for the 2012-2014 mean landings exceeded the recalculated ACL.

Table 2. Effect of data editing on ACL overage calculation compared to existing ACLs for Puerto Rico species with mean 2012-14 calculated total landings exceeding established ACLs. Summary includes the 2012-2014 mean pounds landed as calculated from unedited and edited data, percentage of each ACL using the 2012-2014 means calculated from unedited and edited data, and the differences in the mean 2012-2014 pounds landed and percent of ACLs resulting from edited data minus the unedited data. ACLs are in pounds. Means were calculated using calculated total landings in pounds.

ACL unit	Existing ACL	2012-14 mean pounds landed from unedited data	2012-14 mean pounds landed from edited data	Difference 2012-14 mean pounds	Percent of ACL (mean) using unedited data	Percent of ACL (mean) using edited data	Difference Percent of ACL (mean)
PARROTFISH UNIT	52,737	54,182	54,207	25	102.7	102.8	0.05
SNAPPER UNIT 2	145,916	155,529	155,662	133	106.6	106.7	0.09
SPINY LOBSTER	327,920	345,665	345,747	82	105.4	105.4	0.02
TRIGGERFISHES AND FILEFISHES	58,475	70,807	70,868	61	121.1	121.2	0.1
WRASSES	54,147	59,150	59,146	-4	109.2	109.2	-0.01

Recalculated ACLs for all other FMUs were lower than the original ACLs except for porgies and wrasses. It was in only two ACL units that the recalculated ACL differ from the existing ACL by more than approximately one percent. The recalculated ACL for jacks was five percent lower than the existing ACL but the recalculated ACL for wrasses was either 2.8% or 26% higher than the existing ACL depending on the species included (see below). The 2012-2014 mean landings of spiny lobster and triggerfish and filefish (calculated using edited data) exceeded the recalculated ACLs.

The results of these calculations demonstrate that most of the ACL units identified by SERO as exceeding the established Puerto Rico commercial fishery ACL would also have exceeded ACLs calculated using the edited Puerto Rico commercial fishery landings data. The degree to which the ACL was exceeded differed slightly between the recalculated ACL and the existing ACL.

When recalculating the ACL for wrasses, it was noted that the existing ACL for wrasses appears to have been calculated without Spanish hogfish (calculated using only hogfish and puddingwife landings). This resulted in an observed overage when comparing the existing ACL to the 2012-2014 mean landings for all species in the wrasses FMU (Table 3). The recalculated ACL for wrasses, using landings data from all species in the wrasses FMU was higher than the wrasses mean commercial landings during 2012-2014 (i.e., the ACL was not exceeded).

Table 3. *Comparison of existing Puerto Rico ACLs and recalculated Puerto Rico ACLs using edited data for those ACLs. Top section: ACLs calculated using mean landings 1999-2005, except as noted. Bottom section: ACLs calculated using median landings 1988-2009, except as noted. Negative numbers and percentages in the "difference" columns indicate the existing ACLs were higher than the recalculated ACLs. ACLs are in pounds. Means and medians were calculated using total landings (fraction reporting factors applied) in pounds. ACL overages are highlighted.*

ACL unit	Average landings (1999-2005)	Uncertainty factor	Recalculated ACL using edited data (average landings*uncertainty factor)	Existing ACL in pounds	Difference (edited data ACL - existing ACL)	Percent difference	Average landings (2012-2014) calculated from edited data	Percent of recalculated ACL[1]	Percent of existing ACL
GROUPERS	210,594	0.85	179,005	177,513	1,492	0.84	60,371	33.7	34.0
QUEEN CONCH	407,712	1	n/a	0	n/a	n/a	n/a	n/a	n/a
SNAPPER UNIT 1	340,727	0.85	289,618	284,685	4,933	1.73	185,504	64.1	65.2
SNAPPER UNIT 2	177,422	0.85	150,809	145,916	4,893	3.35	155,662	103.2	106.7
SNAPPER UNIT 3	409,309	0.85	347,913	345,775	2,138	0.62	176,655	50.8	51.1
SNAPPER UNIT 4	441,319	0.85	375,121	373,295	1,826	0.49	177,422	47.3	47.5
PARROTFISH UNIT*				52,737			54,207	102.8	102.8
ACL unit	**Median landings (1988-2009)**	**Uncertainty factor**	**Recalculated ACL using edited data (median*uncertainty factor)**	**Existing ACL in pounds**	**Difference (edited data ACL-existing ACL)**	**Percent difference**	**Average landings (2012-2014) calculated from edited data**	**Percent of recalculated ACL[1]**	**Percent of existing ACL**
BOXFISHES	95,507	0.9	85,956	86,115	-159	-0.18	40,926	47.6	47.5
GOATFISHES	19,403	0.9	17,462	17,565	-103	-0.58	8,292	47.5	47.2
GRUNTS	200,555	0.9	180,500	182,396	-1,896	-1.04	27,376	15.2	15.0
JACKS	90,782	0.9	81,704	86,059	-4,355	-5.06	41,398	50.7	48.1
PORGIES	27,567	0.9	24,811	24,739	7	0	23,113	93.2	93.4
SPINY LOBSTER	363,256	0.9	326,930	327,920	-990	-0.3	345,747	105.8	105.4

