

*Quality Assessment Toolkit for analysis of the 2021 Systematic Data Collection of
Recreational fisheries in Azores (ICES area X) – sampling schemes
Elasmobranchs_Azores_off-site surveys and HighlyMigratorySpp_Azores_off-site
surveys.*

DESIGN			
Question		Answer	Comments (including magnitude and direction of bias)
Target population	Are all sectors contribution to the total catch, harvest or release well-known and documented?	Yes	The target population is recreational boats, spearfishing, and touristic fishing (charter boats).
	Is there illegal/tourist fishery, which is not accounted for?	No	The sampling method ensures that all fishing modes within the scope of this Pilot Survey are adequately covered.
	Are there elements of the target population that are not accessible?	No (but see notes)	Shore angling and hand collecting were not covered but did not catch the target species, thus are outside the scope of the survey. Some target population elements are not fully accessible through license system surveys (tourists) since they are identified in the study. Still, there is no specific survey for fishing effort and target species. A follow-up survey aimed at collecting data on tourist fishers started in 2022.
Target frame	Is the PSU identified and documented?	Yes	The off-site methodology presents a Direct frame of individual elements of the target population.
	Does the sampling frame fully cover the target population?	Yes (but see notes)	Some underrepresentation could occur for non-residents (tourists) since they are identified in the license system survey, but there are no specific surveys for fishing effort and target species.
	Are there elements of the target population that are excluded from the frame (e.g.	No (see notes)	Some underrepresentation could occur for non-residents

	non-residents, private access sites)?		(tourists) – see comments above.
Stratification	Are the strata well defined, known in advance and stable?	Yes	The frame population (license holders) was divided into subpopulations strata (fishing mode, island, year)
	Is there an overstratification leading to excessive imputation?	No	The applied stratification was implemented to ensure higher homogeneity in each stratum while maintaining strata with a minimum number of individuals – to reduce the likelihood of imputation.
Selection	Is sampling probability based (e.g. stratified random with spatial strata, PPS)?	Not applicable	All license holders are asked to fill the questionnaires while the license is issued
IMPLEMENTATION			
QUESTION		Answer	Comments (including magnitude and direction of bias)
Selection	Has the survey been designed to maximize precision?	Yes	
	Are there protocols in place and have they been followed for subsamples (selection of individuals, times, boats, biological samples)?	Yes	There are protocols
	Are the right sites, times, respondents, biological data sampled?	Yes	
	Is there a language barrier (tourist fishery)?	Yes	A follow-up survey, explicitly aimed at collecting data on tourist fishers was implemented in 2022.
	Is there a preference not to engage with illegal fishers (e.g. threatening behavior)?	Not applicable	Does not apply due to the nature of the survey. With an off-site survey, all sampling is in the frame. As long as they hold a fishing license, they have the same likelihood of being covered by the survey. The survey cannot anticipate whether this type of anglers will be more likely to engage in the survey, but they are not excluded. Besides, non-licensed fishers are not included. The available estimates suggest that this group is negligible.

	Has the assignment been completed?	Yes	
Nonresponse	Are response rates recorded and evaluated?	Yes	
	Are refusal rates (e.g. according to spatial issues, fishing in MPAs or fishing for high value species) recorded and evaluated?	No	The follow-up survey implemented in 2022 will also consider the reasons behind refusals.
	Have you re-evaluated refusals?	No	The follow-up survey implemented in 2022 will allow the re-evaluation of refusals.
	Have you accounted for not completed assignments (unobserved sample bias)?	Not applicable	After initiating the survey, respondents must fill it until the end
Recall	Is the recall period appropriate?	Yes	The catch and effort from the logbook was imputed due to the recall bias from the 12-month recall survey embedded in the recreational fishing license system.
	Does recall period match fishing season?	Yes	The recall period is all year round since it is dependent on the month that the angler is licensed.
Effort	Is effort well defined (unit, fishing mode, target species, location) and related to CPUE measures?	Yes	
	Is the concept of effort understood by respondents?	Yes	
	Is it possible to record incorrect fishing areas?	No	Until 2019 the fishing area identified was island level. In 2020 it was changed to parish level in a scroll-down list. The respondents know well the parish limits.
Catch	Is catch verified by surveyors (e.g. all filleted, don't show)?	Not applicable	The license system survey is based on a 12-month recall inquiry; the catch is not available for surveyors.
	Is species identification and naming reliable?	Yes (see notes)	In general, yes. However, some few taxa are given at genera level while occasionally some common names bring some difficulty. A

			s esquemas scroll-down species list was not possible to implement due to informatics limitations.
	Is there a clear division between fish kept and fish released?	No	The 12-month survey only records the retained fish. The logbook survey also recorded the released fish, but the assessment is not possible yet.
	Are there any high-valued/threatened species taken in the fishery that might be unreported?	Yes	There are some species as <i>Palinurus elephas</i> , <i>Scyllarides latus</i> , <i>Epinephelus marginatus</i> potentially can be unreported related to high level of protection and fishers specialization.
	Is there a digit preference in the reports?	Yes	Digit bias occurs in the 12-month survey. However, the data imputation from the panel decrease this type of bias.

ANALYSIS

	QUESTION	ANSWER	COMMENTS (INCLUDING MAGNITUDE AND DIRECTION OF BIAS)
General	Does the estimation procedure follow the survey design?	Yes	
	Has imputation been used to account for missing observations and, if so, is the procedure documented?	No	Fishers that failed to submit fishing trips in any month of the time period of 12 months were excluded.
	Has the precision of estimates been calculated and, if yes, where are the documented?	No	The precision was calculated based on van der Hammen et al., 2016. The document is being prepared.
	Has there been weighting to correct for nonresponses/avidity bias	No	Non-response bias will be corrected after implementing the follow-up survey during 2022.
	In panel surveys, have those seleted changed their fishing pattern or activity?	Not applicable	The panel surveys will derive from logbook surveys.
	Is the bias caused by drop-outs and drop-ins in a panel corrected for?	Not applicable	The panel surveys will derive from logbook surveys.

WGRFS ASSESSMENT OF SURVEY

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