Table 3. Continued

ACL unit	Median landings (1988-2009)	Uncertainty factor	Recalculated ACL using edited data (median*uncertainty factor)	Existing ACL in pounds	Difference (edited data ACL-existing ACL)	Percent difference	Average landings (2012-2014) calculated from edited data	Percent of recalculated ACL[1]	Percent of existing ACL
SQUIRRELFISHES	18,408	0.9	16,567	16,663	-96	-0.57	6,939	41.9	41.6
TRIGGERFISHES AND FILEFISHES	64,325	0.9	57,893	58,475	-582	-1	70,868	122.4	121.2
WRASSES	75,812	0.9	68,231	54,147	14,084	26.01	59,146	86.7	109.2
Wrasses (Spanish hogfish excluded)**	61,840	0.9	55,656	54,147	1,509	2.79	59,146	106.3	109.2
ANGELFISH*				8,984			0	0	0
SURGEONFISH*				7,179			22	0.3	0.3
TILEFISH*[2]				14,642			0	0	0

*ACL not based upon landings, but set by other SSC decision
**Spanish hogfish landings apparently not included in original ACL calculation, see text
[1]Percent of ACLs for parrotfish, angelfish, surgeonfish, and tilefish calculated using existing ACLs
[2]Tilefish ACL is US Caribbean-wide

Reason for Overages in Puerto Rico

None of the analyses prepared by the SEFSC support the notion that the ACL overages in Puerto Rico for the parrotfish unit, snapper unit 2, spiny lobster, triggerfish and filefish, and wrasses FMUs were a result of improved reporting. Rather, they appear to be the result of increased landings. However, the overage for wrasses may be the result of calculating the ACL without using the landings for all species in the FMU during benchmark years. ACLs set in 2010 were established using mean while ACLs set in 2011 used the median landings. Precautionary reductions of 10-25 percent from those means and medians were also applied. Therefore, ACLs are exceeded periodically. By definition, setting an ACL using median landings suggests that future median (and possibly mean) landings will exceed the ACL in equal frequency as landings below the ACL. This will be the case even if precautionary reductions to account for management and scientific uncertainties were not applied as long as fishing behavior and catch rates remain constant. ACLs established using mean landings might also be exceeded in approximately half of all future years provided aberrantly high landings were not observed during one or a small number of the ACL benchmark years.

Conclusions

The SEFSC believes the ACLs for the US Virgin Islands' angelfish, squirrelfish, and wrasse FMUs were exceeded due to improved data collection. This is the direct result of the addition of these species to the reporting forms currently in use in the USVI or, in the case of wrasses, more frequent write-ins for that species on the reporting forms.

On the other hand, the ACL overages in the Puerto Rico parrotfish unit, snapper unit 2, spiny lobster, triggerfish and filefish, and wrasses FMUs appear to be the result of increased landings. Although there may have been improvements in compliance with reporting requirements for Puerto Rico, this improvement is already incorporated in the reporting fractions (i.e., as a higher fraction of pounds reported) resulting in a lower estimate of the number of pounds not reported. This means fewer unreported pounds are added to the reported pounds to obtain the estimated total landings. In addition, the SEFSC also reviewed impacts resulting from edits to the data and determined that the overages would still have occurred since the data edits resulted in only minor changes for those species with overages.

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